Subject: EASA Operations Rulemaking

File: EASA
Reported by: Ray Rohr

Summary:

The OPS.001 Rulemaking Group met on Feb. 13 & 15 review progress in the sub-groups and open issues. The minutes of that meeting are linked to this report.

At its fifth meeting of the Non-Commercial Operations with Complex Motor-Powered Aircraft Sub-Group reviewed the following working papers that addressed the requirements and AMC/GM material, and agreed on proposed revisions:
- General Rules for Operations Manuals,
- Mass and Balance,
- Security Programs, and
- Fatigue Countermeasures.

The linked copies of the working papers reflect the proposed revisions. These Items should be finalized at the next meeting.

The Sub-group also reviewed a discussion paper on Conditions and Procedures Related to Declarations. A number of issues were identified that require further work. This is a key issue will be further addressed at the next meeting.

The Sub-group reviewed cross reference lists from the proposed modernization of Annex 6 Part II to identify any additional issues that needed to be addressed and CFR Part 91K to discuss how there rules could be used in the development of PART OPS 2.

The Sub-Group was advised that their request to augment their expertise by the addition of a member with expertise in managing a corporate flight department and with hands on SMS experience plus a person with fractional ownership operations experience was in process.

A copy of the draft meeting minutes of the Sub-group meeting is linked to this report.

The next OPS.001 and Non-Commercial Operations meetings are on March 13 - 15.

Implication for Business Aviation:

This is a very important ongoing project with a number of issues that must be resolved. Fortunately progress to date has been positive.

Decisions Required:

Nil at this time.
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European Aviation Safety Agency

TASK OPS.001 RULEMAKING GROUP

MEETING MINUTES OF

13 FEBRUARY 2007, 08.30 H – 10.00 H
15 FEBRUARY 2007, 09.00 H – 15:00 H
EASA PREMISES, COLOGNE

13 February 2007 Pre-briefing

Attendees:
Thierry Allain (TAL), DGAC France
Ragnar Boge (RBO), CAA Sweden
Douglas Carr (DCA), GAMA
Inger-Helene Enger (IHE), ETF
Michel Gaubert (MGA), Eurocopter
Pekka Henttu (PHE), AEA
Louis Hucher (LHU), Dassault
Mario Moura (MMO), INAC Portugal
Jacob T. Pedersen (JTP), IAOPA
Ray Rohr (RRO), EBAA
Mark Wilson (MWI), ECOGAS
Stefan Wolf (SWO), ECA
Eric Sivel (ESI), EASA Deputy Head of Flight Standards
Maria Algar Ruiz (MAR), EASA Rulemaking Officer
Matthias Borgmeier (MBO), EASA Rulemaking Officer
Daniela Defossar (DDE), EASA Rulemaking Officer
Betty Lecouturier (BLE), EASA Rulemaking Officer
Luis Cardoso Ribeiro (LCR), EASA Rulemaking Officer
Micaela Verissimo (MVE), EASA Rulemaking Officer
Bass van der Weide (BVW), EASA Rulemaking Officer

Excused:
Joel Hencks (JHE), EAS

1. MMO opened the meeting and asked the new EASA staff to present themselves. MBO will replace Herbert Meyer as secretary of the aerial work subgroup.

2. The group reviewed the meeting minutes of the last de-briefing including the open action items. The aerial work group was asked to close the action on liaising with MDM.032 on private aerial work. The complementation of the non-commercial complex aircraft subgroup with additional expertise has not been concluded yet. In addition, MMO requested further expertise for fractional ownership operations. This was supported by the group.
Regarding the coordination meeting with FCL.001 on Subpart N, MVE proposed that FCL.001 develops a working paper for the coordination meeting. She asked OPS.001 to nominate experts to participate in this meeting that should be scheduled for April. Training requirements contained in other OPS subparts seem to be specific operator training, that should be addressed by the OPS.001 subgroups but anyway should be also subject to the coordination meeting with FCL.001. The meeting minutes were adopted without further changes.

3. ESI debriefed the group on the Parliament report on the extension of scope that includes 29 comments on the Commission proposal. The document will be voted upon at the plenary meeting in March.

- Recitals: Agency monitoring compliance with regulations in the field of civil aviation security; “Black list” - exchange of information; Member State fees and charges
- Definitions: deletion of accreditation of qualified entities; complex motor-powered aircraft – deletion of turbojet engines and increase to 19 passengers, new definitions of light aircraft operation and light aircraft
- Implementing rules for pilot licensing shall take into account scientific and technical progress
- Operators filing a declaration shall demonstrate their capability and means to discharge the operator responsibilities
- Attestation (EU-OPS) for cabin crew involved in CAT
- Publication of findings
- Transitional measures
- Protection of information
- Fines imposed by the Agency

15 February 2007 De-briefing

Attendees:
Ragnar Boge (RBO), CAA Sweden
Joel Hencks (JHE), EAS (morning)
Pekka Henttu (PHE), AEA
Louis Hucher (LHU), Dassault
Mario Moura (MMO), INAC Portugal
Jacob T. Pedersen (JTP), IAOPA
Stefan Wolf (SWO), ECA
Maria Algar Ruiz (MAR), EASA Rulemaking Officer
Arthur Beckand (ABE), EASA Legal Advisor
Matthias Borgmeier (MBO), EASA Rulemaking Officer
Daniela Defossar (DDE), EASA Rulemaking Officer
Betty Lecouturier (BLE), EASA Rulemaking Officer
Margit Markus (MMA), EASA Legal Advisor
Luis Cardoso Ribeiro (LCR), EASA Rulemaking Officer
Micaela Verissimo (MVE), EASA Rulemaking Officer
Bass van der Weide (BVW), EASA Rulemaking Officer

Excused:
Thierry Allain (TAL), DGAC France
1. Debriefing of subgroups:

Subgroup Aerial Work:
The subgroup finished the review of draft JAR-OPS 4 and transposition of requirements in OPS 3, identified OPS 0 and management system issues. It will continue to finalise the implementing rules and start drafting the AMC/GM material.
Following a discussion in the core group the following was decided:
- NVIS: Should be addressed in OPS 0. RBO is asked to transfer applicable material to OPS 0 focal point BVW.
- Definition of local area operation: The subgroup is asked to try to regulate the activity as a whole avoiding such differentiations, if possible.
- Definition of aerodrome/landing site: Apart from ICAO, specific terms can be used, if needed. They should be defined.
- Sightseeing flights: The subgroup aerial work is asked to develop the requirements. On the basis of these requirements the core group will decide which kind of certificate should be considered.
- SAR and HEMS: EASA legal service was asked to clarify if SAR is within the remit of EASA and what is the dividing line between SAR and HEMS.
- Commercial training: Will be addressed by FCL.001.
- Aerial work operators training: Should be discussed with FCL.001 as soon as the requirements are drafted.
- Private aerial work: The subgroup suggests to foresee CS. It will liaise with MDM.032 to discuss the issue.

Subgroup Authority requirements and management system:
The subgroup finished the review of JAA OPS JIPs. Work on the management system has started and will be continued at the March meeting. The subgroup will start with the review of JAR-OPS 1/3 Subpart C.
As all approvals will be part of the operations manual, the OPS Specs will be deleted from the AOC. The group further considers the possibility of allowing the AOC and operations manual to be in an electronic format with electronic signature. Directive 1999/93/EC on electronic signatures applies.

Subgroup Non-commercial operations with complex motor-powered aircraft:
JTP reported on behalf of the chairman.
The subgroup discussed the scope and process of declaration and certification. Operational control is seen as a key point. Whenever
operational control is transferred to a management company a certificate should be required. The subgroup will continue its discussion at the next meeting.

The subgroup worked also on requirements and AMC/GM material for mass and balance, operations manual, FTL and security. It furthermore reviewed an ICAO cross reference list.

Material on SOP should be considered by the authority group for all operations.

The subgroup asked for clarification on the use of non approved industry standards or alternative means of compliance. For the use of alternative means of compliance the applicant needs to demonstrate that he meets the intent of the rule and an equivalent safety level. EASA addresses the issue of new AMC and their publication through rulemaking task MDM.010. It was proposed to include an authority obligation to inform EASA of newly accepted standards.

Subgroup Commercial Air Transport:

MVE reported on behalf of the chairman.

The subgroup continued its review of EU-OPS/JAR-OPS 1 and 3 Section 1 and 2 material. Subgroup members expressed their uncertainty regarding the necessary level of detail rule vs. AMC/guidance material. This may be clearer if a complete picture were presented. It was proposed that MVE prepares a legal draft WP for the next subgroup meeting based on the legal review document from Paris.

RBO will join the CAT subgroup for discussions on helicopter operations to bring in expertise with small operations. The Appendices of JAR-OPS 3 should be considered for transfer to CS.

For FTL helicopter ESI had suggested to prepare a tender to have a scheme developed outside. This will be further discussed at the next subgroup meeting.

2. Regarding the drafting of management system requirements RBO expressed concerns that there will be no regulation in place by January 2009. He proposed to have a harmonised approach by Member States to file a time limited difference to ICAO. RBO was asked to address the issue through the AGNA member at the next AGNA meeting.

3. BVW was asked to prepare an OPS 0 working paper incorporating the various OPS 0 subgroup proposals for the next core group meeting.

### Action List

<table>
<thead>
<tr>
<th>Task</th>
<th>responsible</th>
<th>timeframe</th>
<th>status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Liaise with MDM.032 on private aerial work</td>
<td>MBO/JHE</td>
<td>asap</td>
<td>o</td>
</tr>
<tr>
<td>2. Inform MDM.032 of amended structure</td>
<td>DDE/BVW</td>
<td>asap</td>
<td>o</td>
</tr>
<tr>
<td>3. Presentation on transfer of AW JARs into IR</td>
<td>ESI</td>
<td>Next core group</td>
<td>o</td>
</tr>
<tr>
<td></td>
<td>Follow up on requests to complement Non-commercial complex aircraft subgroup with expertise in corporate operations and fractional ownership</td>
<td>DDE</td>
<td>asap</td>
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<tr>
<td>5.</td>
<td>Nomination of experts for FCL.001 coordination meeting on Subpart N</td>
<td>Core group</td>
<td>Next core group meeting March</td>
</tr>
<tr>
<td>6.</td>
<td>NVIS: Transfer regulations material to OPS 0 focal point BVW</td>
<td>RBO</td>
<td>asap</td>
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<tr>
<td>7.</td>
<td>SAR and HEMS: clarify if SAR is within the remit of EASA and dividing line between SAR and HEMS</td>
<td>EASA legal service</td>
<td>asap</td>
</tr>
<tr>
<td>8.</td>
<td>SMS implementation in MS: address to AGNA member</td>
<td>RBO</td>
<td>asap</td>
</tr>
<tr>
<td>9.</td>
<td>Prepare OPS 0 WP with subgroup inputs</td>
<td>BVW</td>
<td>asap</td>
</tr>
</tbody>
</table>

DDE  
16/02/2007
OPS 2A9.020 General Rules for Operations Manuals

OPS 2A9.020 General Rules for Operations Manuals

(a) An operator shall provide, for the use and guidance of personnel concerned, an operations manual containing all the instructions and information necessary for operations personnel to perform their duties.

(b) An aircraft operator shall ensure that the contents of the Operations Manual including all amendments or revisions, do not contravene the conditions contained in the Declaration made to the Competent Authority or any other applicable regulations.

(c) An aircraft operator shall ensure that all operations personnel have easy access to a copy of each part of the Operations Manual required to carry out their duties including when on board the aircraft.

(d) An aircraft operator shall ensure that the Operations Manual is amended or revised so that the instructions and information contained therein are kept up to date. The aircraft operator shall also ensure that all operations personnel are made aware of the changes that are relevant to their duties.

(e) An aircraft operator must ensure that the contents of the Operations Manual are presented in a form which can be used without difficulty and that the design of the manuals observe Human Factors principles.

(f) An aircraft operator may present the Operations Manual or parts thereof, in a form other than on printed paper. In such cases, the accessibility, usability and reliability must be assured.


Operations manuals may be compiled in accordance with an industry code of practice. Also see AMC OPS 2A9.025
AMC OPS 2A9.025 Operations Manual - Structure and Contents

1. General

An operations manual, which may be issued in separate parts corresponding to specific aspects of an operation, should include the instructions and information necessary to enable the personnel concerned to perform their duties safely. Operations manuals will vary in detail and complexity in accordance with the complexity of the operation and of the type and number of aircraft operated. A flight department with several turbojet aircraft will have a more comprehensive operations manual than will be required by an owner operated small turboprop aircraft.

The operations manual should be such that:

a. all parts of the manual are consistent and compatible in form and content;

b. the manual can be readily amended;

c. the manual contains an amendment control page and a list of the pages that are in effect; and

d. the manual has the date of the last amendment to each page specified on that page.

An operator should provide a copy of the appropriate parts of its operations manual, including any amendments to that manual, to each of its crew members and to its ground operations and maintenance personnel.

An operator may place a copy of the appropriate parts of its operations manual in each aircraft that it operates, instead of providing a copy to each crew member. Every person who has been provided with a copy of an operations manual should keep it up to date with the amendments provided and should ensure that the appropriate parts are accessible when the person is performing assigned duties.

An operator should include in the company operations manual a description of the process to allow deviations from the provisions contained in it and specify the person who may approve such deviations. Any deviation should identify the associated conditions under which it is permitted or required, and should be based on a risk assessment process.

The design of the company operations manual and all associated manuals should observe Human Factors principles.

Note.- Guidance material on the application of Human Factors principles can be found in the ICAO Human Factors Training Manual (Doc 9683).

2. Operations Manual Contents

The operations manual may be based on an industry code of practice and should at least contain the following information

a. table of contents;

b. amendment control page and list of effective pages, unless the entire document is re-issued with each amendment and the document has an effective date on it;

c. duties, responsibilities and succession of management and operating personnel;

d. operator safety management system;

e. operational control system;

f. MEL procedures (where applicable);

g. normal flight operations;

h. SOPs;

i. weather limitations;

j. flight and duty time limitations;

k. emergency operations;

l. accidents/incidents consideration;
OPS 2A9.020  General Rules for Operations Manuals

m. personnel qualifications and training;
   n. record keeping; and
   o. a description of the maintenance control system.

3. Operations Manual Structure

An operator may structure their operations manual as they deem appropriate. One option is to follow the format specified in OPS 1. In that case the following may structure may be used.

Part A. General/basic

1. Administration and control of operations manual;
   1.1 Table of contents, and
   1.2 Amendment control page and list of effective pages, unless the entire document is re-issued with each amendment and the document has an effective date;
2. Organisation duties, responsibilities and succession of management and operating personnel;
3. Operational control system;
4. Operator safety management system;
5. Personnel qualification requirements;
6. Flight time limitations;
7. Weather limitations;
8. Standard operating procedures;
9. Security;
10. Handling of accidents and occurrences; ans
11. Maintenance control system.

Part B. Aeroplane operating matters type related

1. Normal procedures;
2. Abnormal and emergency procedures; and
3. Minimum equipment list (where applicable).

Part C. Route and aerodrome instructions and information (If applicable)

Part D. Training

1. Personnel training and competency programs; and
2. Record keeping.
Standard Operating Procedures

Standard operating procedures are a very effective safety management tool in multi-crew aircraft and equally beneficial in single pilot operations. It is recommended that an operator establish and maintain standard operating procedures for each type of aircraft that is operated. Information on development of a SOP manual is contained in Attachment A.
Attachment A  Standard Operating Procedures

The Standard Operating Procedures (SOP) should contain the following information for each type of aircraft operated. Where there are significant differences in equipment and procedures between aircraft of the same type operated, the SOP should show the registration mark of the aircraft, it is applicable to. The SOP may be a stand alone document or may be incorporated into the Company Operations manual.

1. **Recommended Contents of a SOP**

1. table of contents;
2. list of effective pages;
3. amending procedure;
4. communications;
5. crew coordination;
6. use of check lists;
7. standard briefings;
8. standard calls;
9. radio procedures;
10. normal procedures
   a. battery/APU engine starts;
   b. taxi;
   c. take-off and climb;
   d. cruise;
   e. descent;
   f. instrument approach procedures and circling, arrival and departure procedures at controlled and uncontrolled airports;
   g. landing;
   h. refuelling with passengers onboard; and
   i. use of onboard navigation and alerting aids;
11. abnormal procedures
   a. rejected take-off;
   b. missed approaches and balked landing procedures;
   c. stall recovery;
12. emergencies
   a. pilot incapacitation; (2 pilot crew);
   b. bomb threat and hijacking;
   c. engine fire/failure/shutdown;
   d. fire, internal/external;
   e. smoke removal;
   f. rapid decompression;
   g. flapless approach and landing; and
   h. check lists.
OPS 2A2.010 Mass and Balance General

(a) An aircraft operator shall establish and implement systems and procedures to ensure that during every phase of the flight, the load restrictions, mass and centre of gravity of the aircraft conform to the limitations specified in the aircraft flight manual.

(b) An aircraft operator shall specify in its company operations manual its mass and balance system and instructions to employees regarding the preparation and accuracy of mass and balance forms.

See AMC OPS 2A2.010
AMC OPS 2A2.010

An operator may use the Mass and Balance AMC material from OPS 1 to develop their mass and balance system, however, it should at least include the considerations identified below.

1. Operators Mass and Balance System

   The operator’s mass and balance system should specify for each flight how the operator will establish and be responsible for the accuracy of:

   1.1. Aircraft basic empty mass and centre of gravity determined in accordance with the aircraft flight manual;

   1.2. Aeroplane operational empty mass and centre of gravity. The aircraft operational empty mass is the actual mass of the aircraft before loading for dispatch consisting of the aircraft basic empty mass and may include removable equipment, flight crew members (including baggage), crew members (including baggage and supplies), water, toilet fluids and chemicals, oil, unusable fuel and emergency equipment and shall be defined by the air operator;

   1.3. Mass of passengers, carry-on baggage and stowed baggage, determined either by actual or standard mass, and the actual mass of cargo;

   1.4. Mass of the fuel load determined by using either the actual specific gravity or a standard specific gravity;

   1.5. Aircraft loading including, but not limited to, compartment mass and bulk cargo limits, floor loading limits, cargo restraint and unit load device/pallet loading considering mass and centre of gravity limits;

   1.6. Aircraft zero fuel mass (if applicable);

   1.7. Location of the centre of gravity to include the longitudinal position and where required, lateral and vertical positions; and

   1.8. Preparation and disposition of all required documentation whether by the pilot-in-command or other qualified personnel authorized by the operator.

   The mass and balance system should also include both initial and recurrent of all personnel with duties and responsibilities in this system.

   The mass and balance computation may be incorporated in the operational flight plan or be a separate system and may include standards load profiles.

2. Standard Passenger Mass

If determining the mass of passengers using standard mass values, the values in Tables 1 below should be used. The standard masses include hand baggage and the mass of any infant below 2 years of age carried by an adult on one passenger seat. Infants occupying separate passenger seats must be considered as children for the purpose of this sub-paragraph.

Table 1 – Standard Passenger Mass

<table>
<thead>
<tr>
<th>Passenger Seats</th>
<th>1 - 5</th>
<th>6 - 9</th>
<th>10 - 19</th>
<th>More than 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>104</td>
<td>96</td>
<td>92</td>
<td>88</td>
</tr>
<tr>
<td>Female</td>
<td>86</td>
<td>78</td>
<td>74</td>
<td>70</td>
</tr>
<tr>
<td>Children</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>

1 In operations where no hand baggage is carried 6 kg should be deducted from the adult passenger weights

2 Children age 2 – 12 year
(a) An operator shall establish, maintain and carry out a security program that is proportional to the threat against the operator, its personnel, aircraft and facilities and the associated vulnerabilities.

(b) The security program shall include:

1. a process to assess threats and vulnerabilities,
2. preventive measures designed to reduce vulnerabilities and deter and prevent the commission of unlawful acts,
3. responsive measures to be taken when an unlawful act has been committed against the operator,
4. training of personnel involved, and
5. testing of the security program preventative and responsive measures.

(c) Where a National security program is prescribed for non-commercial operation of complex motor-powered aircraft the operator’s security program shall also meet the requirements of that program.

See AMC OPS 2A8.005
1. **Overview**

It is important that a security program is proportional to the threat against the operator, its personnel, aircraft and facilities. The security program should include a threat assessment process, preventive measures designed to deter and prevent the commission of unlawful acts, responsive measures to be taken when an unlawful act has been committed against the operator, appropriate training of personnel involved and testing of the security program preventative and responsive measures. The security program should be periodically assessed to ensure that it is appropriate and effective.

2. **Assessing the Threat and Vulnerability**

The first step in the development of an effective security program is to assess the threat against the company, its personnel, aircraft and facilities and the operator’s vulnerabilities. Threats may relate to the nature of business the company conducts, where that business is conducted, the nationality of the company, the nationality of company aircraft, the profile of passengers carried, and the value of goods carried. Information on the various kinds of threats the operator is subject to will come from a variety of sources. In developing and maintaining a current threat assessment for areas of operations, the flight department manager should use the following resources as appropriate:

   a. national and local security officials;
   b. national and local law enforcement officials;
   c. the company security officer, if applicable;
   d. national and international trade associations;
   e. air security assessment and intelligence service providers;
   f. local and foreign media reports; and
   g. company officials posted in foreign locations, if applicable.

Security professionals can provide assistance in determining and assessing the flight department’s vulnerabilities.

3. **Preventive Measures**

The focus of preventive security measures will be to:

   a. prevent unauthorized access to company aircraft and facilities;
   b. prevent the unauthorized introduction of weapons or explosives onto company aircraft and into company facilities; and
   c. prevent the use of company aircraft to commit unlawful acts.

The security measures implemented by the operator should be proportional to the threat. Procedures and training should be in place to implement enhanced measures when the threat is increased and to implement reduced measures when the threat is reduced.

Preventive security measures will include, as appropriate:

   a. **Global Considerations**
      i. Whenever possible avoid areas where there is an identified security risk;
      ii. Have a security program that is specific to your location and operation;
      iii. Ensure that all flight department personnel receive security program training;
      iv. Make security an integral part of all aspects of the flight department and its operation;
      v. Establish a Security Champion role, much like the Safety Officer role;
      vi. Maintain a security information program; and

   b. **People and Processes**
      i. Require pre-employment screening of flight department personnel;
ii. Require that crew members display photo IDs at all times;
iii. Limit the publication of aircraft itineraries;
iv. Establish security threat alerting procedures, such as a code word for use by persons under duress;
v. Require an accurate and accessible passenger manifest for all trip legs;
vi. Ensure that only company personnel and authorized guests, identified in advance, are allowed to board a company aircraft;
vii. Ensure that passengers or flight department members maintain positive control of luggage; and
viii. Positively identify all luggage and match luggage to specific passengers (colour-coded bag tags can be helpful).

c. Aircraft
i. Check lavatories, baggage compartments and all cavities for unauthorized people or objects prior to every departure;
ii. Ensure that a flight department member is present at all times when the aircraft is being serviced (fuelling catering, etc.) at company facilities;
iii. Ensure that a aircraft crewmember is present at all times when the aircraft is being serviced (fuelling, catering, etc.) at locations away from company aviation facility;
iv. Use the aircraft's security system (locks and alarms) whenever it is unattended away from company facilities;
v. Apply tamper evidence security tape on door, panels, etc;
vi. Post a guard at the aircraft when away from company facilities at locations where security is a concern; and
vii. Consider removing company identification from the aircraft and facilities.

d. Facilities
i. Ensure company facility perimeter security with effective fencing, lighting, security patrols (as appropriate), gates and limited access areas;
ii. Ensure external gates and doors are closed and locked at all times;
iii. Require positive access control for all external gates and doors;
iv. Close hangar doors when that area is unattended;
v. Secure all key storage areas (food and liquor, parts and tools, etc.);
vi. Have an access control management system for keys and passes;
vii. Confirm the identity and authority of each passenger, vendor and visitor prior to allowing access to facilities and aircraft;
viii. Accompany all visitors away from secure areas (visitor lounge, etc.);
ix. Require a picture ID of any unfamiliar or unaccompanied visitor or vendor;
x. Post emergency numbers prominently around facility;
xi. Ensure easy access to phones or "panic buttons" in various facility locations (break room, hangar bay, etc.); and
xii. Confirm security of destination facilities.

4. Responsive Measures

In the case of a hijacking, the aircraft crew must attempt to make an assessment of the intent of the hijacker and follow the emergency procedures set out in the company operations manual. These procedures will include the making of distress radio calls and transponder settings, to indicate that the aircraft has been hijacked and for adherence to the procedures that have been established and promulgated in ICAO Doc 7030 – Regional Supplementary Procedures in both the cases where the aircraft continues on the assigned track and cruising level or is forced to deviate there from.

In the case of bomb threats, the operator should first determine the legitimacy of the threat or whether it is likely to be a hoax. If considered to be legitimate, law enforcement officials should be notified. If
the aircraft is in the air, ATS should be notified and the aircraft should land to be searched. If on the
ground, the aircraft should be moved, for searching, to the designated isolated parking.

In the case of other unlawful acts, the operator should contact the responsible law enforcement
agencies.

5. Training

Training programs should be established with the objective of ensuring that all personnel with security
related duties acquire and maintain the competence to perform their duties. The training program
should include initial and periodic refresher training.

6. Testing

Testing of the security program preventative and responsive measures should be undertaken
periodically. Scenario based exercises that involve elements of the preventative or responsive
measures are an appropriate means of testing. It is very important that the results of such test be
recorded and where deficiencies are identified, corrective action plans are develop and implemented
and then tracked to ensure that they are appropriate and effective.

7. Sample Security Checklist

This sample security checklist is included with permission of the National Business Aviation
Association. Other sample checklists and related guidance material, may be found in industry codes
of practice.

PRIOR TO EVERY FLIGHT¹

- Perimeter Awareness……………….. MAINTAIN
- Gates and Doors…………………….. LOCKED or ATTENDED
- Storage Areas……………………….. LOCKED or ATTENDED
- Hangar Security Systems…………… ACTIVATED IF INSTALLED or ATTENDED
- Transient Facility Security……………. VERIFIED
- Suspicious Activity…………………… CALL LAW ENFORCEMENT SECURITY AGENCY
- Servicing……………………………… CREW PRESENT
- Security Inspection:
  Refer to AFM guidance and include the following if appropriate
  - No sign of tampering
  - Externally accessible service compartments
  - Wheel wells
  - System openings and vents
  - Lavatories
  - Internal/external storage compartments
  - Baggage holds
  - Accessible mechanical/electrical compartments
- Passenger Manifest…………………….. COMPLETE
- Passengers……………………………… IDENTIFIED & VERIFIED
- Luggage/Cargo………………………….. IDENTIFIED & VERIFIED
- Unmatched Luggage/Cargo…………….. DO NOT LOAD
- Any Behavioral Changes in Personnel…….. CHECKED
  - **Temporary Flight Restrictions………… CHECK NOTAMS**
- All Itinerary/Manifest Information Retained Only if Required by Regulation or Company Policy

¹ Included with the permission of the National Business Aviation Association
BEFORE LEAVING AIRCRAFT

- Unattended Aircraft Security:
  - AFM recommendations
  - Close and secure emergency exits
  - Arm alarm systems (if installed)
  - Close and lock all keyed access doors
  - Operator specific procedures/alternative means of compliance

- Upon departing secured aircraft, place security compliant certificate in forward left pilot window

Note: Procedures specified in the AFM always take precedence.
OPS 2A7.005 Fatigue Countermeasure Program

(a) An aircraft operator shall establish and implement a fatigue countermeasures system. The system shall be described in the operations manual and shall contain limitations that ensure that all personnel under control of the operator involved in the operation and maintenance of aircraft do not carry out their duties when fatigued.

(b) If deviations from the flight and/or duty time limitations are permitted, the system shall include provisions for:

   (1) Assessing the associated risks and applying appropriate mitigation to ensure that there is no degradation of safety, and

   (2) Identify the management person who is authorized to approve the deviation.

(c) In the case of deviations, the risk assessment and related mitigation shall be recorded in writing and become part of the SMS data base.

(d) Deviations shall be made only with the express approval of all personnel involved.

See AMC OPS 2A7.005
1. **Global Consideration**

Fatigue is related to a variety of different subjective experiences, for example, physical discomfort after overworking a particular group of muscles, concentration difficulties during a monotonous task, difficulty appreciating potentially important signals following long or irregular work hours, or simply difficulty staying awake. Fatigue becomes important if it reduces efficiency or otherwise degrades performance. Subjective fatigue can be affected by motivation or by the amount of stimulation coming from the environment.\(^1\)

Fatigue is a hazard faced by most aviation operations. Research clearly indicates that fatigue is an issue across all segments of aviation, not only in long haul flights that involve significant time zone changes\(^2\). The data shows that different flight operations and work schedules create different physiological disruptions and somewhat different outcomes. However, there are four core operational factors that must be considered in fatigue countermeasures programs.

1. Duty period length is related to the continuous hours of wakefulness through a subset. Flight time is a subset of duty period.
2. Rest or off-duty periods, are related to sleep opportunity and can affect both acute sleep loss and the creation of a cumulative sleep debt.
3. Circadian factors can affect both alertness and performance during operations as well as the quantity and quality of sleep obtained during rest periods.
4. Cumulative effects can be relevant for continuous and consecutive duty periods and the creation of sleep debt.

The physical environment and work conditions also contribute to fatigue.

The risks normally associated with this hazard are mistakes and accidents. Strategies to manage this hazard and the associated risks should be developed by operators and included in their safety management system. The management strategies should include processes to involve all persons involved in the operation, and include:

1. Training and education for everyone involved in the operation on the physiological mechanisms that underlie fatigue and the misconceptions about fatigue,
2. Flight and duty time limits based on sound research,
3. Scheduling practices that carefully consider the safety-risks associated with fatigue and its cumulative effects,
4. Mechanisms that ensure that people involved in the operation report on situations where fatigue became an issue,
5. Process to analyse all report, provide feedback and effect change to preclude future occurrences.

The reporting, analysis and feedback mechanisms should be a component of the company safety management system.

2. **Fatigue Countermeasures Program Development**

As noted above the first step in development of a fatigue countermeasures program should be an analysis of the fatigue hazards and the associated risks inherent in the operation as a component of the operator’s SMS. Industry models, such as the IS-BAO an International Standard for Business Aircraft Operations, and a range of other guidance material are available to assist in this process. With this information an operator can then make an informed decision on the use of an appropriate fatigue countermeasure program from OPS 1, one of the model programs included in this AMC or developing their own individual program.

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\(^1\) Rosekind, Mark et al, *Crew Factors in Flight Operations XV: Alertness Management in General Aviation Education Module*, NASA Ames Research Center, Moffett Field, California, 2002

3. Flight Safety Foundation Fatigue Countermeasures Program

The Flight Safety Foundation guidelines were developed by a task force that worked closely with the U.S. National Aeronautics and Space Administration’s Ames Research Center. They looked into such issues as circadian physiology, off-duty periods, duty periods and flight time along with education and training issues. The Task force was comprised of 30 representatives of operators, aircraft manufactures, and training suppliers. They relied extensively on research from the Flight Management and Human Factors Division of the NASA-Ames Fatigue Countermeasures Program.

Tables 1 and 2 present an overview of the guidelines and recommendations continued in the Task Force report. Operators are encouraged to obtain and review the full report. It may be downloaded at http://www.flightsafety.org/members/serveme.cfm/?path=/fsd/fsd_feb97.pdf.

3.1 Relevant Definitions

Window of Circadian Low
The window of circadian low is best estimated by the hours between 0200 and 0600 for individuals adapted to a usual day-wake/night-sleep schedule. This estimate is calculated from scientific data on the circadian low of performance, alertness, subjective report (i.e., peak fatigue) and body temperature. For duty periods that cross three or fewer time zones, the window of circadian low is estimated to be 0200 to 0600 home-base/domicile time. For duty periods that cross four or more time zones, the window of circadian low is estimated to be 0200 to 0600 home-base/domicile time for the first 48 hours only. After a crew member remains more than 48 hours away from home-base/domicile, the window of circadian low is estimated to be 0200 to 0600 local time at the point of departure. Recommended guidelines related to the window of circadian low should be applied when any of the following operations occur: landing within the window; flight through both sides of the window; or duty period that starts at 0400 or earlier within the window.

Off Duty
is a continuous, predefined period of uninterrupted time during which a crew member is free of all duties.

Duty
is any task a crew member is required to perform by the operator, including flight time, administrative work, managerial duties, training and deadheading.

Duty period
is a continuous period of time during which tasks are performed for the operator; determined from report time until free from all required tasks.

Flight time
is the sum of all flight time, calculated from block to block for each flight segment.

Standby
A flight crew member on “standby” is required to be available to an operator (away from the airport) for assignment to a flight duty period.
## 3.2 Guidelines and Recommendations

### Table 1 – General Guidelines and Recommendations

<table>
<thead>
<tr>
<th>Off Duty</th>
<th>Duty Period</th>
<th>Flight Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per 24-hour Period</td>
<td>Per Week</td>
<td>Other</td>
</tr>
<tr>
<td>Two Pilots</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 hours</td>
<td>Minimum 36 continuous hours, including two consecutive recovery nights, in a seven-day period (calculated on a seven-day or 168-hour rolling basis)</td>
<td>48 continuous hours on return home following duty period across multiple time zones</td>
</tr>
<tr>
<td>12 hours (following extended flight time)</td>
<td>14 hours</td>
<td>Up to 12 Hours (requires landings, maximum cumulative hours be restricted, with compensatory off-duty time)</td>
</tr>
<tr>
<td>Three Pilots (Augmented)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 hours</td>
<td>Same as above</td>
<td>Reclining seat 18 hours</td>
</tr>
<tr>
<td>12 hours</td>
<td>Same as above</td>
<td>Supine bunk 20 hours</td>
</tr>
</tbody>
</table>

* Extended operations can involve duty/rest cycles longer than 24 hours.

** Each flight crew gets maximum sleep opportunity with minimum four hours total; maximum two consecutive duty periods with 18 hours off duty.

Source: Flight Safety Foundation and U.S. National Aeronautics and Space Administration

Included with the permission the Flight Safety Foundation
Table 2 - Flight Operations During the Window of Circadian Low

The “window of circadian low” is best estimated to be the hours between 0200 and 0600 for individuals adapted to a usual day-wake/night-sleep schedule. Guidelines apply to the following operations within this window of circadian low:

1. Landing
2. Flight through both sides of the window of circadian low
3. Duty period that starts at 0400 or earlier in the window of circadian low

<table>
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<th>Flight Time</th>
</tr>
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<tbody>
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<td>Per Week</td>
<td>Other</td>
</tr>
<tr>
<td>12 hours</td>
<td>48 continuous hours in seven-day period following multiple duty periods in circadian low (calculated on a seven day or 168 hour rolling basis)</td>
<td>48 continuous hours on return home following duty period across multiple time zones</td>
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</tbody>
</table>

Two Pilots

<table>
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</tbody>
</table>

No two pilot extensions recommended

Three Pilots (Augmented)

<table>
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<tr>
<th>Off Duty</th>
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* Extended operations can involve duty/rest cycles longer than 24 hours.
** Each flight crew gets maximum sleep opportunity with minimum four hours total; maximum two consecutive duty periods with 18 hours off duty.

Source: Flight Safety Foundation and U.S. National Aeronautics and Space Administration

Included with the permission the Flight Safety Foundation
4. CBAA Fatigue Countermeasures Program

The following fatigue management system guidelines are derived from the guidelines published by the Canadian Business Aviation Association (CBAA) as part of their private operator certification (POC) Program.

4.1 Flight Time Limitations for Pilots

No operator shall assign a flight crew member for flight time, and no flight crew member shall accept such an assignment, if the flight crew member’s total flight time will exceed:

a. 1,200 hours in any 12 consecutive months;
b. 300 hours in any 90 consecutive days;

c. 120 hours in any 30 consecutive days; or
d. where the flight crew member conducts single-pilot IFR flights, 8 hours in any 24 consecutive hours.

4.2 Flight and Duty Time Limits and Rest Periods for All Crew Members

The fatigue management system must ensure that flight duty time is limited to:

a. 14 hours in any consecutive 24 hour period;
b. 15 hours in any consecutive 24 hour period provided:
   i. the crew member’s total flight time in the previous 30 consecutive days does not exceed 70 hours, or
   ii. the rest period prior to the flight is at least 24 hours;

c. 17 hours in any consecutive 24 hour period where
   i. the crew is augmented by at least one additional flight crew member;
   ii. a seat outside of the cockpit that provides for rest is provided;
   iii. the maximum flight deck duty time is 12 hours; and
   iv. the subsequent minimum rest period is at least equal to the length of the preceding duty day; or

d. 20 hours in any consecutive 24 hour period where
   i. the crew is augmented by at least one additional flight crew member;
   ii. a flight rest bunk is provided;
   iii. the maximum flight deck duty time is 14 hours; and
   iv. the subsequent minimum rest period is at least equal to the length of the preceding duty day; and

4.3 Minimum Rest Period

The minimum rest period shall be provided with an opportunity to obtain not less than eight consecutive hours of sleep in suitable accommodation, time to travel to and from that accommodation and time for personal hygiene and meals. During the period crew members shall be free from all duties and not be interrupted by the operator.

4.4 Delayed Reporting Time

Where a crew member is notified of a delay in reporting time within the two hours preceding that reporting time and the delay is in excess of three hours, the crew member’s flight duty time starts three hours after the original reporting time.

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3 Includd with permission of the Canadian Business Aation Association
4.5 Split Flight Duty Time

Where flight duty time includes a rest period, flight duty time may be extended beyond the maximum flight duty time referred to in 4.2 by one-half the length of the rest period, to a maximum of 4 hours, if:

a. the operator provides the crew member with advance notice of the extension of flight duty time; and

b. the operator provides the crew member with a rest period of at least 4 consecutive hours in suitable accommodation.

In such cases the minimum rest period following this flight duty time shall be increased by an amount at least equal to the extension to the flight duty time.

4.6 Unforeseen Operational Circumstances

The fatigue management system may provide for the flight duty time to be extended by up to three hours in the case of unforeseen operational circumstances provided that:

a. the subsequent minimum rest period is increased by an amount at least equal to the extension of the flight duty time; and

b. all persons involved explicitly agree to extend the flight duty time.

4.7 Controlled Rest on the Flight Deck

An air operator may institute a program of controlled rest on the flight deck if provisions are contained in its Operations Manual that addresses:

a. Pre-flight Activities
   i. The pilot-in-command shall determine if operational considerations allow or preclude the use of controlled rest on the flight deck based on guidelines developed by the operator;
   ii. Normally, the flight crew members’ rest periods will be planned at a pre-flight briefing to enable them to anticipate and maximize the sleep opportunity and to manage their alertness. However, if required, this briefing can occur in flight; and
   iii. The briefing shall include:
      A. the choice of rest sequence,
      B. planned and unplanned wake-up criteria,
      C. transfer of control procedures, and
      D. coordination with the cabin crew (if applicable).

b. Pre-rest Period
   Pre-rest period activities should take approximately 5 minutes and shall include:
   i. the transfer of duties;
   ii. an operational briefing;
   iii. completion of physiological needs;
   iv. co-ordination with the cabin crew;
   v. and time for the flight crew member preparing to rest to become comfortable in the flight deck seat.

c. Rest Period
   i. Only one flight crew member at a time shall rest and the other flight crew member(s) shall remain alert. An alertness monitor may be considered as a back-up system;
   ii. the resting flight crew member’s duties shall be completed by the non-resting flight crew member(s);
   iii. all flight crew members shall remain on the flight deck throughout the rest period;
   iv. each rest period shall be limited to a maximum of 45 minutes to avoid sleep inertia when the flight crew member is awakened;
   v. rest periods shall occur only during the cruise phase of the flight and shall be completed at least 30 minutes before planned top of descent, workload permitting; and
   vi. if required, more than one sleep opportunity may be taken by the flight crew members.
d. Post-rest Period
   i. Unless required due to an abnormal or emergency situation, at least 15 minutes without
      any flight duties should be provided to the awakened flight crew member to allow
      sufficient time to become fully awake before resuming normal duties; and
   ii. an operational briefing shall be given to the awakened flight crew member.

Every flight crew member who participates in the controlled rest on the flight deck program shall have
received training in the program as well as training in the general principles of fatigue and fatigue
countermeasures.

4.8 Days Off

The fatigue management system must provide for
   a. at least one period of 36 consecutive hours free from duty within each seven consecutive
defays; or
   b. at least one period of 3 consecutive calendar days free from duty days within each 17
      consecutive days.
5.0 IS-BAO Single Pilot Fatigue Countermeasures Program

The following fatigue management system guidelines are derived from the Single Pilot Generic Operations Manual published by the International Business Aviation Council (IBAC) as part of the IS-BAO – an International Standard for Business Aircraft Operations and are included with the permission of IBAC.

5.1 Fatigue Management

Fatigue management is an issue that must receive close attention. Duty time calculations will include all time spent working in the office or in meetings as well flight duty time. This section contains the limits that pilots involved in flight operations will observe.

5.2 Relevant Definitions

Window of Circadian Low

The window of circadian low is best estimated by the hours between 0200 and 0600 for individuals adapted to a usual day-wake/night-sleep schedule. This estimate is calculated from scientific data on the circadian low of performance, alertness, subjective report (i.e., peak fatigue) and body temperature. For duty periods that cross three or fewer time zones, the window of circadian low is estimated to be 0200 to 0600 home-base/domicile time. For duty periods that cross four or more time zones, the window of circadian low is estimated to be 0200 to 0600 home-base/domicile time for the first 48 hours only. After a crew member remains more than 48 hours away from home-base/domicile, the window of circadian low is estimated to be 0200 to 0600 local time at the point of departure. Recommended guidelines related to the window of circadian low should be applied when any of the following operations occur: landing within the window; flight through both sides of the window; or duty period that starts at 0400 or earlier within the window.

Off Duty

Is a continuous, predefined period of uninterrupted time during which a crew member is free of all duties.

Duty

Is any task a crew member is required to perform by the operator\(^4\), including flight time, administrative work, managerial duties, training and deadheading.

Duty period

Is a continuous period of time during which tasks are performed for the operator\(^4\), determined from report time until free from all required tasks.

Flight time

Is the sum of all flight time, calculated from block to block for each flight segment.

Standby

A flight crew member is on “standby” when he/she is required to be available to an operator (away from the airport) for assignment to a flight duty period.

5.3 Flight and Duty Time Limitations

The maximum flight time for pilots involved in single pilot operations shall not exceed:

a. 1,200 hours in any 12 consecutive months;

b. 300 hours in any 90 consecutive days;

c. 120 hours in any 30 consecutive days; or

d. 8 hours in any 24 consecutive hours.

The duty times for pilots shall be limited to:

a. 14 hours in any consecutive 24 hour period;

b. 15 hours in any consecutive 24 hour period provided:

   i. the pilot's total flight time in the previous 30 consecutive days does not exceed 70 hours, or

   ii. the rest period prior to the flight is at least 24 hours off duty;

\(^4\) For the owner/operator duty time includes all such task taken on their own account.
OPS 2A7.005 Fatigue Countermeasure Program

The minimum rest period between duty periods shall provide an opportunity to obtain not less than eight consecutive hours of sleep in suitable accommodation, time to travel to and from that accommodation and time for personal hygiene and meals.

When operations occur during a period of circadian low the rest period shall be increased to provide for a minimum of 12 hours off duty.

6.0 Additional References

Additional material on fatigue management is available from the following sources:

- **Alertness Solutions** has a number of research papers and educational materials at [http://www.alertness-solutions.com/](http://www.alertness-solutions.com/) that would be of use to operators.

- **NASA Ames Research Center Human Factors Research and Technology Division** has a wealth of flight crew fatigue countermeasure-related studies and papers at their website at [http://human-factors.arc.nasa.gov/zteam/fcp/FCP.pubs.html](http://human-factors.arc.nasa.gov/zteam/fcp/FCP.pubs.html).

1. Aim

This paper discusses issues related to operator declarations as prescribed in the Essential Requirements for Licensing, Operations and Third Country Aircraft as contained in Regulation (EC) No 1592/2002 revised, and proposed processes and procedure for the filing, processing and management of such declarations.

2. Background

Article 6b - Air Operations para 2 of the Essential Requirements for Licensing, Operations and Third Country Aircraft specifies:

Unless otherwise determined in the implementing rules, operators engaged in commercial operations shall demonstrate their capability and means to discharge the responsibilities associated with their privileges. These capabilities and means shall be recognised through the issuance of a certificate. The privileges granted to the operator and the scope of the operations shall be specified in the certificate.

Para 3 of that Article states:

Unless otherwise determined in the implementing rules, operators engaged in the non-commercial operation of complex motor-powered aircraft shall declare their capability and means to discharge the responsibilities associated with the operation of the aircraft.

Para 5(b) requires that the implementing rules specify:

the conditions for issuing, maintaining, amending, limiting, suspending or revoking the certificates referred to in paragraph 2 and the conditions under which a certificate shall be replaced by a declaration of the capability and means of the operator to discharge the responsibilities associated with the operation of the aircraft;

Para 5(d) goes on to require that the implementing rules specify:

the conditions and procedures for the declaration by, and for the oversight of, operators referred to in paragraph 3 and the conditions under which a declaration shall be replaced by a demonstration of capability and means to discharge the responsibilities associated with the privileges of the operator recognised by the issuance of a certificate;

Paras 1 and 2 of Article 7 – Oversight and Enforcement state:

1. The Member States, the Commission and the Agency shall cooperate with the aim to ensure that any product, person or organisation subject to this Regulation complies with its provisions and with its implementing rules.

2. For the implementation of paragraph 1, Member States shall, in addition to their oversight of certificates that they have issued, conduct investigations, including ramp inspections, and shall take any measure, including grounding of aircraft, to prevent the continuation of an infringement.

3. Discussion

3.1 Essential Requirements Considerations

From the foregoing provisions it is clear that the Council of the European Union and the European Parliament see three distinct levels of regulatory oversight for aircraft operations. The higher level is that associated with operators engaged in commercial operations. As indicated in Article 6 b para 2, the norm for commercial operations shall be certification. However, exceptions to the requirement to hold a certificate can be made in the implementing rules. The exception allowed for in para 5(b) of Article 6b is to replace the certification process with a declaration of the capability and means of the operator to discharge the responsibilities associated with the operation of the aircraft.

The lowest level of regulatory oversight for aircraft operations is that associated with the operation of non-complex motor powered aircraft. In those cases there is no requirement for any type of certification or declaration specified.

The mid level of regulatory oversight is the declaration referred to in para 3 of Article 6b, which is required of the operator of complex motor powered aircraft engaged in non-commercial operations. In this case operators must declare their capability and means to discharge the responsibilities associated with the operation of the aircraft.

The difference envisaged between the regulatory oversight associated with certification and a declaration is evident in several provisions. While paras 1 and 2 of Article 7 and Article 15b deal specifically with certification issues, the declaration process is left entirely to be developed in the implementing rules. It is also noteworthy that the Essential Requirements make reference to ICAO standards and recommended practices (SARPS) and manuals.

3.2 ICAO Considerations

ICAO Annexes 6 Part II International General Aviation Operations – Aeroplanes and 6 Part III, Section III International General Aviation Operations – Helicopters, both place responsibility for adherence to the SARPS on the pilot-in-command and have no provisions related to the operator. Consequently, the State’s primary regulatory oversight focus to ensure compliance with the rules is through the pilot (licence) and aircraft (airworthiness).

The introduction of the concept of complex motor powered aircraft in the Essential Requirements and the recognition of the reality of the operation of such aircraft, logically introduces the role of the operator in these operations. This reality is also reflected in the modernization of Annex 6 Part II which will soon be distributed by ICAO for State comment. In both cases the role of the operator is to develop and implement systems, programs procedures and documentation to endure the safe operation of the aircraft and the adherence to rules. At this point in time the draft of Annex 6 Part II does not specify any State regulatory oversight requirements related to the operator.

While the ICAO Safety Oversight Manual Doc 9734 does not deal specifically with non-commercial air operations it articulates a number of principles that would appear to be applicable. The manual states that it is the responsibility of individual States to “ensure that the national aviation industry provides a safety level equal to, or better than, that defined in the SARPs”. The manual also references Article 12 of the Chicago Convention which states that:

> Each contracting State undertakes to adopt measures to insure that every aircraft flying over or maneuvering within its territory and that every aircraft carrying its nationality mark, wherever such aircraft maybe, shall comply with the rules and regulations relating to the flight and maneuver of aircraft there in force. Each contracting State undertakes to keep its own regulations in these respects uniform, to the greatest possible extent, with those established from time to time under this Convention.

Discussion Paper
Conditions and Procedures Related to Declarations

Article 12 goes on to state that:

Each contracting State undertakes to insure the prosecution of all persons violating the regulations applicable.

The Safety Oversight Manual then articulates a number of principles which are applicable to all oversight activities. These include:

- Adoption of safety management systems by the civil aviation authority in the functional areas of regulation as well as in the operation and service provision,
- Conducting safety oversight in a manner which includes:
  - A systematic approach,
  - Use of risk management strategies,
  - Coordinating with other agencies where jurisdictions overlap or interface, and
  - Requiring and encouraging industry to adopt systematic philosophies as part of an SMS.

The Manual continues on to describe how these principles should be applied to pilots through the licensing requirements and oversight and to aircraft through the airworthiness requirements and oversight. It discussed the use of inspections, analysis of operations, identification of safety deficiencies, granting, suspending or revoking licences, certificates or approvals for all aviation activities as well as air operator certificates.

All of this would appear to indicate that it is expected that all general aviation operations, including pilots, aircraft and non-commercial operators, should be subject to a similar level of safety oversight.

3.3 Declaration Background

When JAR OPS 2 was developed part of the motivation was to ensure an equivalent level of safety for person carried on large and turbojet aircraft engaged in non-commercial operations that were registered in third countries as was being prescribed for those aircraft that were registered in EU countries and subject to the JARs. The concept that was developed to achieve this objective was the requirement for all large and turbojet aircraft based in an EU country to file a registration with the civil aviation authority that included:

1. The official name and business name, address and mailing address of the applicant;
2. A description of the proposed operation, the location of operating bases and, the principal operating base;
3. A description of the management organisation;
4. The name of the accountable manager;

In respect of the aircraft operator’s maintenance system only, the following information must be included in the initial application for Registration.

1. The aircraft operator’s aircraft maintenance programme(s);
2. The aircraft technical log;
3. Where appropriate, the technical specification(s) of the maintenance contract(s) between the aircraft operator and any approved maintenance organisation; and
4. Type(s) [and class(es)] of aircraft and MAPSC if applicable. 4

It was the opinion of the AWGAS that these provisions would play an important role in ensuring that all aircraft operators affected by JAR OPS 2 were aware of the associated requirements and the operator’s accountabilities. The draft JAR-OPS 2 also included in the general rules for registration the requirements that the aircraft operator must:

1. Have a management organisation capable of exercising operational control and supervision over any flight operated under the terms of its Registration,

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4 JAR-OPS 2 Subpart C (draft of August 2004) JAA Aerial Work and General Aviation Sub-Group, Hoofdorp
2. Have appointed an accountable manager who must be advised by competent persons, unless he has competence himself, for ensuring that all operations and maintenance activities can be financed and carried out to an acceptable standard,

3. Ensure that every flight is conducted in accordance with the provisions of the Operations Manual,

4. Ensure that its aircraft are equipped and its crews are qualified, as required for the area and type of operation, and

5. Comply with the maintenance requirements, for all aircraft operated under the terms of its Registration.

The draft also contained the provision that for the Registration to remain valid the operator must:

1. Operated aircraft that have a standard Certificate of Airworthiness issued in accordance with ICAO Annex 8;

2. Maintain the ability to:
   a. Establish and maintain an adequate organisation,
   b. Establish and maintain a safety management system,
   c. Comply with specified training programmes,
   d. Comply with maintenance requirements, consistent with the nature and extent of the operations specified, and
   e. Comply with the general rules for Registration, and

3. Communicate to the Authority any changes to the submitted information.

While the implementing material for the draft rule was not developed, it was the opinion of the AWGAS that the Registration would not involve an audit process but that the National Authorities (NAs) would include the requirements of JAR OPS 2 in their general aviation safety oversight program. Also, there was agreement within the AWGAS that if the operator was registered to be in conformance with a recognized industry standard or code of practice, that fact would be recognized in the NA safety oversight program.

In reaching this conclusion the AWGAS were influenced by:

- the very good safety record of the business aviation community,
- the application of risk management strategies,
- the recognition that the operators of large and turbojet aircraft would be required to develop safety management systems, and
- the role that industry standards, such as the IS-BAO – an International Standards for Business Aircraft Operations, could play.

It was also understood that the Registration process would not create any change in the processes and procedures related to operating authorities such as RVSM, RNP and CAT II or CAT approvals.


Based on the foregoing, it is proposed that the provisions in the OPS Implementing Rules related to a declaration by an aircraft operator of their capability and means to discharge the responsibilities associated with the operation of the aircraft, should follow the following principles:

1. The general rules for declarations should include the requirement that the aircraft operator must:
   a. Have a management organisation capable of exercising operational control and supervision over any flight operated under the terms of its Declaration,
   b. Have appointed an accountable manager who must be advised by competent persons, unless he has competence himself, for ensuring that all operations and maintenance activities can be financed and carried out to an acceptable standard,
   c. Ensure that every flight is conducted in accordance with the provisions of the Operations Manual and any operating approval from the NA,
d. Ensure that its aircraft are equipped and its crews are qualified, as required for the area and type of operation, and

e. Comply with the maintenance requirements, for all aircraft operated under the terms of its Declaration.

2. The declaration should include the requirement for the aircraft operator to:

a. Provide the official name and mailing address of the business and the location of the base of operation,

b. Provide a description of the nature of the operation and the type, number and registration details of the aircraft involved,

c. Provide a description of the management organization and the name of the accountable manager,

d. Declare that they have developed and implemented a safety management system that includes procedures for demonstrating compliance with the requirements of the relevant OPS and Maintenance Parts and that they have developed and implemented the required systems, programs, procedures and manuals, and

e. If they have implemented and demonstrated conformance to, an industry standard, the name of the standards and the date of the last audit of their conformance.

3. The associated rules should contain the requirement that for the declaration to remain valid the aircraft operator must:

a. Maintain the ability to:
   i. Establish and maintain an adequate organisation,
   ii. Establish and maintain a safety management system,
   iii. Comply with specified training programmes,
   iv. Comply with maintenance requirements, consistent with the nature and extent of the operations specified, and
   v. Comply with the general rules for Declarations, and

b. Communicate to the NA any changes to the submitted information.

4. EASA and the NAs should establish a system to record filed declarations that facilitates sharing of the declaration information with ESA and EU member NAs.

5. When declarations are filed, the NA would receive them as information and include the operator in the safety oversight program that they apply to all general aviation operations.

6. The NA safety oversight program should include:

a. Systems and procedures to collect safety information including a confidential reporting system for incidents and aviation system hazards and associated investigations,

b. The provision of safety information, including accident and incident data, to pilots and aircraft operators,

c. Conducting ramp inspections and where indications of safety problems are detected, investigation of the indicated safety problem, and

d. Where the aircraft operator is not registered to be in conformance with a recognized industry standard, periodic evaluations of the operator's SMS.

7. The NAs are not expected to establish programs to audit aircraft operators who are required to file declarations.
### ICAO Cross reference table

#### CHAPTER 3.1 LARGE AND TURBOJET AEROPLANES

<table>
<thead>
<tr>
<th>3.1.1</th>
<th>The following operations shall be subject to the Standards and Recommended Practices of Section II, and those of Section III: International general aviation operations with:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>aeroplanes with a maximum certificated take-off mass exceeding 5 700 kg; or</td>
</tr>
<tr>
<td>b)</td>
<td>aeroplanes equipped with one or more turbojet engines.</td>
</tr>
</tbody>
</table>

| 3.1.2 | **Recommendation.**— An operation involving an aeroplane with a seating configuration of more than 9 passenger seats should be conducted in accordance with Section III. |

| BR Art. 3(j) |

#### CHAPTER 3.2 CORPORATE OPERATIONS

| 3.2.1 | **Recommendation.**— A corporate aviation operation involving three or more aircraft that are operated by pilots employed for the purpose of flying the aircraft should be conducted in accordance with Section III. |

| n/a |

#### CHAPTER 3.3 GENERAL

### 3.3.1 Compliance with laws, regulations and procedures

| 3.3.1.1 | An operator shall ensure that all employees know that they must comply with the laws, regulations and procedures of those States in which operations are conducted. |

**Note.**— Information for pilots on flight procedure parameters and operational procedures is contained in PANS-OPS, Volume I. Criteria for the construction of visual and instrument flight procedures are contained in PANS-OPS, Volume II. Obstacle clearance criteria and procedures used in certain States may differ from PANS-OPS, and knowledge of these differences is important for safety reasons. |

| ER 1.a OPS 2A0.005 |

| 3.3.1.2 | An operator shall ensure that all pilots are familiar with the laws, regulations and procedures, pertinent to the performance of their duties, prescribed for the areas to be traversed, the aerodromes to be used and the air navigation facilities relating thereto. The operator shall ensure that other members of the flight crew are familiar with such of these laws, regulations and procedures as are pertinent to the performance of their respective duties in the operation of the aeroplane. |

| ER 1.a OPS 2A0.005 |

| Check with OPS 0 |

| 3.3.1.3 | The pilot-in-command is responsible for operational control. An operator shall describe the operational control system in the operations manual and identify the roles and responsibilities of those involved in the system. |

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

| ER 1.c, 8.a.1, 8.b OPS 2A1.005 |

| ??? |

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| 3.3.1.4 | An operator shall ensure that the pilot-in-command has available on board the aeroplane all the essential information concerning the search and rescue services in the area over which the aeroplane will be flown. |

| Check with CATAG 0 |

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### 3.3.1.5 An operator shall ensure that flight crew members demonstrate the ability to speak and understand the language used for aeronautical radiotelephony communications as specified in Annex 1.

**OPS 2A6.005**

### 3.3.2 Safety management system

#### 3.3.2.1 An operator shall establish and maintain a safety management system that is appropriate to the size and complexity of the operation.

**Requirements on SMS**

#### 3.3.2.2 Recommendation. — The safety management system should as minimum include:

- a) a process to identify actual and potential safety hazards and assess the associated risks;
- b) a process to develop and implement remedial action necessary to maintain an acceptable level of safety; and
- c) provision for continuous monitoring and regular assessment of the appropriateness and effectiveness of safety management activities.

**Note. — Guidance on safety management systems is contained in ICAO Doc 9859 AN/460 ICAO Safety Management Manual and industry codes of practice.**

### 3.4.1 Operating facilities

An operator shall ensure that a flight will not be commenced unless it has been ascertained by every reasonable means available that the ground and/or water facilities including communication facilities and navigation aids available and directly required on such flight, for the safe operation of the aeroplane, are adequate for the type of operation under which the flight is to be conducted.

**Note. — “Reasonable means” in this Standard is intended to denote the use, at the point of departure, of information available to the operator either through official information published by the aeronautical information services or readily obtainable from other sources.**

### 3.4.2 Operational management

#### 3.4.2.1 Operator notification

- **3.4.2.1.1** If an operator has an operating base in a State other than the State of Registry, the operator shall notify the State in which the operating base is located.
- **3.4.2.1.2** Upon notification in accordance with 3.4.2.1.1, safety and security oversight shall be coordinated between the State in which the operating base is located and the State of Registry.

**Add to OPS 2**

**ER 2.a.1**

**OPS 2A1.015 for authorisation of aerodromes**
<table>
<thead>
<tr>
<th>3.4.2.2  Operations manual</th>
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| 3.4.2.2.1  An operator shall provide, for the use and guidance of personnel concerned, an operations manual containing all the instructions and information necessary for operations personnel to perform their duties. The operations manual shall be amended or revised as is necessary to ensure that the information contained therein is kept up to date. All such amendments or revisions shall be issued to all personnel that are required to use this manual. | ER 8.b  
OPS 2 WP |
| Note 1.— States may reference accepted and recognized industry codes of practice as the basis for the development of an operations manual. |  |
| Note 2.— Attachment A contains guidance on the organization and content of an operations manual. |  |
| 3.4.2.3  Operating instructions — general |  |
| 3.4.2.3.1  An operator shall ensure that all operations personnel are properly instructed in their particular duties and responsibilities and the relationship of such duties to the operation as a whole. | ER 8.b  
OPS 2A6.005 |
| 3.4.2.3.2  Recommendation.— An operator should issue operating instructions and provide information on aeroplane climb performance to enable the pilot-in-command to determine the climb gradient that can be achieved during the departure phase for the existing take-off conditions and intended take-off technique. This information should be included in the operations manual. |  |
| 3.4.2.4  In-flight simulation of emergency situations |  |
| An operator shall ensure that when passengers are being carried, no emergency or abnormal situations shall be simulated. | ER 7.e  
OPS 2A1.010  
OPS 2A1.040 |
| 3.4.2.5  Checklists |  |
| Checklists shall be used by flight crews prior to, during and after all phases of operations, and in emergency, to ensure compliance with the operating procedures contained in the aircraft operating manual and the aeroplane flight manual or other documents associated with the certificate of airworthiness and otherwise in the operations manual, are followed. The design and utilization of checklists shall observe Human Factors principles. | ER 1.b  
OPS 2A1.010  
Add to OPS 2 |
<p>| Note.— Guidance material on the application of Human Factors principles can be found in the Human Factors Training Manual (Doc 9683). |  |
| 3.4.2.6  Minimum flight altitudes |  |
| An operator shall specify, for flights which are to be conducted in accordance with the instrument flight rules, the method of establishing terrain clearance altitudes. | OPS 2A1.025 |</p>
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>3.4.2.7</td>
<td>Aerodrome operating minima&lt;br&gt;An operator shall ensure that no pilot-in-command operates to or from an aerodrome using operating minima lower than those which may be established for that aerodrome by the State in which it is located, except with the specific approval of that State. &lt;br&gt;Note.— It is the practice in some States to declare, for flight planning purposes, higher minima for an aerodrome when nominated as an alternate, than for the same aerodrome when planned as that of intended landing.</td>
</tr>
<tr>
<td>3.4.2.8</td>
<td>Fatigue management&lt;br&gt;3.4.2.8.1 Fatigue management programme. An operator shall establish and implement a fatigue management programme that ensures that all operator personnel involved in the operation and maintenance of aircraft do not carry out their duties when fatigued. The programme shall address flight and duty times and be included in the operations manual. &lt;br&gt;3.4.2.8.2 If deviations from the flight and or duty time limitations are permitted, the system shall include provisions for:&lt;br&gt;a) assessing the associated risks and applying appropriate mitigation to ensure that there is no degradation of safety, and&lt;br&gt;b) identify the management person who is authorized to approve the deviation. &lt;br&gt;3.4.2.8.3 In the case of deviations, the risk assessment and related mitigation shall be recorded in writing. &lt;br&gt;3.4.2.8.4 Deviations shall be made only with the approval of all personnel involved. &lt;br&gt;Note. — Accepted industry codes of practice may be used in the development of such a programme.</td>
</tr>
<tr>
<td>3.4.2.9</td>
<td>Passengers&lt;br&gt;3.4.2.9.1 An operator shall ensure that passengers are made familiar with the location and use of:&lt;br&gt;a) seat belts;&lt;br&gt;b) emergency exits;&lt;br&gt;c) life jackets, if the carriage of life jackets is prescribed;&lt;br&gt;d) oxygen dispensing equipment, if the provision of oxygen for the use of passengers is prescribed; and&lt;br&gt;e) other emergency equipment provided for individual use, including passenger emergency briefing cards.</td>
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<tr>
<th>References</th>
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<tbody>
<tr>
<td>ER 3.a.5</td>
<td>OPS 2A1.020</td>
</tr>
<tr>
<td>ER 8.f</td>
<td>OPS 2 WP</td>
</tr>
<tr>
<td>OPS 0</td>
<td>ER 2.a.2</td>
</tr>
<tr>
<td>3.4.2.9.2</td>
<td>An operator shall ensure that all persons on board are aware of the location and general manner of use of the principal emergency equipment carried for collective use.</td>
</tr>
<tr>
<td>3.4.2.9.3</td>
<td>An operator shall ensure that in an emergency during flight, passengers are instructed in such emergency action as may be appropriate to the circumstances.</td>
</tr>
<tr>
<td>3.4.2.9.4</td>
<td>An operator shall ensure that during take-off and landing and whenever, by reason of turbulence or any emergency occurring during flight, the precaution is considered necessary, all passengers on board an aeroplane are secured in their seats by means of the seat belts or harnesses provided.</td>
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### 3.4.3 Flight preparation

#### 3.4.3.1 The operator shall develop procedures to ensure that a flight is not commenced unless:

- a) the aeroplane is airworthy, duly registered and that appropriate certificates with respect thereto are aboard the aeroplane;
- b) the instruments and equipment installed in the aeroplane are appropriate, taking into account the expected flight conditions;
- c) any necessary maintenance has been performed in accordance with Chapter 8 of the relevant Section of this Part;
- d) the mass of the aeroplane and centre of gravity location are such that the flight can be conducted safely, taking into account the flight conditions expected;
- e) any load carried is properly distributed and safely secured; and
- f) the aeroplane operating limitations, contained in the flight manual, or its equivalent, will not be exceeded.

#### 3.4.3.2 Recommendation

The operator should make available sufficient information on climb performance with all engines operating to enable determination of the climb gradient that can be achieved during the departure phase for the existing take-off conditions and intended take-off technique.

#### 3.4.3.3 Operational flight planning

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

#### 3.4.3.4 Alternate Aerodromes

- **3.4.3.4.1 Take-off alternate aerodrome**

<table>
<thead>
<tr>
<th>OPS 0</th>
<th>OPS 2A.005</th>
<th>OPS 2.A1 Operational Procedures</th>
<th>OPS 2A9.025</th>
<th>OPS 0</th>
</tr>
</thead>
</table>

Part-M, OPS 0
OPS 0
Part-M
OPS 2 WP
OPS 0
OPS 2A2.005
n/a
OPS 2.A1 Operational Procedures
OPS 2A9.025
### 3.4.3.4.1 Take-off alternate aerodrome

A take-off alternate aerodrome shall be selected and specified in the flight plan if the weather conditions at the aerodrome of departure are at or below the applicable aerodrome operating minima or it would not be possible to return to the aerodrome of departure for other reasons.

**3.4.3.4.1.2** The take-off alternate aerodrome shall be located within the following distance from the aerodrome of departure:

- **a)** aeroplanes having two power-units. Not more than a distance equivalent to a flight time of one hour at the single-engine cruise speed; and
- **b)** aeroplanes having three or more power-units. Not more than a distance equivalent to a flight time of two hours at the one-engine inoperative cruise speed.

**3.4.3.4.1.3** For an aerodrome to be selected as a take-off alternate the available information shall indicate that, at the estimated time of use, the conditions will be at or above the aerodrome operating minima for that operation.

### 3.4.3.5 Refuelling with passengers on board

**3.4.3.5.1** An aeroplane shall not be refuelled when passengers are embarking, on board or disembarking unless it is properly attended by qualified personnel ready to initiate and direct an evacuation of the aeroplane by the most practical and expeditious means available.

**3.4.3.5.2** When refuelling with passengers embarking, on board or disembarking, two-way communication shall be maintained by the aeroplane’s intercommunication system or other suitable means between the ground crew supervising the refuelling and the qualified personnel on board the aeroplane.

**Note 1.** The provisions of 3.4.3.5.1 do not necessarily require the deployment of integral aeroplane stairs or the opening of emergency exits as a prerequisite to refuelling.

**Note 2.** Provisions concerning aircraft refuelling are contained in Annex 14, Volume I, and guidance on safe refuelling practices is contained in the Airport Services Manual (Doc 9137), Parts 1 and 8.

**Note 3.** Additional precautions are required when refuelling with fuels other than aviation kerosene or when refuelling results in a mixture of aviation kerosene with other aviation turbine fuels, or when an open line is used.

### 3.4.3.6 Oxygen supply

**3.4.3.6.1** A flight to be operated at flight altitudes at which the atmospheric pressure in personnel compartments will be less than 700 hPa shall not be commenced unless sufficient stored breathing oxygen is carried to supply:

- **a)** all crew members and 10 per cent of the passengers for any period in excess of 30 minutes that the pressure in
compartments occupied by them will be between 700 hPa and 620 hPa; and
b) the crew and passengers for any period that the atmospheric pressure in compartments occupied by them will be less than 620 hPa.

3.4.3.6.2 A flight to be operated with a pressurized aeroplane shall not be commenced unless a sufficient quantity of stored breathing oxygen is carried to supply all the crew members and passengers, as is appropriate to the circumstances of the flight being undertaken, in the event of loss of pressurization, for any period that the atmospheric pressure in any compartment occupied by them would be less than 700 hPa. In addition, when an aeroplane is operated at flight altitudes at which the atmospheric pressure is less than 376 hPa, or which, if operated at flight altitudes at which the atmospheric pressure is more than 376 hPa and cannot descend safely within four minutes to a flight altitude at which the atmospheric pressure is equal to 620 hPa, there shall be no less than a 10-minute supply for the occupants of the passenger compartment.

3.4.4 In-flight procedures

3.4.4.1 A precision instrument approach where RVR is report shall not be continued beyond the final approach fix unless the controlling RVR is equal to or above the specified minimum.

3.4.4.2 If, after the final approach fix is passed, the controlling RVR falls below the specified minimum, the approach may be continued to DA/H.

Note.— Controlling RVR means the reported values of one or more RVR reporting locations (touchdown, mid-point and stop-end) used to determine whether operating minima are or are not met. Where RVR is used, the controlling RVR is the touchdown RVR, unless otherwise specified by State criteria.

3.4.4.3 Recommendation.— In the standard operating procedures recommended in 3.6.1.2 an operator should include operating procedures for conducting instrument approaches.

3.4.5 Use of oxygen

3.4.5.1 All flight crew members, when engaged in performing duties essential to the safe operation of an aeroplane in flight, shall use breathing oxygen continuously whenever the circumstances prevail for which its supply has been required in 3.4.3.6.1 or 3.4.3.6.2.

3.4.5.2 All flight crew members of pressurized aeroplanes operating above an altitude where the atmospheric pressure is less than 376 hPa shall have available at the flight duty station a quick-donning type of oxygen mask which will readily supply oxygen upon demand.

3.4.5.2.1 Recommendation.— Aeroplane operating procedures for noise abatement should comply with the provisions of PANS-OPS (Doc 8168), Volume I, Part V.

Add to OPS 2 OM
### 3.4.5.2.2 Recommendation
Noise abatement procedures specified by an operator for any one aeroplane type should be the same for all aerodromes.

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

### 3.4.6 Duties of pilot-in-command

**3.4.6.1** The pilot-in-command shall ensure that the check-lists specified in 3.4.2.5 are complied with in detail.

**3.4.6.2** The pilot-in-command shall be responsible for notifying the nearest appropriate authority by the quickest available means of any accident involving the aeroplane, resulting in serious injury or death of any person or substantial damage to the aeroplane or property. In the event that the pilot-in-command is incapacitated the operator shall take the foregoing action.

Note. — A definition of the term “serious injury” is contained in Annex 13 and an explanation of the term “substantial damage” is given in the Accident/Incident Reporting Manual (ADREP Manual) (Doc 9156).

**3.4.6.3** The pilot-in-command shall be responsible for reporting all known or suspected defects in the aeroplane, to the operator, at the termination of the flight.

**3.4.6.4** The pilot-in-command shall be responsible for the journey log book or the general declaration containing the information listed in 3.11.4.

Note. — By virtue of Resolution A10-36 of the Tenth Session of the Assembly (Caracas, June–July 1956) “the General Declaration, [described in Annex 9] when prepared so as to contain all the information required by Article 34 [of the Convention on International Civil Aviation] with respect to the journey log book, may be considered by Contracting States to be an acceptable form of journey log book”.

### 3.4.7 Cabin baggage (take-off and landing)

An operator shall specify procedures to ensure that all baggage carried onto an aeroplane and taken into the passenger cabin is adequately and securely stowed.

### CHAPTER 3.5 AROPLANE PERFORMANCE OPERATING LIMITATIONS

#### 3.5.1 General

**3.5.1.1 Recommendation.** — For aeroplanes for which Parts IIIA and IIIB of Annex 8 is not applicable because of the exemption provided for in Article 41 of the Convention, the State of Registry should ensure that the level of performance specified in 3.5.2 should be met as far as practicable.

### 3.5.2 Applicable to aeroplanes certificated in accordance with Parts IIIA and IIIB of Annex 8

**3.5.2.1** The Standards contained in 3.5.2.2 to 3.5.2.9 inclusive are applicable to the aeroplanes to which Parts IIIA and IIIB of Annex 8 are applicable.

Note. — The Standards of Annex 8 — Airworthiness of Aircraft, Parts IIIA and IIIB, apply to all aeroplanes of over 5 700 kg maximum certificated take-off mass intended for the carriage of passengers or cargo or mail in
international air navigation.

3.5.2.2 An aeroplane shall be operated in compliance with the terms of its certificate of airworthiness and within the approved operating limitations contained in its flight manual.

3.5.2.3 The State of Registry shall take such precautions as are reasonably possible to ensure that the general level of safety contemplated by these provisions is maintained under all expected operating conditions, including those not covered specifically by the provisions of this chapter.

3.5.2.4 A flight shall not be commenced unless the performance information provided in the flight manual indicates that the Standards of 3.5.2.5 to 3.5.2.9 can be complied with for the flight to be undertaken.

3.5.2.5 In applying the Standards of this chapter, account shall be taken of all factors that significantly affect the performance of the aeroplane (such as: mass, operating procedures, the pressure-altitude appropriate to the elevation of the aerodrome, temperature, wind, runway gradient and condition of runway, i.e. presence of slush, water and/or ice, for landplanes, water surface condition for seaplanes). Such factors shall be taken into account directly as operational parameters or indirectly by means of allowances or margins, which may be provided in the scheduling of performance data or in the comprehensive and detailed code of performance in accordance with which the aeroplane is being operated.

3.5.2.6 Mass limitations

a) The mass of the aeroplane at the start of take-off shall not exceed the mass at which 3.5.2.7 is complied with, nor the mass at which 3.5.2.8 and 3.5.2.9 are complied with, allowing for expected reductions in mass as the flight proceeds, and for such fuel jettisoning as is envisaged in applying 3.5.2.8 and 3.5.2.9 and, in respect of alternate aerodromes, 3.5.2.6 c) and 3.5.2.9.

b) In no case shall the mass at the start of take-off exceed the maximum take-off mass specified in the flight manual for the pressure-altitude appropriate to the elevation of the aerodrome, and, if used as a parameter to determine the maximum take-off mass, any other local atmospheric condition.

c) In no case shall the estimated mass for the expected time of landing at the aerodrome of intended landing and at any destination alternate aerodrome, exceed the maximum landing mass specified in the flight manual for the pressure-altitude appropriate to the elevation of those aerodromes, and if used as a parameter to determine the maximum landing mass, any other local atmospheric condition.

d) In no case shall the mass at the start of take-off, or at the expected time of landing at the aerodrome of intended landing and at any destination alternate aerodrome, exceed the relevant maximum masses at which compliance has been demonstrated with the applicable noise certification Standards in Annex 16, Volume I, unless otherwise authorized in exceptional circumstances for a certain aerodrome or a runway where there is no noise disturbance problem, by the competent authority of the State in which the aerodrome is situated.

3.5.2.7 Take-off. The aeroplane shall be able, in the event of a critical power-unit failing at any point in the
take-off, either to discontinue the take-off and stop within the accelerate-stop distance available [or runway available], or to continue the take-off and clear all obstacles along the flight path by an adequate margin until the aeroplane is in a position to comply with 3.5.2.8.

Note.— “An adequate margin” referred to in this provision is illustrated by the appropriate examples included in Attachment C to Annex 6, Part I.

3.5.2.7.1 In determining the length of the runway available, account shall be taken of the loss, if any, of runway length due to alignment of the aeroplane prior to take-off.

3.5.2.8 En route — one power-unit inoperative. The aeroplane shall be able, in the event of the critical engine becoming inoperative at any point along the route or planned diversions there from, to continue the flight to an aerodrome at which the Standard of 3.5.2.9 can be met, without flying below the minimum obstacle clearance altitude at any point.

3.5.2.9 Landing. The aeroplane shall, at the aerodrome of intended landing and at any alternate aerodrome, after clearing all obstacles in the approach path by a safe margin, be able to land, with assurance that it can come to a stop or, for a seaplane, to a satisfactorily low speed, within the landing distance available. Allowance shall be made for expected variations in the approach and landing techniques, if such allowance has not been made in the scheduling of performance data.

CHAPTER 3.6 AEROPLANE INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS

Note.— Specifications for the provision of aeroplane communication and navigation equipment are contained in Chapter 3.7.

3.6.1 General

3.6.1.1 Where a Master Minimum Equipment List (MMEL) is established for the aircraft type, the operator shall include in the operations manual a Minimum Equipment List (MEL) approved by the State of Registry of the aeroplane which will enable the pilot-in-command to determine whether a flight may be commenced or continued from any intermediate stop should any instrument, equipment or systems become inoperative.

Note.— Attachment B contains guidance on the minimum equipment list.

3.6.1.2 Recommendation.— An operator should provide operations staff and flight crew with standard operating procedures, for each aircraft type operated, containing the normal, abnormal and emergency procedures relating to the operation of the aircraft. The manual shall be consistent with the aircraft flight manual and checklists to be used. The design of the manual should observe Human Factors principles.

Note.— Guidance material on the application of Human Factors principles can be found in the Human Factors Training Manual (Doc 9683).

3.6.2 Aeroplanes on all flights
3.6.2.1 In addition to the requirements contained in 2.4.2.2, an aeroplane shall be equipped with:

a) accessible and adequate medical supplies appropriate to the number of passengers the aeroplane is authorized to carry.

b) Recommendation. — Medical supplies should comprise one or more first-aid kits.

Note. — Guidance on the types, number, location and contents of the medical supplies is given in Attachment B to Annex 6, Part I.

c) a safety harness for each flight crew seat. The safety harness for each pilot seat shall incorporate a device which will automatically restrain the occupant’s torso in the event of rapid deceleration;

d) Recommendation. — The safety harness for each pilot seat should incorporate a device to prevent a suddenly incapacitated pilot from interfering with the flight controls.

Note. — Safety harness includes shoulder straps and a seat belt which may be used independently.

e) means of ensuring that the following information and instructions are conveyed to passengers:

1) when seat belts are to be fastened;
2) when and how oxygen equipment is to be used if the carriage of oxygen is required;
3) restrictions on smoking;
4) location and use of life jackets or equivalent individual flotation devices where their carriage is required;
5) location of emergency equipment; and
6) location and method of opening emergency exits.

3.6.2.2 An aeroplane shall carry:

a) the operations manual prescribed in 3.4.2.2, or those parts of it that pertain to flight operations;

b) the flight manual for the aeroplane, or other documents containing performance data required for the application of Chapter 3.5 and any other information necessary for the operation of the aeroplane within the terms of its certificate of airworthiness, unless these data are available in the operations manual; and

c) the checklists to which 3.4.2.5 refers.
3.6.3 Flight recorders

| Note 1.— Flight recorders comprise two systems, a flight data recorder and a cockpit voice recorder. |
| Note 2.— Combination recorders (FDR/CVR) can only be used to meet the flight recorder equipage requirements as specifically indicated in this Annex. |
| Note 3.— Detailed guidance on flight recorders is contained in Attachment C. |

3.6.3.1 Flight data recorders — types

3.6.3.1.1 A Type I flight data recorder shall record the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power, configuration and operation.

3.6.3.1.2 A Type II flight data recorder shall record the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power and configuration of lift and drag devices.

3.6.3.1.3 The use of engraving metal foil flight data recorders shall be discontinued by 1 January 1995.

3.6.3.1.4 **Recommendation.**— The use of analogue flight data recorders using frequency modulation (FM) should be discontinued by 5 November 1998.

3.6.3.1.4.1 The use of photographic film flight data recorders shall be discontinued from 1 January 2003.

3.6.3.1.5 All aeroplanes for which the individual certificate of airworthiness is first issued after 1 January 2005, which utilize data link communications and are required to carry a cockpit voice recorder (CVR), shall record on a flight recorder, all data link communications to and from the aeroplane. The minimum recording duration shall be equal to the duration of the CVR, and shall be correlated to the recorded cockpit audio.

3.6.3.1.5.1 From 1 January 2007, all aeroplanes which utilize data link communications and are required to carry a CVR, shall record on a flight recorder, all data link communications to and from the aeroplane. The minimum recording duration shall be equal to the duration of the CVR, and shall be correlated to the recorded cockpit audio.

3.6.3.1.5.2 Sufficient information to derive the content of the data link communications message, and, whenever practical, the time the message was displayed to or generated by the crew shall be recorded.

**Note.**— Data link communications include, but are not limited to automatic dependent surveillance (ADS), controller-pilot data link communications (CPDLC), data link-flight information services (D-FIS) and aeronautical operational control (AOC) messages.

3.6.3.1.6 **Recommendation.**— All aeroplanes of a maximum certificated take-off mass over 5 700 kg, required to be equipped with a flight data recorder and a cockpit voice recorder, may alternatively be equipped with two combination recorders (FDR/CVR).
3.6.3.1.7 **Recommendation.** – All aeroplanes of a maximum certificated take-off mass of 5 700 kg or less, required to be equipped with a flight data recorder and/or a cockpit voice recorder, may alternatively be equipped with one combination recorder (FDR/CVR).

3.6.3.1.8 A Type IA flight data recorder shall record the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power, configuration and operation. The parameters that satisfy the requirements for a Type IA flight data recorder are listed in the paragraphs below. The parameters without an asterisk (*) are mandatory parameters which shall be recorded. In addition, the parameters designated by an asterisk (*) shall be recorded if an information data source for the parameter is used by aeroplane systems or the flight crew to operate the aeroplane.

3.6.3.1.8.1 The following parameters satisfy the requirements for flight path and speed:

- Pressure altitude
- Indicated airspeed or calibrated airspeed
- Air–ground status and each landing gear air-ground sensor when practicable
- Total or outside air temperature
- Heading (primary flight crew reference)
- Normal acceleration
- Lateral acceleration
- Longitudinal acceleration (body axis)
- Time or relative time count
- Navigation data*: drift angle, wind speed, wind direction, latitude/longitude
- Groundspeed*
- Radio altitude*

3.6.3.1.8.2 The following parameters satisfy the requirements for attitude:

- Pitch attitude
- Roll attitude
- Yaw or sideslip angle*
- Angle of attack*

3.6.3.1.8.3 The following parameters satisfy the requirements for engine power:

- Engine thrust/power: propulsive thrust/power on each engine, cockpit thrust/power lever position
- Thrust reverse status*
- Engine thrust command*  
- Engine thrust target*
- Engine bleed valve position*
- Additional engine parameters*: EPR, \( N_1 \), indicated vibration level, \( N_2 \), EGT, TLA, fuel flow, fuel cut-off lever position, \( N_3 \)
3.6.3.1.8.4 The following parameters satisfy the requirements for configuration:

- Pitch trim surface position
- Flaps*: trailing edge flap position, cockpit control selection
- Slats*: leading edge flap (slat) position, cockpit control selection
- Landing gear*: landing gear, gear selector position
- Yaw trim surface position*
- Roll trim surface position*
- Cockpit trim control input position pitch*
- Cockpit trim control input position roll*
- Cockpit trim control input position yaw*
- Ground spoiler and speed brake*: ground spoiler position, ground spoiler selection, speed brake position, speed brake selection
- De-icing and/or anti-icing systems selection*
- Hydraulic pressure (each system)*
- Fuel quantity*
- AC electrical bus status*
- DC electrical bus status*
- APU bleed valve position*
- Computed centre of gravity*

3.6.3.1.8.5 The following parameters satisfy the requirements for operation:

- Warnings
- Primary flight control surface and primary flight control pilot input: pitch axis, roll axis, yaw axis
- Marker beacon passage
- Each navigation receiver frequency selection
- Manual radio transmission keying and CVR/FDR synchronization reference
- Autopilot/autothrottle/AFC mode and engagement status*
- Selected barometric setting*: pilot, first officer
- Selected altitude (all pilot selectable modes of operation)*
- Selected speed (all pilot selectable modes of operation)*
- Selected mach (all pilot selectable modes of operation)*
- Selected vertical speed (all pilot selectable modes of operation)*
- Selected heading (all pilot selectable modes of operation)*
- Selected flight path (all pilot selectable modes of operation)*: course/DSTRK, path angle
- Selected decision height*
- EFIS display format*: pilot, first officer
- Multi-function/engine/alerts display format*
- GPWS/TAWS/GCAS status*: selection of terrain display mode including pop-up display status, terrain alerts, both cautions and warnings, and advisories, on/off switch position
- Low pressure warning*: hydraulic pressure, pneumatic pressure
- Computer failure*
- Loss of cabin pressure*
- TCAS/ACAS (traffic alert and collision avoidance system/airborne collision avoidance system)*
- Ice detection*  
- Engine warning each engine vibration*  
- Engine warning each engine over temperature*  
- Engine warning each engine oil pressure low*  
- Engine warning each engine over speed*  
- Wind shear warning*  
- Operational stall protection, stick shaker and pusher activation*  
- All cockpit flight control input forces*: control wheel, control column, rudder pedal cockpit input forces  
- Vertical deviation*: ILS glide path, MLS elevation, GNSS approach path  
- Horizontal deviation*: ILS localizer, MLS azimuth, GNSS approach path  
- DME 1 and 2 distances*  
- Primary navigation system reference*: GNSS, INS, VOR/DME, MLS, Loran C, ILS  
- Brakes*: left and right brake pressure, left and right brake pedal position  
- Date*  
- Event marker*  
- Head up display in use*  
- Para visual display on*  

Note 1.— Parameter requirements, including range, sampling, accuracy and resolution, as contained in the Minimum Operational Performance Specification (MOPS) document for Flight Recorder Systems of the European Organization for Civil Aviation Equipment (EUROCAE) or equivalent documents.

Note 2.— The number of parameters to be recorded will depend on aeroplane complexity. Parameters without an (*) are to be recorded regardless of aeroplane complexity. Those parameters designated by an (*) are to be recorded if an in-formation source for the parameter is used by aeroplane systems and/or flight crew to operate the aeroplane.

3.6.3.2 Flight data recorders — duration

Types I and II flight data recorders shall be capable of retaining the information recorded during at least the last 25 hours of their operation.

3.6.3.3 Flight data recorders — aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 1989

3.6.3.3.1 All aeroplanes of a maximum certificated take-off mass of over 27 000 kg shall be equipped with a Type I flight data recorder.

3.6.3.3.2 Recommendation.— All aeroplanes of a maximum certificated take-off mass of over 5 700 kg up to and including 27 000 kg should be equipped with a Type II flight data recorder.

3.6.3.4 Flight data recorders — aeroplanes for which the individual certificate of airworthiness is first issued

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after 1 January 2005

All aeroplanes of a maximum certificated take-off mass of over 5 700 kg shall be equipped with a Type IA flight data recorder.

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<th>Section</th>
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<tr>
<td>3.6.3.5</td>
<td>Cockpit voice recorders — aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 1987</td>
</tr>
<tr>
<td></td>
<td>Note.— Cockpit voice recorder performance requirements are as contained in the Minimum Operational Performance Specifications (MOPS) document for Flight Recorder Systems of the European Organization for Civil Aviation Equipment (EUROCAE) or equivalent documents.</td>
</tr>
<tr>
<td>3.6.3.5.1</td>
<td>All aeroplanes of a maximum certificated take-off mass of over 27 000 kg shall be equipped with a cockpit voice recorder, the objective of which is the recording of the aural environment on the flight deck during flight time.</td>
</tr>
<tr>
<td>3.6.3.5.2</td>
<td><strong>Recommendation.</strong>— <em>All aeroplanes of a maximum certificated take-off mass of over 5 700 kg up to and including 27 000 kg should be equipped with a cockpit voice recorder, the objective of which is the recording of the aural environment on the flight deck during flight time.</em></td>
</tr>
<tr>
<td>3.6.3.6</td>
<td>Cockpit voice recorders — duration</td>
</tr>
<tr>
<td>3.6.3.6.1</td>
<td>A cockpit voice recorder shall be capable of retaining the information recorded during at least the last 30 minutes of its operation.</td>
</tr>
<tr>
<td>3.6.3.6.2</td>
<td><strong>Recommendation.</strong>— <em>A cockpit voice recorder, installed in aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1990, should be capable of retaining the information recorded during at least the last two hours of its operation.</em></td>
</tr>
<tr>
<td>3.6.3.6.3</td>
<td>A cockpit voice recorder, installed in aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued after 1 January 2003, shall be capable of retaining the information recorded during at least the last two hours of its operation.</td>
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<tr>
<td>3.6.3.7</td>
<td>Flight recorders — construction and installation</td>
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<tr>
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<td>Flight recorders shall be constructed, located and installed so as to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed. Flight recorders shall meet the prescribed crashworthiness and fire protection specifications.</td>
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<tr>
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<td>Note.— <em>Industry crashworthiness and fire protection specifications can be found in documents such as the European Organization for Civil Aviation Equipment (EUROCAE) documents ED55 and ED56A.</em></td>
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<tr>
<td>3.6.3.8</td>
<td>Flight recorders — operation</td>
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<tr>
<td>3.6.3.8.1    Flight recorders shall not be switched off during flight time.</td>
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<tr>
<td>3.6.3.8.2    To preserve flight recorder records, flight recorders shall be de-activated upon completion of flight time following an accident or incident. The flight recorders shall not be re-activated before their disposition as determined in accordance with Annex 13.</td>
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<tr>
<td>Note 1.— The need for removal of the flight recorder records from the aircraft will be determined by the investigation authority in the State conducting the investigation with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.</td>
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<tr>
<td>Note 2.— The pilot-in-command’s responsibilities regarding the retention of flight recorder records are contained in 3.6.3.9.</td>
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<tr>
<td>3.6.3.9    Flight recorder records</td>
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<td>The pilot-in-command shall ensure, to the extent possible, in the event the aeroplane becomes involved in an accident or incident, the preservation of all related flight recorder records, and if necessary the associated flight recorders, and their retention in safe custody pending their disposition as determined in accordance with Annex 13.</td>
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<tr>
<td>3.6.3.10    Flight recorders — continued serviceability</td>
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<tr>
<td>Operational checks and evaluations of recordings from the flight data and cockpit voice recorder systems shall be conducted to ensure the continued serviceability of the recorders.</td>
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<tr>
<td>Note.— Procedures for the inspections of the flight data and cockpit voice recorder systems are given in Attachment C.</td>
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<tr>
<td>3.6.3.11    Aeroplanes on long-range over-water flights</td>
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<tr>
<td>3.6.3.11.1    The operator of an aeroplane operated on an extended flight overwater shall determine the risks to survival of the occupants of the aeroplane in the event of a ditching. The operator shall take into account the operating environment and conditions such as, but not limited to, sea state and sea and air temperatures, the distance from land suitable for making an emergency landing, and the availability of search and rescue facilities. Based upon the assessment of these risks, the operator shall, in addition to the equipment required in 2.4.5.3, ensure that the aeroplane is appropriately equipped with:</td>
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<td>a) life-saving rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in emergency, provided with such lifesaving equipment, including means of sustaining life, as is appropriate to the flight to be undertaken; and</td>
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<td>b) equipment for making the distress signals described in Annex 2.</td>
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3.6.3.11.2 Each life jacket and equivalent individual flotation device, when carried in accordance with 2.4.4.3, shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons, except where the requirement of 2.4.4.3 is met by the provision of individual flotation devices other than life jackets.

3.6.3.12 Aeroplanes for which the individual certificate of airworthiness is first issued before 1 January 1990

3.6.12.1 Pressurized aeroplanes intended to be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa shall be equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurization.

3.6.12.2 An aeroplane intended to be operated at flight altitudes at which the atmospheric pressure is less than 700 hPa in personnel compartments shall be equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in 3.4.3.6.1.

3.6.12.3 An aeroplane intended to be operated at flight altitudes at which the atmospheric pressure is less than 700 hPa but which is provided with means of maintaining pressures greater than 700 hPa in personnel compartments shall be provided with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in 3.4.3.6.2.

3.6.4 Aeroplanes in icing conditions

Aeroplanes shall be equipped with suitable de-icing and/or anti-icing devices when operated in circumstances in which icing conditions are reported to exist or are expected to be encountered.

3.6.5 Aeroplanes operated in accordance with instrument flight rules

3.6.5.1 In addition to the requirements contained in 2.6.7.1, aeroplanes when operated in accordance with the instrument flight rules or when the aeroplane cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be equipped with two independent altitude measuring and display systems.

3.6.5.2 Aeroplanes over 5 700 kg — Emergency power supply for electrically operated attitude indicating instruments

3.6.5.2.1 Aeroplanes of a maximum certificated take-off mass of over 5 700 kg newly introduced into service after 1 January 1975 shall be fitted with an emergency power supply, independent of the main electrical generating system, for the purpose of operating and illuminating, for a minimum period of 30 minutes, an attitude indicating instrument (artificial horizon), clearly visible to the pilot-in-command. The emergency power supply shall be automatically operative after the total failure of the main electrical generating system and clear indication shall be given on the instrument panel that the attitude indicator(s) is being operated by emergency power.

3.6.5.2.2 Recommendation. — Aircraft with advanced cockpit automation systems (glass cockpits) should have system redundancy that provides the flight crew with attitude, heading, airspeed and altitude indications in case of failure of the primary system or display.

3.6.5.2.3 Those instruments that are used by any one pilot shall be so arranged as to permit the pilot to see their
indications readily from his or her station, with the minimum practicable deviation from the position and line of vision normally assumed when looking forward along the flight path.

### 3.6.6 Pressurized aeroplanes when carrying passengers — weather detecting equipment

Pressurized aeroplanes when carrying passengers shall be equipped with operative weather detecting equipment capable of detecting thunderstorms whenever such aeroplanes are being operated in areas where such conditions, may be expected to exist along the route either at night or under instrument meteorological conditions.

### 3.6.7 Aeroplanes operated above 15 000 m (49 000 ft) — radiation indicator

**Recommendation.** — Aeroplanes intended to be primarily operated above 15 000 m (49 000 ft) shall carry equipment to measure and indicate continuously the dose rate of total cosmic radiation being received (i.e. the total of ionizing and neutron radiation of galactic and solar origin) and the cumulative dose on each flight. The display unit of the equipment shall be readily visible to a flight crew member.

*Note.* — The equipment is calibrated on the basis of assumptions acceptable to the appropriate national authorities.

### 3.6.8 Aeroplanes required to be equipped with ground proximity warning systems (GPWS)

- **3.6.8.1** All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

- **3.6.8.2** **Recommendation.** — All piston-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers should be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

### 3.6.9 Aeroplanes carrying passengers — cabin crew seats

#### 3.6.9.1 Aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 1981

Aeroplanes shall be equipped with a forward or rearward facing (within 15 degrees of the longitudinal axis of the aeroplane) seat, fitted with a safety harness for the use of each cabin crew member required to satisfy the intent of 3.12.1 in respect of emergency evacuation.

#### 3.6.9.2 Aeroplanes for which the individual certificate of airworthiness was first issued before 1 January 1981

- **3.6.9.2.1** **Recommendation.** — Aeroplanes should be equipped with a forward or rearward facing (within 15 degrees of the longitudinal axis of the aeroplane) seat, fitted with a safety harness for the use of each cabin crew member required to satisfy the intent of 3.12.1 in respect of emergency evacuation.

  *Note.* — Safety harness includes shoulder straps and a seat belt which may be used independently.

#### 3.6.9.2.2 Cabin crew seats provided in accordance with 3.6.9.1 or 3.6.9.2.1 shall be located near floor level and
other emergency exits as required by the State of Registry for emergency evacuation.

<table>
<thead>
<tr>
<th>3.6.10</th>
<th>Aeroplanes required to be equipped with an airborne collision avoidance system (ACAS)</th>
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<tbody>
<tr>
<td>3.6.10.1</td>
<td>Recommendation.— All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15 000 kg, or authorized to carry more than 30 passengers, for which the individual airworthiness certificate is first issued after 24 November 2005, should be equipped with an airborne collision avoidance system (ACAS II).</td>
</tr>
<tr>
<td>3.6.10.2</td>
<td>All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15 000 kg or authorized to carry more than 30 passengers, for which the individual airworthiness certificate is first issued after 1 January 2007, shall be equipped with an airborne collision avoidance system (ACAS II).</td>
</tr>
<tr>
<td>3.6.10.3</td>
<td>Recommendation.— All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg but not exceeding 15 000 kg, or authorized to carry more than 19 passengers, for which the individual airworthiness certificate is first issued after 1 January 2008, should be equipped with an airborne collision avoidance system (ACAS II).</td>
</tr>
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<tr>
<th>3.6.11</th>
<th>Aeroplanes required to be equipped with a pressure-altitude reporting transponder</th>
</tr>
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</table>
| 3.6.11.1 | Aeroplanes shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of Annex 10, Volume IV.  

Note.— This provision is intended to improve the effectiveness of air traffic services as well as airborne collision avoidance systems. |

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<tr>
<th>3.6.12</th>
<th>Microphones</th>
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<td>All flight crew members required to be on flight deck duty shall communicate through boom or throat microphones below the transition level/altitude.</td>
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</table>

CHAPTER 3.7 AEROPLANE COMMUNICATION AND NAVIGATION EQUIPMENT

<table>
<thead>
<tr>
<th>3.7.1</th>
<th>Communication equipment</th>
</tr>
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</table>
| 3.7.1.1 | In addition to the requirements of 2.5.1.1 to 2.5.1.5, an aeroplane shall be provided with radio communication equipment capable of:  
a) conducting two-way communication for aerodrome control purposes;  
b) receiving meteorological information at any time during flight; and  
c) conducting two-way communication at any time during flight with at least one aeronautical station and with such other aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.  

Note.— The requirements of 3.7.1.1 are considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route. |

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### 3.7.2 Installation

The equipment installation shall be such that the failure of any single unit required for either communications or navigation purposes or both will not result in the failure of another unit required for communications or navigation purposes.  

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### 3.7.3 Electronic navigation data management

3.7.3.1 An operator of an aeroplane shall not employ electronic navigation data products that have been processed for application in the air and on the ground unless the State of Registry has approved the operator’s procedures for ensuring that the process applied and the products delivered have met acceptable standards of integrity and that the products are compatible with the intended function of the equipment that will use them. The State of Registry shall ensure that the operator continues to monitor both process and products.  

Note.— Guidance relating to the processes that data suppliers may follow is contained in RTCA DO-200A/EUROCAE ED-76 and RTCA DO-201A/EUROCAE ED-77.  

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3.7.3.2 An operator shall implement procedures that ensure the timely distribution and insertion of current and unaltered electronic navigation data to all aeroplanes that require it.  

### CHAPTER 3.8 AEROPLANE MAINTENANCE

Regulation 2042/2003

#### 3.8.1 Operator’s maintenance responsibilities

3.8.1.1 – 3.8.1.4 An operator shall comply with the requirements of 2.6.1.  

3.8.1.5 Recommendation. — An operator should ensure that all maintenance personnel receive initial and continuation training acceptable to the State of Registry and appropriate to their assigned tasks and responsibilities. This should include human factors and coordination with other maintenance personnel and flight crew.  

Note.— Guidance material on the application of human factors principles can be found in the Human Factors Training Manual (Doc 9683).

#### 3.8.2 Operator’s maintenance control manual

3.8.2.1 Recommendation.— An operator should provide a maintenance control manual for the use and guidance of maintenance and operating personnel.  

Note.— States may provide guidance material as outlined in 3.11.2 or reference accepted industry codes of practice.

#### 3.8.3 Maintenance programme

3.8.3.1 An operator shall provide, for the use and guidance of maintenance and operational personnel concerned, a maintenance programme, acceptable to the State of Registry, containing the information required by 3.11.2. The design and application of the operator’s maintenance programme shall observe human factors principles.
according to the State of Registry guidance material.

Note.— Guidance material on the application of Human Factors principles can be found in the Human Factors Training Manual (Doc 9683).

3.8.3.2 Copies of all amendments to the maintenance programme shall be furnished promptly to all organizations or persons to whom the maintenance programme has been issued.

3.8.4 Continuing airworthiness information

An operator of an aeroplane over 5 700 kg maximum certificated take-off mass shall, as prescribed by the State of Registry, ensure that the information resulting from maintenance and operational experience with respect to continuing airworthiness, is transmitted as required by Annex 8, Part II, 4.3.5 and 4.3.8.

3.8.5 Maintenance release

3.8.5.1 A maintenance release shall be completed and signed, as prescribed by the State of Registry, to certify that the maintenance work was performed in accordance with the maintenance programme or other data and procedures acceptable to the State of Registry.

3.8.5.2 A maintenance release shall contain a certification including:

a) basic details of the maintenance performed;

b) date such maintenance was completed;

c) when applicable, the identity of the approved maintenance organization; and

d) the identity of the person or persons signing the release.

CHAPTER 3.9 AEROPLANE FLIGHT CREW

3.9.1 Composition of the flight crew

3.9.1.1 Designation of pilot-in-command

For each flight the operator shall designate a pilot to act as pilot-in-command.

3.9.1.2 Flight engineer

When a separate flight engineer’s station is incorporated in the design of an aeroplane, the flight crew shall include at least one flight engineer especially assigned to that station, unless the duties associated with that station can be satisfactorily performed by another flight crew member, holding a flight engineer licence, without interference with regular duties.

3.9.2 Flight crew member emergency duties

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An operator shall, for each type of aeroplane, assign to all flight crew members the necessary functions they are to perform in an emergency or in a situation requiring emergency evacuation. Recurrent training in accomplishing these functions shall be contained in the operator’s training programme and shall include instruction in the use of all emergency and life-saving equipment required to be carried, and drills in the emergency evacuation of the aeroplane.

### 3.9.3 Flight crew member training programmes

3.9.3.1 An operator shall establish and maintain a training programme that is designed to ensure that a person who receives training acquires and maintains the competency to perform assigned duties, including skills related to human performance. Ground and flight training programmes shall be established either through internal programmes or through a training services provider, and include or make reference to a syllabus for those training programmes in the company operations manual. The training programme shall include training to competency for all equipment installed.

3.9.3.2 **Recommendation.** — Flight simulators should be used to the maximum extent practicable for initial and annual recurrent training.

### 3.9.4 Qualifications

3.9.4.1 Flight crew member licensing

3.9.4.1.1 An operator shall:

a) ensure that each flight crew member assigned to duty holds a valid licence issued by the State of Registry, or if issued by another Contracting State, rendered valid by the State of Registry;

b) ensure that the flight crew members are properly rated; and

c) be satisfied that flight crew members are competent to carry out assigned duties.

3.9.4.1.2 The operator of an aeroplane equipped with an airborne collision avoidance system (ACAS II) shall ensure that each flight crew member has been appropriately trained to competency in the use of ACAS II equipment and the avoidance of collisions.

*Note 1.— Procedures for the use of ACAS II equipment are specified in the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume I — Flight Procedures. ACAS II Training Guidelines for Pilots are provided in PANS-OPS, Volume I, Attachment A to Part VIII.*

*Note 2.— Appropriate training, to the satisfaction of the State, to competency in the use of ACAS II equipment and the avoidance of collisions may be evidenced, for example, by:

a) possession of a type rating for an aeroplane equipped with ACAS II, where the operation and use of ACAS II are included in the training syllabus for the type rating; or

b) possession of a document issued by a training organization or person approved by the State to conduct training for pilots in the use of ACAS II, indicating that the holder has been trained in accordance with the**

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guidelines referred to in Note 1; or

c) a comprehensive pre-flight briefing by a pilot who has been trained in the use of ACAS II in accordance with the guidelines referred to in Note 1.

3.9.4.2 Recent experience — pilot-in-command

An operator shall not assign a pilot to act as pilot-in-command of an aeroplane unless that pilot has made at least three take-offs and landings within the preceding 90 days on the same type of aeroplane or in a flight simulator approved for the purpose.

3.9.4.3 Recent experience — co-pilot

An operator shall not assign a co-pilot to operate at the flight controls of an aeroplane during take-off and landing unless that pilot has made at least three take-offs and landings within the preceding 90 days on the same type of aeroplane or in a flight simulator approved for the purpose.

3.9.4.4 Pilot proficiency checks

An operator shall ensure that piloting technique and the ability to execute emergency procedures is checked periodically in such a way as to demonstrate the pilot’s competence. Where the operation may be conducted under instrument flight rules, an operator shall ensure that the pilot’s competence to comply with such rules is demonstrated to either a check pilot of the operator or a representative of the State issuing the pilot licence.

Note.— The periodicity of the checks referred to in 3.9.4.4 is dependent upon the complexity of both the aeroplane and the operation.

CHAPTER 3.10 FLIGHT OPERATIONS OFFICER/FLIGHT DISPATCHER

3.10.1 Recommendation.— An operator should ensure that any person assigned as a flight operations officer/flight dispatcher is trained and maintains familiarization with all features of the operation which are pertinent to their duties, including knowledge and skills related to human factors.

CHAPTER 3.11 MANUALS, LOGS AND RECORDS

Note.— The following documents are associated with this Annex but are not included in this chapter:

Operational flight plan — see 3.4.3.3

3.11.1 Operator’s maintenance control manual

An operator’s maintenance control manual when provided in accordance with 3.8.2, may be issued in separate parts, shall be developed according to Industry Codes of Practice or to the State of Registry guidance material, containing information about:
a) the means for complying with the procedures required by 3.8.1.1;
b) the means for recording names and duties of the person or persons required by 3.8.1.4;
c) the maintenance programme required by 3.8.3.1;
d) the methods used for the completion and retention of the operator’s maintenance records required by 3.8.5;
e) the procedures for complying with the service information reporting requirements of Annex 8, Part II, 4.3.5 and 4.3.8;
f) the procedures for implementing action resulting from mandatory continuing airworthiness information;
g) a system of analysis and continued monitoring of the performance and efficiency of the maintenance programme, in order to correct any deficiency in that programme;
h) the aircraft types and models to which the manual applies;
i) the procedures for ensuring that unserviceabilities affecting airworthiness are recorded and rectified; and
j) procedures for advising the State of Registry of significant in-service occurrences.

3.11.2 Maintenance programme

3.11.2.1 A maintenance programme for each aeroplane as required by 3.8.3 shall contain the following information:

a) maintenance tasks and the intervals at which these are to be performed, taking into account the anticipated utilization of the aeroplane;
b) when applicable, a continuing structural integrity programme;
c) procedures for changing or deviating from a) and b) above as approved by the State of Registry; and
d) when applicable and approved by the State of Registry, condition monitoring and reliability programme descriptions for aircraft systems, components and powerplants.

3.11.2.2 Maintenance tasks and intervals that have been specified as mandatory in approval of the type design or approved changes to the maintenance programme, shall be identified as such.

3.11.2.3 Recommendation.— The maintenance programme should be based on maintenance programme information made available by the State of Design or by the organization responsible for the type design, and any additional applicable experience.
### 3.11.3 Flight recorder records

The owner of the aeroplane, or in the case where it is leased, the lessee, shall ensure, to the extent possible, in the event the aeroplane becomes involved in an accident or incident, the preservation of all related flight recorder records and, if necessary, the associated flight recorders, and their retention in safe custody pending their disposition as determined in accordance with Annex 13.

### 3.12 CABIN CREW

#### 3.12.1 Assignment of emergency duties

The requirement for cabin crew for each type of aeroplane, shall be determined by the operator, based on seating capacity or the number of passengers carried, in order to effect a safe and expeditious evacuation of the aeroplane, and the necessary functions to be performed in an emergency or a situation requiring emergency evacuation. The operator shall assign these functions for each type of aeroplane.

#### 3.12.2 Cabin crew at emergency evacuation station

When cabin crew are required by a State authority, each cabin crew member assigned to emergency evacuation duties shall occupy a seat provided in accordance with 3.6.9 during take-off and landing and whenever the pilot-in-command so directs.

#### 3.12.3 Protection of cabin crew during flight

Each cabin crew member shall be seated with seat belt or, when provided, safety harness fastened during take-off and landing and whenever the pilot-in-command so directs.

#### 3.12.4 Training

1. **3.12.4.1** An operator shall ensure that a training programme is completed by all persons before being assigned as a cabin crew member.

2. **3.12.4.2 Recommendation.** An operator should establish and maintain a cabin crew training programme that is designed to ensure that a person who receives training acquires the competency to perform their assigned duties and includes or makes reference to a syllabus for the training programme in the company operations manual. The training programme should include human factors training.

   **Note.** Guidance material on the application of Human Factors principles can be found in the Human Factors Training Manual (Doc 9683).

### 3.13 SECURITY

#### 3.13.1 Security Programme

1. **3.13.1.1 Recommendation.** Each Contracting State should ensure that each entity conducting general aviation operations, including corporate operators aviation operations, using aircraft with a maximum take-off mass greater than 5 700 kg, has established, implements and maintained a written operator security programme that meets the requirements of the national civil aviation security programme of that State.
Note.— Accepted industry codes of practice may be used as the basis for the development of a written operator security programme.
The following is the suggested content of a company operations manual. It may be issued in separate parts corresponding to specific aspects of an operation. It should include the instructions and information necessary to enable the personnel concerned to perform their duties safely and shall contain at least the following information:

- a) table of contents;
- b) amendment control page and list of effective pages, unless the entire document is re-issued with each amendment and the document has an effective date on it;
- c) duties, responsibilities and succession of management and operating personnel;
- d) operator safety management system;
- e) operational control system;
- f) MEL procedures (where applicable);
- g) normal flight operations;
- h) SOPs;
- i) weather limitations;
- j) flight and duty time limitations;
- k) emergency operations;
- l) accidents/incidents consideration;
- m) personnel qualifications and training;
- n) record keeping; and
- o) a description of the maintenance control system.

ATTACHMENT B - MINIMUM EQUIPMENT LIST (MEL)

1. If deviations from the requirements of States in the certification of aircraft were not permitted an aircraft could
not be flown unless all systems and equipment were operable. Experience has proved that some unserviceability can be accepted in the short term when the remaining operative systems and equipment provide for continued safe operations.

2. The State should indicate through approval of a minimum equipment list those systems and items of equipment that may be inoperative for certain flight conditions with the intent that no flight can be conducted with inoperative systems and equipment other than those specified.

3. A minimum equipment list, approved by the State of the Operator, is therefore necessary for each aircraft, based on the master minimum equipment list established for the aircraft type by the organization responsible for the type design in conjunction with the State of Design.

4. The State of the Operator should require the operator to prepare a minimum equipment list designed to allow the operation of an aircraft with certain systems or equipment inoperative provided an acceptable level of safety is maintained.

5. The minimum equipment list is not intended to provide for operation of the aircraft for an indefinite period with inoperative systems or equipment. The basic purpose of the minimum equipment list is to permit the safe operation of an aircraft with inoperative systems or equipment within the framework of a controlled and sound programme of repairs and parts replacement.

6. Operators are to ensure that no flight is commenced with multiple minimum equipment list items inoperative without determining that any interrelationship between inoperative systems or components will not result in an unacceptable degradation in the level of safety and/or undue increase in the flight crew workload.

7. The exposure to additional failures during continued operation with inoperative systems or equipment must also be considered in determining that an acceptable level of safety is being maintained. The minimum equipment list may not deviate from requirements of the flight manual limitations section, emergency procedures or other airworthiness requirements of the State of Registry or of the State of the Operator unless the appropriate airworthiness authority or the flight manual provides otherwise.

8. Systems or equipment accepted as inoperative for a flight should be placarded where appropriate and all such items should be noted in the aircraft technical log to inform the flight crew and maintenance personnel of the inoperative system or equipment.

9. For a particular system or item of equipment to be accepted as inoperative, it may be necessary to establish a maintenance procedure, for completion prior to flight, to de-activate or isolate the system or equipment. It may similarly be necessary to prepare an appropriate flight crew operating procedure.

10. The responsibilities of the pilot-in-command in accepting an aeroplane for operation with deficiencies in accordance with a minimum equipment list are specified in 2.4.3.1.
Introduction

The material in this Attachment concerns flight recorders intended for installation in aeroplanes engaged in international air navigation. Flight recorders comprise two systems - a flight data recorder and a cockpit voice recorder. Flight data recorders are classified as Type I, Type II and Type IIA depending upon the number of parameters to be recorded and the duration required for retention of the recorded information.

1. Flight data recorder (FDR)

1.1 General requirements

1.1.1 The FDR is to record continuously during flight time.

1.1.2 The FDR container is to:
   a) be painted a distinctive orange or yellow colour;
   b) carry reflective material to facilitate its location; and
   c) have securely attached an automatically activated underwater locating device.

1.1.3 The FDR is to be installed so that:
   a) the probability of damage to the recording is minimized. To meet this requirement it should be located as far aft as practicable. In the case of pressurized aeroplanes it should be located in the vicinity of the rear pressure bulkhead;
   b) it receives its electrical power from a bus that provides the maximum reliability for operation of the FDR without jeopardizing service to essential or emergency loads; and
   c) there is an aural or visual means for pre-flight checking that the FDR is operating properly.

1.2 Parameters to be recorded

1.2.1 Type I FDR. This FDR will be capable of recording, as appropriate to the aeroplane, at least the 32 parameters in Table D-1. However, other parameters may be substituted with due regard to the aeroplane type and the characteristics of the recording equipment.
1.2.2 *Types II and IIA FDRs.* These FDRs will be capable of recording, as appropriate to the aeroplane, at least the first 15 parameters in Table D-1. However, other parameters may be substituted with due regard to the aeroplane type and the characteristics of the recording equipment.

1.3 Additional information

1.3.1 A Type IIA FDR, in addition to a 30-minute recording duration, is to retain sufficient information from the preceding takeoff for calibration purposes.

1.3.2 The measurement range, recording interval and accuracy of parameters on installed equipment is usually verified by methods approved by the appropriate certificating authority.

1.3.3 The manufacturer usually provides the national certificating authority with the following information in respect of the FDR:
   a) manufacturer’s operating instructions, equipment limitations and installation procedures;
   b) parameter origin or source and equations which relate counts to units of measurement; and
   c) manufacturer’s test reports.

1.3.4 Documentation concerning parameter allocation, conversion equations, periodic calibration and other service-ability/maintenance information should be maintained by the operator. The documentation must be sufficient to ensure that accident investigation authorities have the necessary information to read out the data in engineering units.

2. **Cockpit voice recorder (CVR)**

2.1 General requirements

2.1.1 The CVR is to be designed so that it will record at least the following:
   a) voice communication transmitted from or received in the aeroplane by radio;
   b) aural environment on the flight deck;
   c) voice communication of flight crew members on the flight deck using the aeroplane’s interphone system;
   d) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker;
   e) voice communication of flight crew members using the passenger address system, if installed; and
2.1.2 The CVR container is to:

a) be painted a distinctive orange or yellow colour;

b) carry reflective material to facilitate its location; and

c) have securely attached an automatically activated under-water locating device.

2.1.3 To aid in voice and sound discrimination, microphones in the cockpit are to be located in the best position for recording voice communications originating at the pilot and co-pilot stations and voice communications of other crew members on the flight deck when directed to those stations. This can best be achieved by wiring suitable boom microphones to record continuously on separate channels.

2.1.4 The CVR is to be installed so that:

a) the probability of damage to the recording is minimized. To meet this requirement it should be located as far aft as practicable. In the case of pressurized aircraft it should be located in the vicinity of the rear pressure bulkhead;

b) it receives its electrical power from a bus that provides the maximum reliability for operation of the CVR without jeopardizing service to essential or emergency loads;

c) there is an aural or visual means for pre-flight checking of the CVR for proper operation; and

d) if the CVR has a bulk erase device, the installation should be designed to prevent operation of the device during flight time or crash impact.

2.2 Performance requirements

2.2.1 The CVR will be capable of recording on at least four tracks simultaneously except for the CVR in Chapter 6, 6.3.7.2. To ensure accurate time correlation between tracks, the CVR is to record in an inline format. If a bi-directional configuration is used, the in-line format and track allocation should be retained in both directions.

2.2.2 The preferred track allocation is as follows:

Track 1 — co-pilot headphones and live boom microphone

Track 2 — pilot headphones and live boom microphone

Track 3 — area microphone

Track 4 — time reference plus the third and fourth crew members’ headphones and live microphone, if
Note 1.— Track 1 is located closest to the base of the recording head.

Note 2.— The preferred track allocation presumes use of current conventional magnetic tape transport mechanisms, and is specified because the outer edges of the tape have a higher risk of damage than the middle. It is not intended to preclude use of alternative recording media where such constraints may not apply.

2.2.3 The CVR, when tested by methods approved by the appropriate certificating authority, will be demonstrated to be suitable for the environmental extremes over which it is designed to operate.

2.2.4 Means will be provided for an accurate time correlation between the FDR and CVR.

Note.— One method of achieving this is by superimposing the FDR time signal on the CVR.

2.3 Additional information

The manufacturer usually provides the national certificating authority with the following information in respect of the CVR:

a) manufacturer’s operating instructions, equipment limitations and installation procedures; and
b) manufacturer’s test reports.

3. Inspections of FDR and CVR systems

3.1 Prior to the first flight of the day, the built-in test features on the flight deck for the CVR, FDR and Flight Data Acquisition Unit (FDAU), when installed, should be monitored.

3.2 Annual inspections should be carried out as follows:

a) the read-out of the recorded data from the FDR and CVR should ensure that the recorder operates correctly for the nominal duration of the recording;

b) the analysis of the FDR should evaluate the quality of the recorded data to determine if the bit error rate is within acceptable limits and to determine the nature and distribution of the errors;

c) a complete flight from the FDR should be examined in engineering units to evaluate the validity of all recorded parameters. Particular attention should be given to parameters from sensors dedicated to the FDR. Parameters taken from the aircraft’s electrical bus system need not be checked if their serviceability can be detected by other aircraft systems;

d) the read-out facility should have the necessary software to accurately convert the recorded values to
engineering units and to determine the status of discrete signals;

e) an annual examination of the recorded signal on the CVR should be carried out by re-play of the CVR recording. While installed in the aircraft, the CVR should record test signals from each aircraft source and from relevant external sources to ensure that all required signals meet intelligibility standards; and

f) where practicable, during the annual examination, a sample of in-flight recordings of the CVR should be examined for evidence that the intelligibility of the signal is acceptable.

3.3 Flight recorder systems should be considered unserviceable if there is a significant period of poor quality data, unintelligible signals, or if one or more of the mandatory parameters is not recorded correctly.

3.4 A report of the annual inspection should be made available on request to the State’s regulatory authority for monitoring purposes.

3.5 Calibration of the FDR system:

a) the FDR system should be re-calibrated at least every five years to determine any discrepancies in the engineering conversion routines for the mandatory parameters, and to ensure that parameters are being recorded within the calibration tolerances; and

b) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there should be a re-calibration performed as recommended by the sensor manufacturer, or at least every two years.

<table>
<thead>
<tr>
<th>Serial number</th>
<th>Parameter</th>
<th>Measurement range</th>
<th>Recording interval (seconds)</th>
<th>Accuracy limits (sensor input compared to FDR read-out)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Time (UTC when available, otherwise elapsed time)</td>
<td>24 hours</td>
<td>4</td>
<td>±0.125% per hour</td>
</tr>
<tr>
<td>2</td>
<td>Pressure-altitude—</td>
<td>300 m (–1 000 ft) to maximum certified altitude of aircraft</td>
<td>1</td>
<td>±30 m to ±200 m (±100 ft to ±700 ft)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+1 500 m (+5 000 ft)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Indicated airspeed</td>
<td>95 km/h (50 kt) to max Vso (Note 1) to 1.2 V0 (Note 2)</td>
<td>1</td>
<td>±5%</td>
</tr>
<tr>
<td>4</td>
<td>Heading</td>
<td>360°</td>
<td>1</td>
<td>±2°</td>
</tr>
<tr>
<td>5</td>
<td>Normal acceleration—</td>
<td>3 g to +6 g</td>
<td>0.125</td>
<td>±1% of maximum range excluding datum error of ±5%</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Range/Value</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------</td>
<td>----------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Pitch attitude</td>
<td>±75°</td>
<td>±2°</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Roll attitude</td>
<td>±180°</td>
<td>±2°</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Radio transmission keying</td>
<td>On-off (one discrete)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Power on each engine</td>
<td>Full range</td>
<td>1 (per engine) ±2%</td>
<td></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 ±5% or as pilot’s indicator</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 ±5% or as pilot’s indicator</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Thrust reverser position</td>
<td>Stowed, in transit, and reverse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Ground spoiler/speed brake selection</td>
<td>Full range or each discrete position</td>
<td>±2% unless higher accuracy uniquely required</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Outside air temperature</td>
<td>Sensor range</td>
<td>±2°C</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Autopilot/auto throttle/AFCs mode and engagement status</td>
<td>A suitable combination of discretes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Note.— The preceding 15 parameters satisfy the requirements for a Type II FDR.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Longitudinal acceleration</td>
<td>±1 g</td>
<td>0.25 ±1.5% max range excluding datum error of ±5%</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Lateral acceleration</td>
<td>±1 g</td>
<td>0.25 ±1.5% max range excluding datum error of ±5%</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Pilot input and/or control surface position-primary controls (pitch, roll, yaw)</td>
<td>Full range</td>
<td>±2° unless higher accuracy uniquely required</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Pitch trim position</td>
<td>Full range</td>
<td>±3% unless higher accuracy uniquely required</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Radio altitude</td>
<td>6 m to 750 m (~20 ft to 2 500 ft)</td>
<td>±0.6 m (~2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Glide path deviation</td>
<td>Signal range</td>
<td>±3%</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Localizer deviation</td>
<td>Signal range</td>
<td>±3%</td>
<td></td>
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<tr>
<td>23</td>
<td>Marker beacon passage</td>
<td>Discrete</td>
<td>1</td>
<td></td>
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<tr>
<td>24</td>
<td>Master warning</td>
<td>Discrete</td>
<td>1</td>
<td></td>
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<tr>
<td>25</td>
<td>NAV 1 and 2 frequency selection (Note 5)</td>
<td>Full range</td>
<td>As installed</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>DME 1 and 2 distance (Notes 5 and 6)</td>
<td>0 – 370 km</td>
<td>As installed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parameter Description</td>
<td>Type</td>
<td>Value</td>
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<td>----------------------------------------------------------------</td>
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<tr>
<td>27</td>
<td>Landing gear squat switch status</td>
<td>Discrete</td>
<td>1</td>
<td></td>
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<tr>
<td>28</td>
<td>GPWS (ground proximity warning system)</td>
<td>Discrete</td>
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<tr>
<td>29</td>
<td>Angle of attack</td>
<td>Full range</td>
<td>0.5</td>
<td>As installed</td>
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<tr>
<td>30</td>
<td>Hydraulics, each system (low pressure)</td>
<td>Discrete</td>
<td>2</td>
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<tr>
<td>31</td>
<td>Navigation data (latitude/longitude, ground speed and drift angle) (Note 7)</td>
<td>As installed</td>
<td>1</td>
<td>As installed</td>
</tr>
<tr>
<td>32</td>
<td>Landing gear or gear selector position</td>
<td>Discrete</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

**Note.**— The preceding 32 parameters satisfy the requirements for a Type I FDR.

**Notes.**—

1. $V_{so}$ stalling speed or minimum steady flight speed in the landing configuration.
2. $V_D$ design diving speed.
3. Record sufficient inputs to determine power.
4. For aeroplanes with conventional control systems ’’or’’ applies. For aeroplanes with non-mechanical control systems ’’and’’ applies. In aeroplanes with split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately.
5. If signal available in digital form.
6. Recording of latitude and longitude from INS or other navigation system is a preferred alternative.
7. If signals readily available.

If further recording capacity is available, recording of the following additional information should be considered:

a) operational information from electronic display systems, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS). Use the following order of priority:

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, ETC.;
3) warnings and alerts;
4) the identity of displayed pages for emergency procedures and checklists;
   b) retardation information including brake application for use in the investigation of landing overruns and rejected take-offs; and
   c) additional engine parameters (EPR, N₁, EGT, fuel flow, etc.).
<table>
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<th>Part 91K</th>
<th>Part 91/OPS 2</th>
<th>Discussion</th>
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<tr>
<td>91.1001 Applicability</td>
<td>No comparison within OPS 2 as these requirements detail specifically the construction of a fractional ownership program</td>
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<td>91.1002 Compliance date</td>
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<td>91.1027 Recordkeeping</td>
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<td>OPS 2.355 Take-off conditions OPS 2.360 Application of take-off minima</td>
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European Aviation Safety Agency

TASK OPS.001 RULEMAKING GROUP

SUBGROUP NON-COMMERCIAL OPERATIONS WITH COMPLEX MOTOR-POWERED AIRCRAFT

MEETING MINUTES OF

13 FEBRUARY 2007, 10.30 H – 17.00 H
14 FEBRUARY 2007, 08.30 H – 12:00 H

EASA PREMISES, COLOGNE

Attendees:
Karl Brady (KBR), ECA
Douglas Carr (DCA), GAMA
Mike Hamlin (MHA), ECOGAS (13/02/2007)
Josef Maurer (JMA), ETF (14/02/2007)
Dick Nederlof (DNE), CAA Netherlands
Geoff Parker (GPA), UK CAA
Jacob T. Pedersen (JTP), IAOPA
Ray Rohr (RRO), EBAA
Daniela Defossar (DDE), EASA Rulemaking Officer

1. RRO opened the meeting and welcomed all participants.

2. The Subgroup reviewed the proposed agenda. DDE proposed that the Subgroup consider drafting cabin crew requirements instead of waiting for the CAT subgroup. The CAT subgroup had decided to await the outcome of the EASA cabin crew study, if feasible. The Subgroup agreed and RRO offered to draft a proposal based on the WP prepared by JMA for a previous meeting.

In order to identify specific management system issues for the authority subgroup the item Management System was added to the agenda.

3. The minutes of the last meeting and action item list were reviewed. DDE reported that the EU Directive on cosmic radiation and its impact on ops will be further studied by legal service. KBR confirmed that internal doors and curtains are covered by the certification specifications. He agreed to check CS 23 regarding the means for emergency evacuation.

The meeting minutes were adopted without further changes.

4. The Subgroup discussed the parliament document on the Commission proposal for the EASA extension of scope, especially the proposed definition of complex motor-powered aircraft and light aircraft.
5. The working paper on conditions and procedures related to declarations was reviewed. The Subgroup agreed that the intent of the declaration is to ensure that the operator is aware of their accountabilities and have implemented the required systems, processes and procedures to ensure that they meet those obligations as specified in OPS 2. The issue that is not clear is the extent and nature of safety oversight obligations a declaration puts on the authority who receives such declarations. The Subgroup agreed this is an issue which must be further considered. It was agreed that the AMC should reference industry standards, but the process by which existing and new industry standards and alternative means of compliance become accepted, needs to be addressed. The role of EASA in the process also needs to be elaborated. Another issue that should be addresses is which non-commercial operations will be subject to certification and how that fits into the process. Subgroup members were asked to review the working paper and consider the foregoing issues for the next meeting.

6. The Subgroup reviewed the mass and balance working paper. It was agreed that paragraph (a) should be transferred to OPS 0 and paragraph (b) should remain in OPS 2. In addition to the proposed AMC a second AMC referencing JAR-OPS 1 Subpart J was added. The wording of the requirement and AMC material should be harmonised with the other operations parts.

7. The Subgroup reviewed the operations manual working paper. The material on SOPs should be transferred to the management system. The paragraph on runway incursions should become GM.

8. The working paper on flight time limitations was reviewed. The group clarified that the deviations from paragraph (b), (c), (d) are part of the system mentioned in paragraph (a). The content of the WP will be added to the OPS 2 rule template and AMC.

9. The subgroup reviewed the working paper on security. It was agreed that a sample security checklist should be included in the AMC. The text will be added to the OPS 2 rule template and AMC.

10. The ICAO reference list was reviewed. DDE will draft requirements to incorporate the additional items identified for OPS 2.

11. The Subgroup discussed the management system working paper prepared by the Authority Subgroup and any particularities for the operation of complex motor-powered aircraft. The GM on SOPs should be transferred to the authority group to be considered for all operations.

12. The subgroup reviewed the comparison table FAR 91K and JARs/European regulations. Members expressed the importance of operational control whenever a management company is involved irrespective if the aircraft is owned by one or several persons. JTP and GPA were asked to draft a working paper for the next meeting.
13. The subgroup briefly discussed the issues of training of personnel to recognise DG and the authorisation to carry DG. DDE was asked to prepare a WP for the next meeting with assistance of a CAA UK expert.

**ACTION LIST**

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