

## **CAP 789**

# **Requirements and Guidance Material for Operators**

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## Revision History

### CAP 768 Issue 1

**8 December 2006**

This manual was produced for the benefit of Air Operators' Certificate (AOC) holders and applicants to provide information considered to be of long-term interest and essential or useful guidance material. The CAP consists of extracts from the now obsolete *CAP 360 Air Operators' Certificates* along with information from CAA Notices to AOC Holders (NTAOCHs), Letters to Operators (LTOs) and Flight Operations Division Communications (FODCOMs).

### CAP 768 Issue 1, Amendment 1/2007

**28 September 2007**

This amendment was issued to bring together information previously published in various FODCOMs.

The main inserted text is located at:

Chapter 4, paragraph 4: Insurance Requirements for Air Carriers and Aircraft Operators – Documents to be Carried;

Chapter 6, paragraph 4: Implementation of the Railway and Transport Safety Act 2003 – Aviation: Alcohol and Drugs;

Chapter 8, paragraph 12: Carriage of Guide Dogs and Assistance Dogs in the Aircraft Cabin;

Chapter 9, paragraph 3: Foreign Object Damage (FOD) to Aircraft and Aircraft Engines;

Chapter 11, paragraph 12: Redistribution of Passenger or Freight Load Whilst Airborne;

Chapter 12, paragraph 3: Loss of Communication;

Chapter 12, paragraph 6: Level Bust Prevention – Best Practice;

Chapter 17, paragraph 4: Recording of Dangerous Goods Occurrences Reported under the Air Navigation (Dangerous Goods) Regulations 2002;

Chapter 21, paragraph 10: Helicopter Offshore Operations – Crosswind Considerations;

Chapter 29, paragraph 7: Practical Application of Halon Fire Extinguishers;

Chapter 32, paragraph 5: Passenger Boarding – Provision of Steps.

Some of paragraph 2 of Chapter 8 has been deleted because it duplicates information from JAR-OPS subpart E.

Editorial changes, corrections and amendments convenient to be included at this time have also been incorporated.

### CAP 768 Issue 1, Amendment 1/2008

**14 April 2008**

This amendment was issued to bring together information previously published in FODCOMs 24/2005, 25/2005, 26/2005, 08/2006, 17/2006 and 21/2006.

The main inserted text is located at:

Chapter 2, Annex 1: Operations Manual – Notice of Proposed Amendment;

Chapter 4, paragraph 5: Carriage of a Certified True Copy of the Air Operator Certificate (AOC);

Chapter 12, paragraph 25: The Use and Misuse of Frequency 121.5 MHz;

Chapter 12, paragraph 26: The Provision of Routings for En-route Traffic Outside Controlled Airspace;

Chapter 21, paragraph 11: Use of Vacant Flight Crew Seats;  
 Chapter 21, paragraph 12: Helicopter Onshore Operating Sites;  
 Chapter 21, Annex 1: Onshore Operating Site Selection and Survey Procedure;  
 Chapter 21, Annex 2: Pleasure-Flying Onshore Site Requirements for H1 Helicopters;  
 Chapter 21, Annex 3: Provision of Rescue and Fire-Fighting Services (RFFS) for Helicopters at Unlicensed Onshore Operating Sites.

In addition, the following changes have been made:

Chapter 10, Annex 1 has been significantly amended;

Chapter 31, Appendix A has been deleted because a new Cabin Crew Medical Assessment Form will be produced shortly.

Editorial changes, corrections and amendments convenient to be included at this time have also been incorporated.

### **CAP 768 Issue 1, Amendment 2/2008**

**1 August 2008**

This amendment was issued to bring together information previously published in FODCOMs 07/2005 (Dangerous Goods Training Applicable to All AOC Holders) and 33/2005 (Collision Avoidance During Taxiing), which have been inserted as Chapter 17, paragraph 5 and Chapter 10, paragraph 9 respectively.

Other main changes are as follows:

**Table RH1** Significant Changes

<b>Position</b>	<b>Chapter or paragraph title</b>	<b>Reason for change</b>
Chapter 2, paragraph 1	Purpose and Scope of an Operations Manual	Introduces Human Factors principles into the design of manuals.
Chapter 8, paragraph 1	Minimum Safe Altitudes (MSAs)	Clarifies Performance Class 3 helicopter requirements.
Chapter 8, paragraph 8	Meteorological Reports – Special Aircraft Observations	Introduces a requirement for Special Aircraft Observation reporting.
Chapter 8, paragraph 14	Carriage of Musical Instruments and Diplomatic Bags	Replaces Official Record Series 4 Number 666.
Chapter 9, paragraph 3	Reporting of Inadequacy of Facilities	Introduces a requirement on operators.
Chapter 21 Paragraph 2	Minimum Weather and Associated Requirements for Public Transport Flights in VMC at Night	Generally rewritten and updated.
Chapter 22	Minimum Weather Conditions for Helicopter Over-water Operations	Generally rewritten and updated.
Chapter 28	Additional Factors for Helicopter Pilots' Periodic Tests	Generally rewritten and updated.

Editorial changes, corrections and amendments convenient to be included at this time have also been incorporated.

**CAP 789 Edition 1****29 March 2010**

This CAP has been produced in order to update CAP 768 (which is hereby superseded) and include Requirements in what was previously guidance material. The Foreword describes how these Requirements are distinguished in the text.

Since a lot of CAP 789 is substantially the same as CAP 768, the CAP 768 Revision History has been retained in order to show the evolution of CAP 789. Marginal lines in this Edition 1 indicate the main changes from CAP 768.

The CAP 768 text has been amended to bring together information previously published in various other publications, and this information and its sources are listed in Table RH2 below.

Significant additions or alterations to the CAP 768 text which have not previously been published elsewhere are listed in Table RH3.

Where significant deletions have been made from the CAP 768 text, these deletions are listed in Table RH4.

Editorial changes, corrections and amendments convenient to be included at this time have also been incorporated.

**Table RH2** Previously published information

Position	Chapter or paragraph title	Source
Chapter 1, paragraph 5	AOC Suspension and Revocation of suspended AOCs	FODCOM 24/2007
Chapter 1, paragraph 6	CAA 'On Notice' Procedure	FODCOM 13/2008
Chapter 2, Annex 1	Operations Manual – Additional Subjects for Inclusion	CAP 648 and CAP 649, Addendum 2
Chapter 3, paragraph 2	Acceptance of Accountable Managers	FODCOM 10/2008
Chapter 4, paragraph 9	SAFA Ramp Inspections on UK Aircraft	FODCOM 02/2007
Chapter 8, paragraph 15	Passenger and Cargo Handling Procedures	CAP 648 and CAP 649, Part A, paragraphs 8.2.2 and 8.2.3
Chapter 9 paragraph 6	Operation of Aeroplanes with an Inoperative Exit	FODCOM 08/99
Chapter 9 paragraph 7	Training for Ground De-Icing and Anti-Icing of Aircraft	FODCOM 31/2008
Chapter 11, paragraph 13	Child Restraint Devices	FODCOM 23/2007
Chapter 12, paragraph 23	ACAS/TCAS – Procedures to be Observed in Response to ACAS/TCAS Advisories	AIC P 092/2009
Chapter 12, paragraph 28	Temperature Error	CAP 648 and CAP 649, Part A, paragraph 8.3.3.3
Chapter 15, paragraph 5	Protective Breathing Equipment (PBE) Training	FODCOM 40/2007
Chapter 15, paragraph 6	Smoke Drills	FODCOM 17/2008

**Table RH2** Previously published information (Continued)

Position	Chapter or paragraph title	Source
Chapter 17, paragraph 3.8	The Potential for the Inadvertent Ignition of Cigarette Lighters in Passengers' Baggage	FODCOM 25/2006
Chapter 20, paragraph 1	Authority, Duties and Responsibilities of the Helicopter Commander	CAP 649, Part A, paragraph 1.4
Chapter 20, paragraph 4	Flight-Following for Offshore Helicopters	FODCOM 30/2008
Chapter 20, paragraph 5.1	Flight Preparation Instructions	CAP 649, Part A, paragraph 8.1
Chapter 20, paragraph 5.2	List of Documents, Forms and Additional Information to be Carried	CAP 649, Part A, paragraph 8.1.12
Chapter 20, paragraph 6	Standard Weights for Passengers Carried on Flights in Connection with Oil and Gas Exploitation	FODCOM 27/2005
Chapter 21, paragraph 16	Sporting Weapons and Ammunition	CAP 649, Part A, paragraph 9.6.2
Chapter 21, Annex 4	Provision of Fire-Fighting Services (FFS) for Helicopters Operating at Unlicensed Helicopter Emergency Medical Service (HEMS) or Air Ambulance Operating Base	FODCOM 14/2008
Chapter 24, paragraph 4.1	Go-Around Training	FODCOM 11/2008
Chapter 24, paragraph 12 and Annex 1	Alternative Training and Qualification Programme (ATQP)	FODCOM 28/2008
Chapter 25, paragraph 2 and Annex 1	Airborne Collision Avoidance System (ACAS)	FCTN 06/2009
Chapter 33, paragraph 8 and Annex 1	Fires in the Cabin Caused by Portable Electronic Devices	FODCOM 12/2008

**Table RH3** New or substantially revised text

Position	Chapter or paragraph title	Reason for change
Chapter 2, paragraph 2.4	Operations Manual Amendments	Additional guidelines on the timescales for submission of Operations Manual amendments.
Chapter 2, paragraph 2.7	Operations Manual Amendments	Additional guidelines on the timescales for submission of Minimum Equipment List amendments.

**Table RH3** New or substantially revised text (Continued)

<b>Position</b>	<b>Chapter or paragraph title</b>	<b>Reason for change</b>
Chapter 3, paragraphs 4.2.1 and 4.2.2	Responsibilities of Aircraft Crew and Other Operating Staff	Addition of requirements for flight operations officers and flight dispatchers specified in ICAO SARPs.
Chapter 4, paragraph 2	Safety Management Systems	Addition of guidance to promote the use of Safety Management Systems.
Chapter 4, paragraph 7	Journey Log Books	Addition of requirements to comply with Article 29 of the Chicago Convention.
Chapter 4, paragraph 8	Passenger and Cargo Manifests	Addition of requirements specified in ICAO SARPs.
Chapter 8, paragraph 2.8	Take-Off and Destination Alternate Minima – Helicopters	Addition of requirements specified in ICAO SARPs.
Chapter 8, paragraph 5.1	Navigation/Operational Flight Plan Form	Addition of requirements specified in ICAO SARPs.
Chapter 12, paragraph 7.5	Navigation Performance	Addition of requirements specified in ICAO SARPs.
Chapter 12, paragraph 27	Policy for the Continuation of a Flight by an Aeroplane Conducting Public Transport following an In-flight Failure or Shutdown of an Engine	Additional requirement arising from an AAIB recommendation.
Chapter 14, paragraph 2.3.3	CAA and JAA Policies	Addition of text to provide links to further sources of information regarding MMELs.
Chapter 14, paragraph 3.2 and Annex 1	Authorisation to Utilise Rectification Interval Extensions (RIEs)	Addition of requirement to report the use of RIEs to the CAA.
Chapter 15, paragraph 7	Information on Emergency and Survival Equipment Carried	Addition of requirements specified in ICAO SARPs.
Chapter 15, paragraph 8	Search Procedure Checklists	Addition of requirements specified in ICAO SARPs.
Chapter 17, paragraph 5.3 and Annexes 1 and 2	Dangerous Goods Training Applicable to All AOC Holders	New guidance.
Chapter 21, paragraph 4	Operations over the Sea – Survival Equipment	Addition of requirements specified in ICAO SARPs.
Chapter 21, paragraph 13	Noise and the Environment	Addition of requirements specified in ICAO SARPs.
Chapter 21, paragraph 14	Carriage of Weather Radar Equipment	Addition of requirements specified in ICAO SARPs.

**Table RH3** New or substantially revised text (Continued)

<b>Position</b>	<b>Chapter or paragraph title</b>	<b>Reason for change</b>
Chapter 21, paragraph 15	Communications on the Aeronautical Emergency Frequency	Addition of requirements specified in ICAO SARPs.
Chapter 21, paragraph 17	Operation of Helicopters Certified for Flight in Limited Icing Conditions	Addition of guidance material awaiting incorporation into EASA Implementing Rules for Air Operations.
Chapter 21, Annex 3, paragraphs 2–7, 12 and 17	Provision of Rescue and Fire-Fighting Services (RFFS) for Helicopters at Unlicensed Onshore Operating Sites	Addition of further guidance.
Chapter 24, paragraph 4.3	Operation on more than one Type or Variant	Addition of requirements specified in ICAO SARPs.
Chapter 24, paragraph 11	Security Training	Addition of requirements specified in ICAO SARPs.
Chapter 29, paragraph 6	CAA-Approved Cabin Crew Training Organisations	Addition of guidance on using external training organisations.
Chapter 29, paragraph 18	Transfer of Cabin Crew Training	Re-write of previous paragraphs 17 to 23.
Chapter 31, paragraph 4 and Annex 1	Specimen Cabin Safety Procedures Manual	Introduction of a specimen cabin crew procedures manual.

**Table RH4** Significant deleted text

<b>Position</b>	<b>Chapter or paragraph title</b>	<b>Reason for Deletion</b>
Chapter 9, paragraph 1.9	Cabin Crew	Text included in EU-OPS.
Chapter 14, paragraph 2.1.3	CAA Approved MMEL	Information is available in the document 'Information Sources for Preparing a Minimum Equipment List' on the CAA website.
Chapter 14, paragraph 4.2	CAA MMEL Policy Items	Covered by paragraph 2.3.
Chapter 30, paragraphs 3.3 and 3.4	Carriage of Lifejackets and Flotation Cots for Children and Infants	Information has been sufficiently promulgated.

**CAP 789 Edition 2****18 February 2011**

This edition brings together information previously published in various FODCOMs, and this information and its sources are listed in Table RH5 below.

Significant additions or alterations to the text which have not previously been published elsewhere are listed in Table RH6.

Annex 2 to Chapter 2 (Operations Manual - Additional Subjects for Inclusion) has been deleted since the form is now available on the CAA website at [www.caa.co.uk/srg1832](http://www.caa.co.uk/srg1832).

Chapters 29 to 33 have been rewritten and re-organised so that the information is in a more logical structure. Several paragraphs have been deleted since they have been sufficiently promulgated; these are listed in Table RH7. Chapter 33, paragraph 16 (Disruptive Passenger Incident Reports) has been deleted since there is no longer a separate report for disruptive passenger incidents.

Editorial changes, corrections and amendments convenient to be included at this time have also been incorporated.

**Table RH5** Previously Published Information

Position	Chapter or paragraph title	Source
Chapter 1, paragraph 1	Requirement to Hold an AOC	FODCOM 22/2010
Chapter 2, paragraph 3	Operations Manual Requirements Relating to Dangerous Goods	FODCOM 35/2009
Chapter 4, paragraph 3	Safety Risk Assessments for Commercial Air Transport Flights Outside Controlled Airspace	FODCOM 33/2009
Chapter 4, paragraph 11	Operator Audits of Ground Handling Service Providers	FODCOM 35/2008
Chapter 4, Annex 1	The Safety Risk Assessment Process for CAT Flights Outside CAS	FODCOM 33/2009
Chapter 4, Annex 2	Example of Mitigations and Effectiveness for Flights Outside CAS	FODCOM 33/2009
Chapter 7, paragraphs 2-15	Flight Time Limitations	FODCOM 10/2009
Chapter 8, paragraph 3	Rescue and Fire-Fighting Services (RFFS) Category Required at a Nominated Diversion Aerodrome (NDA) Within the UK for Aeroplane Flights	FODCOM 24/2009
Chapter 8, paragraph 4	Aerodrome RFFS Category Required for Cargo Aeroplanes Carrying Dangerous Goods	FODCOM 25/2009
Chapter 8, paragraph 6.3.6	Load Planning, Supervision and Loading	FODCOM 02/2002
Chapter 9, paragraph 1.14	Contamination of Jet Aviation Fuel by Fatty Acid Methyl Ester (FAME)	FODCOMs 47/2008 and 50/2008
Chapter 9, paragraph 1.15	Fuel Uplift Reconciliation	FODCOM 01/2008
Chapter 9, paragraph 2.7	Ground Handling and Ramp Safety	FODCOM 02/2002

**Table RH5** Previously Published Information (Continued)

Position	Chapter or paragraph title	Source
Chapter 10, paragraph 3	Calculation of Take-Off Performance - Line-Up Allowance	FODCOM 19/2009
Chapter 10, paragraph 7	Operations on a Runway that is Notified by NOTAM as 'May be Slippery when Wet'	FODCOM 28/2007
Chapter 11, paragraph 5	The Use of Performance Data Appropriate to the Existing Runway Conditions	FODCOM 03/2009
Chapter 12, paragraph 20 and Annex 1	Collision Avoidance - the See-and-Avoid Principle	FODCOM 27/2009
Chapter 12, paragraph 30	Guidelines for the Notification of Suspected Communicable Disease	FODCOM 35/2007
Chapter 15, paragraph 2	Actions that Should be Taken in the Event of an Uncontrolled Aeroplane Fire on the Ground	FODCOM 08/2009
Chapter 15, paragraph 3.2	Emergency Procedures for Cabin Altitude Warning	FODCOM 06/2010
Chapter 17, paragraph 3.9	Battery-Powered Wheelchairs	FODCOM 45/2008
Chapter 18, paragraph 3	Illumination of Aircraft by Bright Lights or Lasers	FODCOM 05/2009
Chapter 24, paragraph 12	Operations to Elevated Helipads - Training and Recency	FODCOM 14/2009
Chapter 30, paragraph 6.1	Disabled Persons and Persons of Reduced Mobility (PRMs)	FODCOM 49/2008
Chapter 30, paragraph 6.2	Supplementary Restraint for Persons of Reduced Mobility	FODCOM 18/2009
Chapter 30, paragraph 12	Pre-flight Passenger Safety Briefing - Smaller Aircraft	FODCOM 43/2008
Chapter 32, paragraphs 2 and 3	Attestation of Initial Safety Training	FODCOM 16/2010
Chapter 32, paragraph 9	Cabin Crew Fire and Smoke Training	FODCOM 19/2010

**Table RH6** New or Substantially Revised Text

Position	Chapter or paragraph title	Reason for addition
Chapter 1, paragraph 7	Mergers and Acquisitions	
Chapter 1, Annex 1	Mergers and Acquisitions	
Chapter 1, Annex 2	AOC Mergers and Acquisitions Checklist	To give guidance to operators on how to continue to meet safety requirements when two AOC holders are merging.

**Table RH7** Text Deleted from Chapters 29-33 since it has been Sufficiently Promulgated

Position	Chapter or paragraph title
Chapter 29, paragraph 2	Cabin Crew – Service Duties
Chapter 29, paragraph 3	Health and Safety
Chapter 29, paragraph 4	Training Instructors and Examiners
Chapter 29, paragraph 7	Training Syllabus
Chapter 29, paragraph 9	Evacuation Training
Chapter 29, paragraph 10	Evacuation Training Research
Chapter 29, paragraph 13	Routine Deployment of Inflatable Evacuation Slides
Chapter 29, paragraph 14	Crew Training for Exit Operation
Chapter 29, paragraph 16	Cabin Crew Training for Icing Conditions
Chapter 29, paragraph 17	AOC Applications and Variations - Commencement of Cabin Crew Training
Chapter 30, paragraph 1	Re-stowage of Drop-down Oxygen Masks
Chapter 30, paragraph 2	Protective Breathing Equipment
Chapter 30, paragraph 3	Carriage of Lifejackets and Flotation Cots for Children and Infants
Chapter 31, paragraph 2	Pre-Flight Procedures
Chapter 31, paragraph 8	Rostering
Chapter 31, paragraph 11	Wearing of Neck Chains
Chapter 31, paragraph 12	Scalds to Passengers
Chapter 31, paragraph 13	Carriage of Aerosols
Chapter 31, paragraph 14	Medical Assessment of Cabin Crew
Chapter 31, paragraph 15	Alcohol and Drugs
Chapter 32, paragraph 2	Cabin Class Dividers Located at Self-help Exit Seat Rows
Chapter 32, paragraph 4	Visibility of Cabin Safety Signs
Chapter 32, paragraph 9	Arming and Disarming Evacuation Slides
Chapter 32, paragraph 12	The Secured Cabin - 'Cabin Secure' Check
Chapter 32, paragraph 17	Passenger Electronic Devices
Chapter 33, paragraph 2	Exits Not Classified as Emergency Exits
Chapter 33, paragraph 4	Cabin Fires
Chapter 33, paragraph 6	In-flight Fires - National Transportation Safety Board Report
Chapter 33, paragraph 9	Restrictions on the Use of Therapeutic Oxygen whilst Fire-Fighting

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## Foreword

### Status

The material contained in this CAP describes 'best practice' means of compliance with EU-OPS and JAR-OPS 3, the operational requirements of the Air Navigation Order (ANO) and International Standards and Recommended Practices (SARPs), contained in Annexes to the Chicago Convention. Operators will need to be able to provide cogent reasons, justified in safety terms, for wishing to adopt an alternative means of compliance. This CAP is primarily aimed at aeroplane and helicopter AOC holders. However, some of the requirements and guidance it contains will also be applicable to other operators.

### **International Civil Aviation Organization (ICAO) Compliance Statement to CAP 789 Requirements and Guidance Material for Operators**

The Civil Aviation Authority (Chicago Convention) Directions 2007, issued by the Department for Transport (DfT), require the CAA to ensure that it acts consistently with the obligations placed on the UK under the Convention on International Civil Aviation (Chicago Convention) of December 1944.

Certain topics in this document are published in support of the CAA's discretionary powers contained in the ANO and include requirements based on certain SARPs contained in Annexes to the Chicago Convention.

It is the policy of the CAA to have reference to this document when exercising the discretionary powers referred to above and, in particular, it will exercise those powers to ensure the effective implementation of any such requirements based on SARPs. Those requirements are listed below:

- Chapter 2, paragraph 1.3;
- Chapter 3, paragraphs 4.2.1 and 4.2.2;
- Chapter 4, paragraphs 7, 8 and 9;
- Chapter 8, paragraphs 2.8, 7.1, 10.1(c) and 16.2;
- Chapter 9, paragraphs 3, 6.1 and 6.2;
- Chapter 12, paragraph 7.5 and 22;
- Chapter 14, paragraphs 1 and 3;
- Chapter 15, paragraphs 8 and 9;
- Chapter 16, paragraph 1.3;
- Chapter 20, paragraphs 2.5 and 3.1;
- Chapter 21, paragraphs 4, 13, 14 and 15; and
- Chapter 24, paragraphs 4.3 and 11.

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#### *Requirement*

In the body of the text of CAP 789, Requirements are highlighted by beginning and ending with 'wavy lines' like this.

#### *Requirement End*

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**NOTE:** These requirements are applicable to AOC holders. Some of them are also applicable to other operators, depending on their type of operation.

## Requirements and Guidance

It is the policy of the CAA's Flight Operations Division to use the words 'shall' and 'must' when citing requirements. 'Should' is generally used when reference is made to guidance material, or requirements which are not specified.

Due to the varied nature of the source documents for the text in this CAP, words such as 'shall' and 'must' are sometimes used where no reference to a requirement is given. Furthermore, 'must' is sometimes used when the requirement which is implied is only applicable to certain operators (e.g. AOC holders).

It is intended that the text will be brought into line with the policy in due course. In the meantime, operators should use their judgement in assessing whether words such as 'shall' and 'must' refer to requirements which are applicable to them.

## Publication of AOC Holder Information

To assist the public to identify legitimate AOC holders, the CAA publishes limited UK AOC holder details on its website (at [www.caa.co.uk/aocholders](http://www.caa.co.uk/aocholders)). On the AOC Application Form for aeroplane and helicopter operators, the CAA requests the following information for publication:

- name and, if applicable, trading name;
- website address or, if not available, e-mail address; and
- aircraft types on AOC.

**NOTE:** Aeroplane and helicopter AOC applicants who do not provide a website address are given the option of either providing an e-mail address or withholding their contact information.

Aeroplane and helicopter AOC holders may update the details or change options at any time, by contacting [FOD.Admin@caa.co.uk](mailto:FOD.Admin@caa.co.uk).

## Definitions

In CAA publications, where a term is used which is defined in a relevant ICAO Annex or Procedures for Air Navigation Services (PANS) document, that definition will apply unless:

- the contrary is indicated; or
- there is a different definition in the ANO or EU Regulations.

Differences to ICAO definitions and SARPs are identified in the Aeronautical Information Publication (AIP).

## Gender

References to the masculine gender used for convenience in this document apply equally to the feminine gender, where appropriate.

## Glossary

AAIB	Air Accidents Investigation Branch
ABP	Able-bodied Person
ACARS	Aircraft Communications, Addressing and Reporting System
ACAS	Airborne Collision Avoidance System(s)
ADELT	Automatically Deployed Emergency Locator Transmitter
ADR <sub>s</sub>	Advisory Routes
AFDS	Autopilot Flight Director System
AFFF	Aqueous Film-Forming Foam
AFM	Aircraft Flight Manual
AGL	Above Ground Level
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Service
AM	Accountable Manager
AMSL	Above Mean Sea Level
AN(DG)Rs	Air Navigation (Dangerous Goods) Regulations
ANDU	Alternative Navigation Display Units
AN(G)Rs	Air Navigation (General) Regulations
ANO	Air Navigation Order
AOC	Air Operator's Certificate
AOG	Aircraft on the Ground
AOM	Aerodrome Operating Minima
APS	Aircraft Prepared for Service
APU	Auxiliary Power Unit
ASDA	Accelerate-Stop Distance Available
ASE	Altimeter System Error
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
ATIS	Automatic Terminal Information Service
ATM	Air Traffic Management
ATOW	Actual Take-Off Weight
ATQP	Alternative Training and Qualification Programme

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ATS	Air Traffic Service(s)
AVAD	Audio Voice Alerting Devices
BCAR	British Civil Airworthiness Requirements
C of A	Certificate of Airworthiness
C of G	Centre of Gravity
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CAS	Controlled Airspace
CAT	Commercial Air Transport
CB	Circuit Breaker
CBT	Computer-Based Training
CC	Conditional Clearance
CDR	Conditional Route
CFIT	Controlled Flight Into Terrain
CFMU	Central Flow Management Unit
CLSD	Company Landing Site Directory
CPA	Closest Point of Approach
CPL	Commercial Pilot Licence
CRAM	Conditional Route Availability Message
CRE	Class Rating Examiner
CRI	Class Rating Instructor
CRM	Crew Resource Management
CRS	Certificate of Release to Service
CUU	Compass Unreliable/Useless
CVR	Cockpit Voice Recorder
DA	Decision Altitude
DH	Decision Height
DIFFS	Deck-Integrated Fire-Fighting System
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DR	Dead Reckoning
EASA	European Aviation Safety Agency
ECAC	European Civil Aviation Conference
ECAM	Electronic Centralised Aircraft Monitor
ELT	Emergency Locator Transmitter
ETOPS	Extended Range Twin Operations

EU-OPS	Annex III to Regulation (EEC) No. 3922/91
FAA	Federal Aviation Administration
FATO	Final Approach and Take-Off Area
FCOM	Flight Crew Operating Manual
FDE	Fault Detection and Exclusion
FDM	Flight Data Monitoring
FDP	Flying Duty Period
FDR	Flight Data Recorder
FE/SPO	Flight Engineer/Systems Panel Operator
FFFFP	Film-Forming FluoroProtein
FFS	Fire-Fighting Services
FLCH	Flight Level Change
FMA	Flight Mode Annunciator
FMS	Fixed Monitor System
FMS	Flight Management System(s)
FOD	Foreign Object Damage
FODCOM	Flight Operations Division Communication
FOI	Flight Operations Inspector
FOI(H)	Flight Operations Inspectorate (Helicopters)
FTL	Flight Time Limitations
GA	General Aviation
GPS	Global Positioning System
GPU	Ground Power Unit
HEMS	Helicopter Emergency Medical Service
HF	High Frequency
HLL	Helideck Limitations List
HMU	Height Monitoring Unit
HSE	Health and Safety Executive
HSW Act	Health and Safety at Work etc. Act
HVR	High Vertical Rate
IAS	Indicated Air Speed
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IEM	Interpretative and Explanatory Material
IFE	In-Flight Entertainment

IFR	Instrument Flight Rules
IGE	In Ground Effect
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
INQ	Instrument Night Qualification
IR	Instrument Rating
IRS	Inertial Reference/Navigation System(s)
ISA	International Standard Atmosphere
ISAGO	IATA Safety Audits for Ground Operations
ISARPs	IATA Standards and Recommended Practices
JAA	Joint Aviation Authorities
JAR-OPS	Joint Aviation Requirements - Operations
KPI	Key Performance Indicator
JLB	Journey Log Book
LAHSO	Land and Hold Short Operations
LDA	Localiser-type Direction Aid
LDR	Landing Distance Required
LM	Loading Mass
LOE	Line-Oriented Evaluation
LOFT	Line-Oriented Flying Training
LOQE	Line-Oriented Quality Evaluation
LPC	Licence Proficiency Checks
LRNS	Long Range Navigation System(s)
LST	Licence Skill Test
LTE	Loss of Tail Rotor Effectiveness
LTO	Letter to Operators
LVPs	Low-Visibility Procedures
MAP	Missed Approach Point
MCC	Multi-Crew Co-operation
MDA	Minimum Decision Altitude
MDH	Minimum Decision Height
MEL	Minimum Equipment List
MFA	Minimum Flight Altitude
MFOI(H)	Manager Flight Operations Inspectorate (Helicopters)
MMEL	Master Minimum Equipment List

MMMF	Man-Made Mineral Fibre
MNPS	Minimum Navigation Performance Specification
MoD	Ministry of Defence
MOR	Mandatory Occurrence Report
MORS	Mandatory Occurrence Reporting Scheme
MPA	Multi-pilot Aeroplane
MPAC	Maximum Permitted Aeroplane Capacity
MPOG	Minimum Pitch On Ground
MSI	Motion Severity Index
MSN	Manufacturer's Serial Number
MTOM	Maximum Authorised Take-Off Mass
MTWA	Maximum Total Weight Authorised
NAA	National Aviation Authority
NAT	North Atlantic
NDA	Nominated Diversion Aerodrome
NDB	Non-Directional Beacon
NM	Nautical Mile(s)
NOTAM	Notice to Airmen
NPA	Notice of Proposed Amendment
NTAOCH	Notice to AOC Holders
NTSB	National Transportation Safety Board
OAT	Outside Air Temperature
OCH	Obstacle Clearance Height
OCL	Obstacle Clearance Limit
OEI	One Engine Inoperative
OGE	Out of Ground Effect
OML	Operational Multi-crew Limitation
OPC	Operator Proficiency Check(s)
OPC(I)	Operator Proficiency Check (Instrument)
PA	Pressure Altitude
PA	Public Address
PANS	Procedures for Air Navigation Services
PAOC	Police Air Operator Certificate
PAOM	Police Air Operations Manual
PBE	Portable Breathing Equipment

PBN	Performance Based Navigation
PDSC	Pre-Departure Service Check
PED	Portable Electronic Device
PETF	Practice Emergency Training Frequency
PF	Pilot Flying
PHA	Public Health Authority
PIC	Pilot in Command
PICUS	Pilot in Command under Supervision
PLOG	Pilot Navigation Log
PM	Pilot Monitoring
PNR	Point of No Return
PPE	Personal Protective Equipment
PRA	Pre-Recorded Announcement
PRM	Person(s) of Reduced Mobility
PRM	Precision Runway Monitor
P-RNAV	Precision Area Navigation
PSU	Passenger Service Unit
PT	Public Transport
QMS	Quality Management System
RA	Resolution Advisory
Radalt	Radio Altimeter
RAIM	Receiver Autonomous Integrity Monitoring
RFF	Rescue and Fire-Fighting
RFFS	Rescue and Fire-Fighting Services
RFM	Rotorcraft Flight Manual
RI	Runway Incursion
RIE	Rectification Interval Extension(s)
RM(O)	Regional Manager (Operations)
RNAV	Area Navigation
RNP	Required Navigation Performance
RPE	Respiratory Protective Equipment
RTF	Radiotelephony
RTOW	Regulated Take-Off Weight
RVR	Runway Visual Range

RVSM	Reduced Vertical Separation Minimum
SA	Safety Area
SAFA	Safety Assessment of Foreign Aircraft
SARPs	Standards and Recommended Practices
SFE	Synthetic Flight Examiner
SFI	Synthetic Flight Instructor
SID	Standard Instrument Departure
SIDD	Safety Investigation and Data Department
SMS	Safety Management System(s)
SOIA	Simultaneous Offset Instrument Approaches
SOPs	Standard Operating Procedures
SPA	Single Pilot Aeroplane
SPH	Single Pilot Helicopter
STAR	Standard Arrival
STD	Synthetic Training Device
SVFR	Special Visual Flight Rules
TA	Traffic Advisory
TAWS	Terrain Awareness Warning System(s)
TCAS	Traffic Alert and Collision Avoidance System(s)
TDP	Take-Off Decision Point
TEM	Threat and Error Management
TERPS	Terminal Instrument Procedure(s)
TGL	Temporary Guidance Leaflet
TLOF	Touchdown and Lift-Off Area
TMA	Terminal Manoeuvring Area
TODA	Take-Off Distance Available
TODR	Take-Off Distance Required
TOM	Take-Off Mass
TORA	Take-Off Run Available
TRE	Type Rating Examiner
TRI	Type Rating Instructor
UKCS	UK Continental Shelf
ULD	Unit Load Device(s)
UTC	Co-ordinated Universal Time
VCF	Visual Contact Flight

VFR	Visual Flight Rules
VLJ	Very Light Jet
VMC	Visual Meteorological Conditions
VNAV	Vertical Navigation
VOR	VHF Omnidirectional Range
V/S	Vertical Speed
WAT	Weight, Altitude, Temperature
WATRS	West Atlantic Route System
WSI	Wind Severity Index
ZFM	Zero Fuel Mass
ZFTT	Zero Flight-Time Training

# Chapter 1 The Air Operator's Certificate (AOC)

(See EU-OPS/JAR-OPS 3 Subpart C)

## 1 Requirement to Hold a Certificate

1.1 An aircraft registered in the United Kingdom (UK) may not fly for the purpose of Public Transport (PT) / Commercial Air Transport (CAT), otherwise than under and in accordance with the terms of an AOC granted to the operator of that aircraft by the CAA. A definition of the term 'public transport' is given in the Air Navigation Order (ANO) and anyone in doubt as to whether particular flights may be made without the operator being the holder of an AOC should seek legal advice. In relation to an AOC, the 'operator' is defined as the person for the time being having the management of the aircraft.

**NOTE:** The term Commercial Air Transport Flight means a flight that is required to be operated under and in accordance with an EU-OPS AOC.

1.2 Under Article 14 of the ANO 2009 it is an offence to advertise a PT flight unless it is operated by the holder of an AOC.

1.3 The CAA investigates specific complaints made by AOC holders who are concerned that their considerable investment in complying with the relevant safety requirements is being compromised by illegal operators.

1.4 Passengers are encouraged to check that their operator holds the required AOC. To enable this, the CAA website has lists of current UK AOC holders, available via [www.caa.co.uk/aocholders](http://www.caa.co.uk/aocholders). To enable passengers to enquire about foreign operators, contact numbers for the Department for Transport are published on the leaflet 'Is My Flight Legal? - A Guide to the Air Operator Certificate', which is available via the above webpage.

1.5 Copies of the 'Is My Flight Legal?' leaflet and an A1 poster version can be requested by contacting [FOP.Admin@caa.co.uk](mailto:FOP.Admin@caa.co.uk).

1.6 Organisations are encouraged to use the leaflet and poster to publicise the AOC amongst passengers and potential customers and to support the CAA in its efforts to reduce the number of illegal public transport flights taking place. In addition, operators might consider publishing articles in in-flight magazines and other publicity materials.

1.7 When the opportunity arises, the CAA also contacts various target organisations, trade bodies and the media. Requests for assistance or advice about publicity or media relations in connection with the campaign to prevent illegal public transport should be addressed to CAA Corporate Communications at [press.office@caa.co.uk](mailto:press.office@caa.co.uk).

## 2 Compliance with Statutory Requirements

2.1 The issue of an AOC signifies only that the holder is considered 'competent to secure the safe operation' of the operator's aircraft. It does not in any way relieve an operator or an aircraft commander of the responsibility for compliance with statutory requirements and for the safe conduct of a particular flight. International agreements and UK legislation are generally based on the concept that the ultimate responsibility for the safety of flight operations rests with the operator and the commander. The issue of an AOC and the work of the CAA in that connection do not entail any departure from this general principle.

2.2 To a large extent, the statutory requirements relating to the operation of aircraft are written in general terms. This is in accordance with the principle of 'operator's responsibility' and helps to facilitate the development of the operating standards and techniques best suited to particular circumstances and conditions. The competence of an operator to 'secure the safe operation' of aircraft will therefore depend, in part, upon the manner in which he applies the statutory requirements to the particular operation. It is important, nevertheless, to appreciate that in the last resort the interpretation of the statutes is a function of the judiciary and that neither the issue of a Certificate nor the expression of any view in this publication should be taken as an indication to the contrary or as a modification of any statutory requirements.

### **3 A to A AOCs**

3.1 The A to A AOC is based upon an original concept which permitted aeroplane flying training schools to undertake occasional "pleasure flying" operations. These were undertaken at their main airfield base which had to be a licensed civil or military airfield as required for their main activity, that of flying training. A to A operations, which may only be conducted by day in Visual Meteorological Conditions (VMC), are limited to a radius of 25 NM from the licensed airfield for single-engined aircraft and 50 NM for twin-engined aircraft. The 25/50 NM radius may be modified at the CAA's sole discretion.

3.2 Whereas, traditionally, A to A operations have been limited solely to the operator's main base, operators with such an AOC may position their aircraft, without passengers, from and to their main operating base and any other licensed airfield within the United Kingdom excluding Northern Ireland (Area AA), where A to A pleasure flying activities may then be undertaken. Where A to A AOC holders wish to operate outside Area AA, then additional charges will be incurred in varying the AOC as this involves reassessing changes necessary in the Operations Manual, together with any additional items required to ensure the continued competency of the operation. The charge imposed would depend upon the amount of work involved.

### **4 AOC Documentation**

4.1 Ramp checks of UK operators' aircraft, conducted by foreign authorities, have shown that crew are not always aware of the contents of the AOC documentation. Crew should have an understanding of the various approvals associated with the AOC documentation including the Minimum Equipment List (MEL) and any navigation approvals such that they can demonstrate their company's compliance with the appropriate regulations. This will expedite ramp checks and reduce the potential of unnecessary findings being made against UK AOC holders.

### **5 AOC Suspension and Revocation of Suspended AOCs**

5.1 AOCs may be suspended by the CAA either at the request of the holder or because the CAA believes the holder is temporarily unable to meet the relevant requirements. Regulation 6 of the CAA Regulations governs the CAA's actions when an AOC is suspended because it believes the holder is temporarily unable to meet the relevant requirements. During the period of suspension, the statutory annual AOC charges continue to be payable although no variable charges are incurred.

5.2 When the holder of a suspended AOC returns to a state of compliance within a relatively short period, it is possible that only minimal investigations will be required (and therefore minimal costs incurred) by the CAA before the suspension can be lifted. However, the longer the period of suspension, the further removed from a state of compliance the operation becomes, and the more detailed the investigations required by the CAA. Eventually a point is reached when the work involved is equivalent to an initial AOC application with a commensurate increase in costs. The CAA's policy will be to review the suspension of AOCs after three months. If there is no evidence of progress towards a resumption of operations the CAA will commence action to revoke the AOC. If there is such evidence the holder will be asked for a project plan showing how and when he expects to resume operations. This should be no later than six months from the date of suspension. Progress will be assessed against this plan. If the operator is not in a position to recommence operations after six months, the CAA will commence action to revoke the AOC.

5.3 Once revoked, should an operator wish to resume operations, he will need to make a fresh application for an AOC and any associated approvals – automatically including an application for a new European Aviation Safety Agency (EASA) Part-M Subpart G approval (hereinafter referred to as a 'Subpart G approval'). The application will be subject to the appropriate charge, which will more accurately reflect the degree of work and costs entailed in establishing the operator's compliance with the requirements.

5.4 If an AOC is suspended, for whatever reason, the associated Subpart G approval is automatically invalidated. Conversely, if any approval is suspended that is required to be in place before the grant of the AOC, for example the Subpart G approval, the AOC must then be suspended. If the holder achieves compliance within the specified timescale, the suspension of the AOC and other approvals will be lifted and the associated Subpart G approval revalidated. If the holder fails to achieve compliance within the specified timescale, the AOC, and any other associated approvals, including the Subpart G approval, will be revoked.

## 6 CAA 'On Notice' Procedure

6.1 An AOC is granted by the CAA either:

- under Article 12 or 13 of the ANO 2009, if it is satisfied that an applicant is competent to secure a safe operation. Article 228(2) of the ANO 2009 provides that the CAA may, on sufficient grounds being shown to its satisfaction following enquiry, revoke, suspend or vary an approval or certificate; or
- under OPS 1.175 of the amended Council Regulation (EEC) No. 3922/91 Annex III (EU-OPS) for operators of aeroplanes conducting Commercial Air Transportation. OPS 1.175 also requires the CAA to vary, suspend or revoke an AOC if it is no longer satisfied that the operator can maintain safe operations.

6.2 Whilst the significant majority of AOC holders maintain high safety standards there are occasions when the CAA detects trends in operations that indicate standards are deteriorating. If left unchecked this could lead to a situation whereby the CAA no longer has confidence in an operator's competence to secure a safe operation. To arrest such a decline before it becomes necessary to take action under ANO 2009 Article 228(2) or OPS 1.175, the CAA will make its concerns clear to the operator and seek action from them to address any shortcomings identified. It is important for the AOC holder to understand why the CAA is concerned, what they must do to address the concerns and the consequences should they fail to do so.

6.3 In the event that the CAA detects the AOC holder's standards are declining the Flight Operations Division Regional Manager (Operations) (RM(O)) or Manager Flight Operations Inspectorate (Helicopters) (MFOI(H)), as appropriate, will contact the operator to set out the CAA's concerns, and make it clear that unless improvements are made the CAA will take action under ANO 2009 Article 228(2) or OPS 1.175. The RM(O)/MFOI(H) will request the operator to provide a plan to address the shortcomings identified by the CAA. This recovery plan should describe what actions the operator intends to take to address the root cause(s) of any identified deficiencies, and should include clear deliverables and specific timescales for these actions. The recovery plan must be agreed with the RM(O)/MFOI(H) and this will be the means by which the CAA measures progress in addressing its concerns. Failure by the operator to adhere to the recovery plan is likely to result in regulatory action.

6.4 The RM(O)/MFOI(H) will write to the operator informing them that they are 'On Notice'. Should the operator carry out the agreed actions in the recovery plan to the satisfaction of the RM(O)/MFOI(H) within the agreed timescales, and it is considered that they are able to maintain the CAA's confidence that they can secure a safe operation, the CAA will confirm in writing that the operator is no longer 'On Notice'. Should the operator fail to carry out the agreed actions, within the agreed timescales, in the recovery plan to the satisfaction of the CAA, the RM(O)/MFOI(H) will refer the matter to their respective Head of Flight Operations Inspectorate for action. This action is likely to include a provisional suspension either of an appropriate approval or of the AOC itself.

6.5 In the event that a serious safety deficiency is detected, the 'On Notice' procedure will not preclude the CAA from taking immediate action to contain any consequent safety risk. Such action is likely to include provisional suspension of a specific approval or, if the risk cannot be contained in this way, provisional suspension of the AOC.

## 7 Mergers and Acquisitions

7.1 Mergers between operators and acquisitions of one operator by another, or by a larger group, are becoming increasingly common. The integration or merger between two or more operators or takeover of one AOC holder by another is a complex matter that is demanding of time and resources for the operator and the CAA. Detailed guidance for mergers, integrations and takeovers is at Annex 1 to Chapter 1. A checklist for mergers, integrations and takeovers is at Annex 2 to Chapter 1.

# Annex 1 to Chapter 1

## Mergers and Acquisitions

**NOTE:** In this Annex 'merger' is used to denote an integration, merger or takeover, unless otherwise specified.

### 1 General

- 1.1 The safety oversight problems entailed by the integration of two or more operators can be extremely challenging. The degree of difficulty depends on many factors, which can include:
  - the size and legal status of each organisation;
  - the difference in size of the organisations;
  - the difference in the type of operation in which the operators specialise;
  - the geographical distribution of operating bases for each operator;
  - the rate of expansion of each operator at the time of integration;
  - the management structure and style differences;
  - the cultural differences;
  - the level and type of outsourcing in each operator;
  - the complexity of the maintenance support arrangements; and
  - the resources allocated to planning and monitoring the merger.
- 1.2 There will always be some problems arising from the friction between two distinct cultures, at both management and operational levels, and it will be necessary to ensure that this is recognised as a safety risk by the management, and reasonable mitigation is proposed. There is also the potential for incompatibilities between maintenance philosophies. Differing schedules, check intervals etc. should be highlighted.
- 1.3 A typical strategy for the integration of operators would consider how to:
  - maintain current or improved operating standards of AOCs under one executive management;
  - produce convergence of policies, standards and procedures within a reasonable timescale, so that operations under all AOCs would be equivalent under audit; and
  - move operational control to a single AOC.
- 1.4 By working through the AOC Mergers and Acquisitions Checklist (Annex 2 to Chapter 1), most points will be covered so that the merger can be accomplished safely and in a timely fashion. The key to this is project planning, possibly using a proprietary web-based tool, under a suitable project manager. The merger is further aided by the appointment of one Accountable Manager (AM) for both AOCs as soon as is practicable, and similarly a Lead CAA inspector. Management resources may need to be increased in order to cover the day-to-day running of the operations as well as the merger. The CAA is willing to advise the operators on regulatory matters that apply to the merger, as this will be unfamiliar territory for them. There is also a need to liaise closely during the pre-merger work as unexpected issues will require resolution that will be beyond the operator's regulatory knowledge.

## 2 Operator Competence for Merger

2.1 The basis for determining operator competence is EU-OPS 1.175(g) and JAR-OPS 3.175(g). The operator must satisfy the CAA that:

- its organisation and management are suitable and properly matched to the scale and scope of the operation; and
- procedures for the supervision of operations have been defined.

2.2 In terms of organisation, an operator will need to show that it has a workable structure that can be demonstrated from the Operations Manual and is suitable for whatever size of operation is planned. This would include job descriptions or terms of reference for all key operational and safety personnel. What the posts are called or what form the structure takes is the operator's choice, but the CAA will ask how certain things work in practice, so reporting lines, accountabilities and responsibilities need to be clear.

2.3 This is further reinforced by local procedures manuals for all staff so that all staff know what it is they should be doing.

2.4 Appendix 2 to EU-OPS 1.175(a) and Appendix 2 to JAR-OPS 3.175(a) state that 'an operator must have a sound and effective management structure in order to ensure the safe conduct of air operations. Nominated postholders must have managerial competency together with appropriate technical/operational qualifications in aviation'. The appendix outlines various responsibilities for operator and management, and IEM OPS 1.175 and IEM OPS 3.175 expand on this. EU-OPS 1.175(i) and JAR-OPS 3.175(i) require four postholders: Flight Operations; the Maintenance System; Crew Training and Ground Operations. The competence requirements for postholders are in ACJ OPS 1.175(i) and ACJ OPS 3.175(i). Management must be suitably qualified and competent and they must have a comprehensive knowledge of the AOC holder's Operations Specification. In practice they will need to know how things are done on that particular AOC.

2.5 The question of how many postholder changes can be accommodated at one time should be looked at in terms of hazard and a risk management process. It might not be safe to make simultaneous multiple postholder changes, but a phased approach could be acceptable. It should be borne in mind that EU-OPS/JAR-OPS 3 require at all times that the management structure is suitable; there should be no allowance for a learning curve. However, it may be possible to put risk mitigation in place to cover a new postholder during the early stages of transition.

2.6 Whatever is proposed has to pass the test of EU-OPS/JAR-OPS 3. The enlarged airline would need to consider its structure and see if any changes are required and amend manuals accordingly. All staff, regardless of AOC origin, would need to have an appropriate understanding of the enlarged airline's structure for their role, so any local procedures manuals would need to be amended. This can be summarised as: "Does everybody know what is going on and how they play their part in the airline?" The CAA will check the Operations Manual to confirm this with some sampling of individuals.

2.7 If the enlarged airline management comprised postholders drawn from both AOCs then the new postholders would need to demonstrate to the CAA that they had comprehensive knowledge of the AOC holder's Operations Specifications, which in effect means "does he know how things work and his role in it?" This would be done by interview for postholders new to the AOC, but possibly for all postholders just to see if they know their terms of reference and what is going on in the AOC. It will not be necessary to check knowledge of EU-OPS/JAR-OPS 3 if they have been postholders before.

- 2.8 At some point, one of the AOC holders will need to change its procedures or possibly both will harmonise procedures. The timing of this will have an impact on safety so any change would need to be carefully assessed, planned and managed to fulfil the requirements of EU-OPS/JAR-OPS 3 as outlined above.
- 2.9 The merger should not distract the management of either AOC from continuing to discharge their safety responsibilities. Any management or key safety personnel changes to the AOC holders ahead of the merger will be subject to these comments. It is likely that management and training resources would need to be increased during this interim period.
- 2.10 Throughout the transition the management must remain competent to oversee its day-to-day operations; therefore the operators must be able to demonstrate how postholders and key staff maintain supervision of their areas of responsibility without being distracted by the changes taking place.

### **3 Demonstration of Management Competence**

- 3.1 Unlike a start-up operation this is the merging of two different cultures with all the problems of deciding which culture will dominate in which areas and for what reasons.
- 3.2 Any assessment of competence would begin with the AM and the senior management team who would need to fulfil the requirements of EU-OPS/JAR-OPS 3 as mentioned above. This will be checked by the Lead Inspector by interview as discussed previously.
- 3.3 Safety Management Systems (SMS) are not yet mandated, but the CAA would take some comfort from an operator who could demonstrate that they had, as the basis for change and ongoing operations, a functioning SMS that included a risk management process, i.e. hazard identification, risk analysis and risk mitigation. This would be complemented by a properly staffed and resourced Quality Management System (QMS). If the Quality System were not suitable then the CAA would question the competence of the operator.
- 3.4 The AM must be able to fully resource the operation, both financially and with regard to staff, to demonstrate that its organisation and management are suitable and properly matched to the scale and scope of the operation. The CAA would expect safety and policy statements to be clear and unequivocal in tone and content but backed up by a practical commitment to the safety culture.
- 3.5 The CAA would carry out its standard inspections but probably with an emphasis on control and supervision of operations. The CAA is always interested to know how an operator satisfies itself how things are safe, which is the most important basis for the CAA's satisfaction. This is normally done by having adequate staffing levels and suitable feedback loops at all levels in the organisation. Management evaluation meetings would be part of this process.
- 3.6 In summary, the CAA would need to be satisfied that the new entity had the resources to effect a project plan that was sound and feasible in the projected timescale and that all risks associated with the project could be properly managed. The merger would then need to be monitored to completion to ensure that the theoretical competence was manifested in practice. The CAA would possibly increase its oversight of safety-critical areas which should correspond to increased operator SMS and QMS activity.

## 4 Interim Accountable Manager

4.1 The appointment of a single AM for all the integrating operators while the AOCs remain separate may be acceptable, subject to the following conditions:

- the competence of the nominated AM, in terms of skills, knowledge and experience, is assessed as appropriate to the scale and scope of the 'integrated' operation;
- the appointment is temporary, with a stipulated termination date (normally the projected date of transfer to a single AOC); and
- the appointment is reviewed regularly by the lead Flight Operations Inspector (FOI) until integration is complete.

4.2 If at any stage it becomes clear that the nomination is not conducive to efficient integration, the lead FOI would request the management teams to submit proposals for remedial action.

## 5 Training

5.1 The AOC holders should take full cognisance of EU-OPS/JAR-OPS 3 subparts N and O. When changing operators an operator's conversion course, where necessary, should be completed for flight crew before operating, and conversion and differences training should be completed for cabin crew. This could mean that crews would be grounded for a period of time while this training is carried out.

5.2 The operator should take due cognisance of the requirements of EU-OPS 1.945(a)/JAR-OPS 3.945(a) and Appendix 1 to OPS 1.945/AMC OPS 3.945 when proposing the movement of pilots from one AOC to another as part of a merger process. The operator's conversion course includes:

- Ground training and checking.
- Emergency and safety equipment training and checking.
- Simulator training and checking (Operator Proficiency Check (OPC)).
- Line flying under supervision and line check (where necessary).

5.3 The content of the operator's conversion course may be modified in accordance with EU-OPS 1.945(a)(4)/JAR-OPS 3.945(a)(4) where Standard Operating Procedures (SOPs) have been harmonised and with the agreement of the assigned inspector.

5.4 The operator's conversion course may be achieved prior to the merger date and combined with recurrent training and checking, subject to paragraph 5.5 below.

5.5 Pilots who have completed simulator training and/or OPC under the 'new operator' SOPs may not operate:

- a) with pilots who have not received such training/checking; or
- b) using significantly different SOPs from those which have been used in such training/checking; or
- c) using an Operations Manual with which they have not been adequately familiarised (see paragraph 6 below).

5.6 Training in revised or 'new' Operations Manual procedures (Flight Time Limitations (FTL), technical log procedures, security procedures etc.) which do not normally involve simulator training or checking may be given in a suitable ground-based environment.

5.7 Operational or commercial circumstances can arise that may make it impracticable to complete all of the training requirements listed above before completion of the merger. At the discretion of the assigned inspectors it may be possible for a complete fleet to move from one AOC to another providing that it remains as a complete entity with its management and training structure intact. This has been called 'Ring Fencing'. This makes the assumption that the fleet management, training, OPCs, Line Checks and SOPs that are carried across are acceptable to the AOC holder. To this end, the AOC holder would be expected to have a procedure to verify the suitability of these actions and state when the fleet will be fully integrated into all the procedures of the new entity.

5.8 This ring fencing arrangement is for a limited period of time and the AOC holder should satisfy themselves that the ring-fenced fleet is adequately monitored for safety standards and that arrangements are in place to maintain its integrity. Some elements of a conversion course will need to be completed that permit the ring-fenced fleet to function in its new environment, e.g. change to operating minima, load sheets and administrative procedures.

## **6 Quality System and Safety Management System**

6.1 Before the merger begins, the SMS will have carried out safety assessments and have in place a risk management procedure. This will contain all of the elements of the merger and will be updated from data obtained as the process goes forward. The SMS is concerned with hazard and risk, therefore all personnel should be involved in providing feedback during the merger that enables hazards to be identified and risks assessed and mitigated.

6.2 The Quality System is concerned about compliance. Many new procedures will have been put in place to ensure the safe and smooth migration from one AOC to another. The Quality System should develop a comprehensive audit schedule for the process with robust corrective action procedures. This is especially important for monitoring the standards of flight crew and cabin crew but also to ensure that focus does not slip from the day-to-day running of the operation onto the merger. Managers should implement their own quality control procedures in support of the Quality System.

## **7 CAA Oversight**

7.1 Until the merger is complete the two AOCs will continue to function as two distinct legal entities. The CAA will continue to apply its safety oversight through the assigned FOI for each AOC. A lead inspector will be appointed who will normally be the FOI for the AOC that is providing the host for the merger or takeover. While continuing to apply safety oversight to the existing AOC operation he will be the CAA project manager for the merger and will continue as the assigned FOI for the new entity. Both FOIs will work together to ensure a safe transfer of AOC functionality while continuing to maintain safety oversight of their assignments.

7.2 Pre-merger, CAA oversight will continue to reflect the normal inspecting schedule of a Mid-term Audit and an Annual Audit with interim audits as required. The timing of these may need to be varied to suit any planned merger or takeover completion date.

7.3 However, the assigned inspectors should review in detail the AOC holder's plans for the merger at the beginning of the merger. If these are suitable then any subsequent audit or inspection should not identify any issues that could delay the merger. At the start of the merger, checks to ascertain operator competence as outlined in paragraphs 2 and 3 above should be carried out, and if successful the merger should

be permitted to proceed. If the checks are not successful then the operator should respond accordingly. At completion of the merger it will be necessary to revise the inspecting schedule to include checks that satisfy the CAA that the new entity is competent to secure the safe operation of aircraft. Consideration should be given to allowing the new entity to 'bed in' before carrying out post-merger checks. The host AOC may need to be varied to accommodate a new aircraft type(s) in which case the normal checks apply.

- 7.4 The operator's Quality System and SMS will be the focus of CAA audit in order to ascertain the operator's monitoring of compliance and standards as outlined above. Both AOC holders involved in the merger process will be expected to enhance their audit schedules in respect of critical safety areas, e.g. monitoring of SOP changes.
- 7.5 The assigned FOIs will increase the frequency of liaison visits with the operators and will expect to be regularly briefed on all aspects of the merger process. Close monitoring of Mandatory Occurrence Reports (MORs), incident reports, discretion reports, Rectification Interval Extensions (RIEs) and staff retention or changes will give some indication of the suitability of the operator's merger plans in practice.
- 7.6 Both assigned FOIs will liaise closely with the CAA Survey Department as legal entity changes can impact Part-M subpart G approvals and in some cases can result in approvals being withdrawn.
- 7.7 The CAA Consumer Protection Group will be fully informed about the merger and will be invited to provide comment on the new entity as verification of the suitability of financial, licensing and insurance matters.

## **8 Continuing Airworthiness EASA Part-M Subpart G and Part-145**

- 8.1 The merger of two AOC holders generates changes to the Continuing Airworthiness and Part-145 organisation that support the new AOC holder. The changes encompass difference in types of aircraft operated, route structure, maintenance programmes including extensions from the manufacturer's maintenance-planning document, third-party maintenance and component support contracts and the approvals of certifying staff.
- 8.2 Survey Department surveyors oversee all of the aforementioned activities so the FOI will liaise closely with the surveyors involved.
- 8.3 One of the changes is worthy of further mention: that of the maintenance programmes. These are often customised or optimised to a particular operator's aircraft type, route structure, flying programme and reliability programme so to transfer into the new AOC may not be possible. This will result in the programme having to be totally re-justified by the new AOC holder which is not only an expensive and time-consuming activity but may require the involvement of the aircraft manufacturer. This task could easily delay the transfer of the AOCs.

## **9 Post-Merger**

- 9.1 The manipulation of two distinct company cultures into one unified culture is a lengthy and time-consuming task. Accomplishing the merger is just the start of a development that should take into account the sensitivities of all staff, especially those who feel that they have been taken over by a less competent entity. Management should have in place a programme to achieve the cultural integration with suitable objectives and indicators that provide data on the continued safe operation of the new entity. Consideration should be given to how disgruntled employees will be identified and their concerns dealt with.

## Annex 2 to Chapter 1

### AOC Mergers and Acquisitions Checklist

**NOTE:** In this checklist 'merger' is used to mean a merger, integration or takeover.

#### 1 Considerations

1.1 Any merger with another AOC holder should consider at least the following:

- Identify hazards to both AOCs pre-merger and address with suitable risk management process, e.g. retention of key staff.
- Identify hazards to the AOC post-merger and respond with suitable risk management process.
- Appoint one project manager, acceptable to the CAA, who will act as a point of contact for the merger.
- Provide a written monthly brief to the CAA on merger activities or as required.
- Arrange face-to-face meetings as required.
- Provide a plan to the CAA that contains timelines, deliverables, Key Performance Indicators (KPIs) and milestones for achieving the merger.
- Identify the form of the merger, i.e. one dominant AOC or harmonisation.
- Identify senior management and the management structure.
- Identify how the management teams of both AOCs will provide management oversight of the continuous day-to-day operations during the merger.
- Appoint one AM for both AOCs as soon as practicable.
- Identify training needs - operator's conversion course, OPC, Line Check, cabin crew training where required. If ring fencing is an option, how to manage the integration for the removal of the ring-fence.

#### 2 Areas to be Addressed

2.1 Areas to be addressed will include but not be limited to:

- Location of new entity - headquarters and bases.
- Final scale of the new entity - aircraft fleet sizes and route structure.
- Management structure - organisation and terms of reference.
- Retention of key safety personnel.
- Resourcing of Quality System and SMS.
- Maintenance arrangements.
- SOPs including abnormal and emergency procedures.
- Cabin crew procedures.
- MELs.
- Safety equipment and procedures.

- FTL - scheme differences, crewing and rostering.
- Crew training and standardisation.
- Fleet standardisation.
- Subcontractors and suppliers.
- Aircraft leases. Reassignment of leases?
- Liaison with the CAA.

## Chapter 2 Administration and Control of an Operations Manual

### 1 Purpose and Scope of an Operations Manual

- 1.1 It is a statutory requirement that an Operations Manual shall contain 'all such information and instructions as may be necessary to enable the operating staff to perform their duties'. Operating staff describes the servants and agents employed by the operator, whether or not as members of the crew of the aircraft, to ensure that the flights of the aircraft are conducted in a safe manner; it includes an operator who himself performs these functions.
- 1.2 The form and scope of manuals will vary considerably with the nature and complexity of the operator's organisation and types of aircraft in use. A 'manual' may comprise a number of separate volumes and may well include individual forms, such as prepared navigation flight plans, supplied by the operator to his crew. Instructions and information to particular groups of operating staff - e.g. traffic manuals, cabin crew manuals, crew rostering instructions and information on weight and balance supplied to handling agents - can all be regarded as part of the Operations Manual. Applicants will be required to lodge copies of their manuals and associated documents with the CAA, together with copies of all amendments and temporary instructions. The Operations Manual will be regarded by the CAA as a primary indication of the standards likely to be achieved by an operator.

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*Requirement*

- 1.3 The operator shall provide operations staff and flight crew with an aircraft operating manual, for each aircraft type operated, containing the normal, abnormal and emergency procedures relating to the operation of the aircraft. The manual shall include details of the aircraft systems and of the checklists to be used. The design of the manual shall observe Human Factors principles. Guidance material on the application of Human Factor principles can be found in International Civil Aviation Organization (ICAO) Document 9683 *Human Factor Training Manual*.

*Requirement End*

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- 1.4 The operator should consult EU-OPS or JAR-OPS 3 Subpart P for the rules, structure and content of an Operations Manual. Annex 1 to Chapter 2 provides a list of subjects that are not specifically required by EU-OPS/JAR-OPS 3 Subpart P but merit consideration for inclusion in Operations Manuals.

### 2 Operations Manual Amendments

- 2.1 An operator should supply the CAA with intended amendments and revisions to any part of the Operations Manual in advance of the effective date. The amendment process should be a controlled sequence of events with close co-ordination between the operator and the assigned FOI. The Flight Operations Inspectorate Department considers that "in advance of the effective date" should normally be a period of not less than 28 days. This will allow a proper review of the amended material to take place and any Approvals to be issued or amended. The use of the provision for immediate amendments or revisions should be limited to those occasions where they are the only means available of securing the interests of safety. In the case of such

an immediate revision or amendment being required, it should be published in the form of a temporary revision to the Operations Manual, or by means of a Notice to Crew or similar, and be incorporated in the Operations Manual, if appropriate, at the next formal revision.

2.2 In order to facilitate the provisions of EU-OPS/JAR-OPS 3 and to ensure the shortest possible time between an operator submitting an Operations Manual amendment, its acceptance and any associated Approval being issued, each Operations Manual amendment submitted to the assigned FOI should be accompanied by a Notice of Proposed Amendment (NPA) (Form SRG 1832).

2.3 The NPA should contain the following information:

- a) details of the amendment (the section/paragraphs of the Operations Manual being amended);
- b) the reason for the amendment;
- c) the effective date; and
- d) the request for any Approval required as a consequence of the amendment, or for any change required to an existing Approval.

2.4 Amended text should also be highlighted on the relevant Operations Manual page(s) by a vertical line in the margin or by a similar means adopted. On completion of his review of the amendment, and after agreeing with the operator any further changes required, the assigned FOI will indicate to the operator, in writing, that the material is acceptable and process the issue of any Approval required as a consequence, or the amendment of any existing Approval held. The operator will then publish the amendment in the normal way and distribute copies to all holders of the Operations Manual, including the assigned FOI.

**NOTE:** For amendments to an existing Operations Manual the operator should provide the amended pages in the correct format to the FOI within 30 days for inclusion in the Operations Manuals held by the CAA. For Operations Manuals supporting a Variation or a new application, all corrected pages should be included in the completed operator's suite of manuals and should also be sent to the CAA within 30 days. This timescale also applies to Operations Manuals provided in CD form.

2.5 FOIs receive an enormous number of Operations Manual amendments and the process of their review and acceptance will be facilitated and shortened by operators providing full details of the impact of the amendment with its submission. It is also important that operators assume responsibility for ensuring that they hold appropriate Approvals for those areas of their operation that require them. The process described above will ensure that Operations Manual amendments are dealt with as quickly and efficiently as possible. It is the operator who is responsible for the accuracy of the content of the Operations Manual, and for its compliance with the requirements, and not the assigned FOI. It is therefore important that amendments are thoroughly prepared and proof read before submission, to ensure that the operator is entirely satisfied with the content.

2.6 The amendment of a manual in manuscript will not be acceptable. Changes or additions, however slight they may be, should be incorporated by the issue of a fresh or additional page on which the amendment material is clearly indicated.

2.7 When Operations Manuals amendments are being prepared, brief summaries of the changes they contain can help the person who uses the document to learn quickly what is new or what has been deleted. For example, notes covering amendments to

*CAP 393 Air Navigation – The Order and the Regulations* illustrate this point: a number of AOC holders already produce summaries in a similar manner. As Operations Manuals form the cornerstone upon which flight operations are managed and standards described, operators should produce summaries to accompany amendments when the number of pages and/or the depth of content seem likely to deter the reader from conducting a lengthy study. In such cases, a 'ready reference' should draw attention to significant changes, additions and deletions that otherwise might pass by unnoticed.

**NOTES:**

- 1 NPAs submitted without the appropriate entries in the Approval Reference column may be returned unprocessed.
- 2 When submitting an initial MEL or a proposed amendment to an existing MEL, operators are required to complete a compliance document. This compliance document should be submitted, together with the MEL and/or amendment, to the assigned FOI for approval. The inclusion of references to source material and justification for MEL items will facilitate the efficient processing of draft MEL documents or amendments. When the CAA is satisfied that the MEL or the amendment to the MEL is acceptable, the assigned FOI will countersign the form and return it to the operator for their records. At this point, the MEL may be issued or amended.
- 3 For an amendment to an existing MEL the operator should provide the amended MEL pages in the correct format to the FOI within 30 days of approval for inclusion in the Operations Manuals held by the CAA. For a new MEL the amended pages should be included in the completed operator's suite of manuals submission and should also be sent to the CAA within 30 days of approval. The timescale also applies to MELs provided in CD form.

### **3 Operations Manual Requirements Relating to Dangerous Goods**

- 3.1 All AOC holders, whether or not holding an approval to carry dangerous goods, are required to publish appropriate instructions in their Operations Manuals. The CAA's Dangerous Goods Office reviews material provided within Operations Manuals relating to the carriage of dangerous goods and often find that the information is either inadequate or out-of-date.
- 3.2 Part A, paragraph 9 of Appendix 1 to EU-OPS 1.1045 specifies that information, instructions and general guidance on the transport of dangerous goods must be included in the Operations Manuals of operators of fixed-wing aircraft. Part A, paragraph 9 of Appendix 1 to JAR-OPS 3.1045 specifies that such information must be included in the Operations Manuals of operators of rotary-wing aircraft.
- 3.3 Specimen Operations Manual entries have been published on the CAA website for operators of fixed-wing and rotary-wing aircraft including separate specimen entries to cater for whether or not an approval for the carriage of dangerous goods as cargo is held by the operator. Specimen Operations Manual entries are also available for A-to-A operators. These specimen Operations Manual entries may be accessed by visiting [www.caa.co.uk/dangerousgoods](http://www.caa.co.uk/dangerousgoods) and selecting 'Information for Operators' from the green area to the left of the page.
- 3.4 Operators should have an adequate system of amendment and revision of the dangerous goods material in their Operations Manuals, e.g. in response to the publication of each edition of the ICAO Technical Instructions and addenda/corrigenda thereto in accordance with EU-OPS 1.1040(g) and Appendix 1 to JAR-OPS 3.1045 (Part A 0.2) as applicable.

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## **Annex 1 to Chapter 2**

# **Operations Manual – Additional Subjects for Inclusion**

Below is a list of subjects that are not specifically required by EU-OPS and JAR-OPS 3 Subpart P but merit consideration for inclusion in Operations Manuals. Should it be determined that coverage of additional subjects is to be included then a location that is relevant to the subject matter will have to be determined. The options for appropriate location could be either an expansion of existing text in Part A of the Operations Manual or incorporation into Parts B, C and D, or incorporation into a Cabin Safety Training and Procedures document, if produced.

### **1 General**

- AOC:
  - authorised AOC region including map;
  - general conditions;
  - special conditions; and
  - details of Exemptions from ANO/Air Navigation (General) Regulations (AN(G)Rs), EU-OPS, JAR-OPS 3.
- Prohibition of falsification of documents.
- Co-pilot take-off and/or landings, circumstances to exist.
- Air Ambulance operations:
  - installation of special equipment; and
  - aeromedical aspects.
- Flight Operations:
  - instructions on continuation/diversion in event of engine failure; and
  - mixed passenger/freight loads, seating considerations.

### **2 Commander's Authority and Responsibility**

- In-flight responsibilities:
  - assisting vessels and aircraft; and
  - meteorological reports/hazardous conditions.

### **3 Duties of Non-Aircrew Operating Staff**

- Duties of flight planning assistants regarding pre-flight preparation and planning/decision-making:
  - flight briefs;
  - Regulated Take-Off Weights (RTOWs) and regulated landing weights;
  - Aerodrome Operating Minima (AOM) (when not in Part C);
  - preparation of Cat. B and C aerodrome briefs; and
  - Operational Flight Plans (PLOGs).

- Performance data:
  - field performance;
  - net flight path obstacle clearance;
  - emergency turns; and
  - en-route performance.
- Traffic Officers:
  - calculation of maximum payload;
  - preparation of load/trimsheets; and
  - supervising aircraft loading.

## 4 Notices to Aircrew – Part A

- Classes of information:
  - administrative notices;
  - operational notices;
  - technical notices; and
  - cabin crew notices.
- Promulgation and amendment.
- Presentation:
  - numbered, dated and indexed; and
  - Produced under authority of senior operations personnel.

## 5 Accident and Incident Procedures

- Distribution:
  - Accident and Occurrence Reporting and Company Procedures:
    - definitions;
    - births, deaths and infectious diseases;
    - overdue aircraft; and
    - emergency in flight.
  - Company Accident Procedures:
    - co-ordination;
    - actions on site;
    - list of persons to be notified;
    - press liaison;
    - departmental responsibilities; and
    - investigation.

## 6 Traffic Staff Instructions

To include security matters:

- Action in the event of:
  - hijack; and
  - bomb threat in flight or on ground.
- Bomb searches.

## 7 Flight Planning (General) – Part C

- Operations with one or more power units inoperative.
- Operations over mountainous terrain:
  - drift-down profile;
  - stabilising altitude; and
  - escape routes.
- Engine-out ferry.

## 8 Aerodrome Operating Minima (AOM) Preparation

- Responsibility allocated for:
  - constant review of AOM rules; and
  - upkeep of AOM.
- General instructions:
  - Increments to be added in event of:
    - engine-out approach; and
    - inexperienced commanders.
  - Offset Instrument Landing System (ILS):
    - Obstacle Clearance Limit (OCL) procedures; and
    - Obstacle Clearance Height (OCH) procedures.
  - Aerodromes without approach aids – Part C:
    - AOM to be specified;
    - VMC descent and approach method; and
    - remote instrument approach method.
  - AOM not in Part C or other AOM publication to be specified in flight brief and retained for three months.
  - AOM calculated by Commander:
    - copy to be left on ground; and
    - to be recorded and returned with ship's papers.
  - Special rules for military aerodromes.

## 9 Let Down and Approach Procedures

- Special cloud break procedures:
  - To be agreed by:
    - aerodrome authorities; and
    - the CAA.

## 10 Loading Instructions (Possible need for specific manual)

- Carriage of baggage and freight:
  - definition of approved stowages;
  - use of passenger seats for fragile items, e.g. musical instruments; and
  - responsibility for checking hold poles, nets, etc.
- Loading control:
  - mixed passenger/cargo load; and
  - performance considerations with respect to loading.
- Effect on RTOW of:
  - Maximum Zero Fuel Weight;
  - Maximum Landing Weight at destination/en-route alternate; and
  - stabilising heights and en-route cruise and drift-down requirements.
- Certificate of Airworthiness (C of A) or Aircraft Flight Manual (AFM) limitations on Weight / Centre of Gravity (C of G).
- Special loading limitations:
  - training; and
  - positioning.
- Arrangements for circulating loading instructions to:
  - crews;
  - traffic staff; and
  - company agents.
- Individual aircraft copies.
- Instructions on use of trimsheet/loadsheet or trim calculator.

## 11 Contaminated Runway Operation

- Operation from ice-, snow-, slush-covered or flooded runways:
  - slippery conditions; and
  - reduced runway width.
- Maximum height of snow banks.
- Minimum cleared width after snow.

- Increments to be added for:
  - dry grass; and
  - wet grass.
- Account to be taken of unserviceabilities.

## **12 Flight Deck Management**

- Training staff on board:
  - Clear instructions as to who is in command:
    - when in a pilot's seat;
    - when not in a pilot's seat; and
    - duties of trainer when not in a pilot's seat.
  - Communications:
    - prohibition of use of hand-held microphones;
    - SOPs, general;
    - rules for the use of headsets and flight deck/cockpit loudspeakers;
    - special frequency guard orders; and
    - use of correct Radiotelephony (RTF) procedure at all times.
  - Altimeter calls.

## **13 Operation in Adverse Weather Conditions**

## **14 Flight Safety and Airmanship**

- Visual illusions in flight; and
- disorientation in flight.

## **15 Miscellaneous**

- Definition of Authorised Person;
- carriage of Flight Engineer;
- operations in areas of compass unreliability;
- intercom;
- stowaways, action in the event of;
- carriage of animals;
- callsigns, use of company designator; and
- indelible entries on document.

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## Chapter 3 Organisation and Responsibilities

### 1 Management and Executive Staff (EU-OPS/JAR-OPS 3 Subpart C)

1.1 A sound and effective management structure is essential; it is particularly important that the operational management should have proper status in the organisation and be in suitably experienced and competent hands. The duties and responsibilities of managers and senior executives should be clearly defined in writing and chains of responsibility firmly established. The number and nature of the appointments will vary, of course, with the size and complexity of the organisation. An excess of managers can lead to fragmentation of responsibility and control; this can result in as much difficulty and inefficiency as a shortage and a lowering of operational standards can easily follow. In general, the appointment of deputies for managerial posts should be kept to a level consistent with providing adequate continuous management cover and particular care should be taken in defining their functions and responsibilities. The CAA will wish to be satisfied that the management organisation is adequate and properly matched to the operating network and commitments. Managers who are also undertaking flying duties should be allocated sufficient time to effectively discharge their management responsibilities.

1.2 The positions held by key personnel will normally be listed in each AOC and it will be a condition of the AOC that the CAA shall be given not less than 14 days' notice of any intended change in appointments or functions. In deciding which key personnel be nominated, applicants should ensure that apart from the obvious personnel, who have direct control of the day-to-day operation of the aircraft, they should also include personnel responsible for such functions as operations, control of cabin staff, maintenance arrangements, etc.

**NOTE:** It is recommended that a corporate organisation responsible for an AOC should always maintain an internal audit procedure to ensure that operational safety levels are maintained throughout that undertaking.

### 2 Acceptance of Accountable Managers

2.1 The accountable manager is a senior manager within an organisation which holds an AOC who is accountable to the CAA for maintaining the safety standards required by regulation, and additional standards specified by an AOC holder or applicant. The accountable manager should be able to demonstrate to the CAA that he has corporate authority for ensuring that all operations and maintenance system activities can be financed and carried out to the standard required. EU-OPS and JAR-OPS 3 require an operator to nominate an accountable manager who is acceptable to the CAA.

2.2 As part of the acceptance process a nominee for accountable manager should be prepared to demonstrate to the CAA the appropriate level of knowledge of, understanding of, and attitudes to regulation and safety management. The CAA normally invites the nominee to a meeting at a Regional Office to allow the assigned FOI and Airworthiness Surveyor to confirm his acceptability for the role.

2.3 The meeting will aim to confirm that the nominee has:

- appropriate seniority in the organisation;
- adequate input into the determination of operating budgets;
- autonomy in financing operations to the required standards;

- appropriate knowledge and understanding of the documents that prescribe safety standards;
- appropriate knowledge and understanding of the requirements for competence of management personnel;
- appropriate knowledge and understanding of quality systems, related principles and practices, and the role of the accountable manager in quality systems; and
- appropriate knowledge and understanding of SMS or Accident Prevention and Flight Safety Programmes, related principles and practices, and the role of the accountable manager in such systems.

2.4 Whereas some nominees may have had previous experience as an accountable manager, others may be new to the role and even to aviation. Advice on how to prepare for the acceptance meeting is contained in a guidance document available on the CAA website ([www.caa.co.uk/aocholders](http://www.caa.co.uk/aocholders) > Preparing an Application > Key Points to Address). Nominees for accountable manager may also wish to avail themselves of specific training courses aimed at preparing them for the role. The Joint Aviation Authorities (JAA) runs such courses and details can be found on the JAA website (<http://jaato.com> > Training courses > Nominated Postholder Training Courses and Accountable Manager Seminar). It should be noted that successful completion of such a course does not in itself guarantee acceptance.

### **3 Adequacy and Supervision of Staff**

#### **3.1 Aircraft Crew**

3.1.1 It will be necessary for operators to satisfy the CAA that they have a sufficient number of aircraft crews for the operations to be undertaken. The adequacy of the crewing level will not be assessed against a set formula, as there will clearly be a wide variation in requirements according to particular circumstances; however, it will be expected that, even if only one aircraft is to be operated, a minimum of two properly qualified aircraft crews will be employed. In certain cases where the volume of work undertaken is small, the normal requirement concerning the number of aircraft crews employed may be relaxed. It is important that aircraft crews should generally be employed full-time under a contract of employment.

3.1.2 Flight crews should be aware of their individual responsibilities in relation to the legality and currency of any Flight Crew Licences and associated ratings and certificates held. Flying with an applicable element that is out of date in a licence is illegal and can invalidate insurance cover.

3.1.3 The employment of part-time or 'freelance' aircraft crews will be acceptable only in exceptional circumstances and in consultation with the assigned FOI. For both part-time and full-time employees, tests carried out to establish the competence of an operator's pilots, under Schedule 8 of the ANO 2009 or JAR-OPS 3 / EU-OPS Subpart N, should be conducted either by the operator himself or by another operator under arrangements set out in detail in the company's training manual. These arrangements should ensure that the pilot is competent to perform all the duties and responsibilities laid upon him by the operator.

3.1.4 Flights over certain areas referred to in Part 16 of the ANO 2009 or JAR-OPS 3 / EU-OPS Subpart L require navigational equipment approved by the CAA; such flights will not be permitted, unless the operator has the CAA's approval for the use of that equipment. The requirements for RNAV and Precision Area Navigation (P-RNAV) are

contained on the application forms SRG 1813 and SRG 1815 which can be found on the CAA website.

3.1.5 Arrangements should be made for the supervision of all grades of aircraft crew by persons having the experience and qualities necessary to ensure the maintenance of high professional standards. This will necessitate such appointments as Chief Pilot, Flight or Fleet Manager and, in the larger organisations, Safety Officer and Chief Cabin Crew. The duties and responsibilities of these officials should be carefully defined and their flying commitments suitably restricted in order that they may have sufficient time for their managerial functions. If there are too many such appointments, they can create as many problems as they solve; the CAA will be concerned only to verify that arrangements for the professional supervision of aircraft crews are properly related to the size and nature of the operator's organisation.

### 3.2 **Ground Staff**

#### 3.2.1 **General**

The number of ground staff needed will depend primarily upon the nature and the scale of flight operations; the CAA will take full account of the operator's particular circumstances. Operations and traffic departments, in particular, should be adequately staffed with trained personnel who have a complete understanding of the nature of their duties and responsibilities; this is especially important where the operator subcontracts his ground handling to a third party.

#### 3.2.2 **Ground Staff Training**

Operators are expected to provide training for ground staff directly involved with flight operations; in particular, those employed in operations and traffic departments. Special training in aviation security in accordance with the guidance given by the Department for Transport should be undertaken; a dangerous goods training programme following *CAP 483 Safe Transport of Dangerous Goods by Air; Guidelines on Training* should be established. Further training will be necessary from time to time (e.g. when new types of aircraft are acquired) and the arrangements in this connection will be taken into account in the consideration of applications for the variation of AOCs.

## 4 **Responsibilities of Aircraft Crew and other Operating Staff**

4.1 In this context the term 'operating staff', as distinct from the crew, means staff having specific duties, in relation to particular flights, which fall within the general pre-flight and in-flight responsibility of the aircraft commander. The Operations Manual should define, where appropriate, the duties and responsibilities of people employed as:

- flight dispatchers/flight watch officers;
- flight planning assistants who prepare navigation flight plans and flight briefs, compute fuel requirements, RTOWs and AOM;
- rostering and scheduling staff; and
- traffic officers or 'loadmasters' responsible for calculating maximum payload and/ or fuel uplifts or for supervising the loading of aircraft and completing load/trim sheets.

4.2 If an operator employs flight operations officers in conjunction with a method of operational control, training for these personnel should be based on relevant parts of *ICAO Doc 7192 - AN/857 D3 Training Manual - Flight Operations Officers/Flight Dispatchers*. This should not be taken as a requirement for licensed flight dispatchers

nor for a flight-following system. Guidance on the role of the flight operations officer/flight dispatcher is contained in ICAO *Doc 8335 The Manual of Procedures for Operations Inspection, Certification and Continued Surveillance*. Detailed guidance on the authorisation, duties and responsibilities of a flight operations officer/flight dispatcher is contained in ICAO *Doc 9376 Preparation of an Operations Manual*.

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*Requirement*

4.2.1 When an operator employs a flight operations officer/flight dispatcher he shall ensure the following:

- a) That the Operations Manual specifies the responsibilities and functions assigned to flight operations officers/flight dispatchers. The actual responsibilities assigned are part of the approved method of control and supervision of flight operations. ICAO *Annex 6, Part I* and ICAO *Annex 6, Part III*, Section II give information on the duties of flight operations officers/flight dispatchers. The duties assigned will be very similar for all such operations personnel, whether licensed or unlicensed.
- b) That the responsibilities of a flight operations officer/flight dispatcher include the provision of assistance to the Pilot in Command (PIC) in flight preparation; completion of operational and Air Traffic Services (ATS) flight plans; liaison with the air traffic, meteorological and communication services; and the provision to the PIC during flight of information necessary for the safe and efficient conduct of the flight. Flight operations officers/flight dispatchers shall also be responsible for monitoring the progress of each flight under their jurisdiction and for advising the PIC of company requirements for cancellation, re-routing or re-planning, should it not be possible to operate as originally planned. In connection with the foregoing, it shall be understood that the PIC is the person ultimately responsible for the safety of the flight.

**NOTE:** The duties and responsibilities of a flight operations officer / flight dispatcher are established in ICAO *Annex 6, Part I* and ICAO *Annex 6, Part III*, Section II. Further guidance is contained in ICAO *Doc 9376 Preparation of an Operations Manual*. The requirements for age, skill, knowledge and experience for the licensing of flight operations officers/flight dispatchers are in ICAO *Annex 1 – Personnel Licensing*.

*Requirement End*  
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*Requirement*

4.2.2 In order to determine that a flight operations officer/flight dispatcher has received adequate training, the FOI shall establish that he can demonstrate the following:

- a) **Communications.** The establishment of rapid and reliable voice communications with the flight crew at the gate. That they are familiar with all facets of operations within their geographical areas of responsibility and are properly authorised and qualified in the use of all communications channels required by the approved method of control and supervision of flight operations. That the necessary emphasis is placed on the timely receipt of messages both in the aircraft and at the operational control centre or en-route stations.
- b) **Meteorology.** That the level of knowledge possessed by individual flight operations officers/flight dispatchers with respect to meteorology in general and to the weather conditions in the area with which they are concerned is of an acceptable standard.

c) **Procedures.** That the exercise of responsibility by PICs and flight operations officers/flight dispatchers in their analysis of all factors pertaining to the flight is clearly defined. That the flight operations officers/flight dispatchers are able to perform their functions in accordance with the terms of the applicable operating instructions and procedures; this includes assisting the PIC in the pre-flight planning, authorisation of delay and release of flights, in accordance with the approved method of control and supervision of flight operations.

*Requirement End*  
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4.3 It is important in this connection that operating staff should be made fully aware of the overriding responsibility and the ultimate authority of the aircraft commander. Manuals should state that in order to secure the safety of a particular flight the commander is authorised to apply greater safety margins, e.g. AOM, fuel reserves and terrain clearance standards, than those specified by the operator for normal operations.

4.4 In defining the duties of members of the crew, the operator should include instructions on:

- a) pre-departure briefings of flight crew and cabin crew;
- b) the briefing of passengers on emergency exits, procedures and equipment (including safety belts, harnesses and, where appropriate, lifejackets, automatic drop-out oxygen equipment and floor path lighting systems), restrictions on smoking and the use of electronic equipment;
- c) the responsibility, in the absence of competent ground engineering staff, for supervising refuelling and ensuring that filler caps, refuelling valves, freight hold doors and other aircraft panels are secure;
- d) the responsibility for ensuring the correct completion of the technical log, before and after flight, where the flight crew are required to carry out day-to-day servicing of the aircraft, any pre-flight maintenance checks, ground de-icing or other special pre-flight servicing;
- e) the responsibility, in the absence of competent traffic staff, for supervising the loading of the aircraft;
- f) the duties of special personnel, e.g. animal attendants;
- g) the responsibility for taking the precautions specified in *CAP 748 Aircraft Fuelling and Fuel Installation Management*,
- h) the responsibility, when an Auxiliary Power Unit (APU) is ground running and passengers are on board the aircraft or are in the process of embarking or disembarking, for ensuring that there are satisfactory arrangements for cabin crew to be warned immediately of any APU or other emergency condition which might require the rapid evacuation of passengers from the aircraft;
- i) limitations on the extent to which pilots and cabin crew may be allowed to operate on more than one aircraft type or variant; and
- j) procedures for the operation of aircraft in icing conditions including detailed ground de-icing/anti-icing holdover time procedures.

4.5 Except where the flight crew is limited to one or two pilots, brief instructions should be provided as to the order and circumstances in which command is to be assumed by members of the flight crew.

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## Chapter 4 Operational Control and Supervision

### 1 Accident Prevention and Flight Safety Programme

- 1.1 The accident prevention and flight safety programme prescribed in Schedule 8 (A) to the ANO 2009, EU-OPS 1.037 and JAR-OPS 3.037, which may be integrated with a Quality System, should include:
  - a) programmes to achieve and maintain risk awareness by all persons involved in operations;
  - b) an occurrence reporting scheme to enable the collation and assessment of relevant incident and accident reports in order to identify adverse trends or to address deficiencies in the interests of flight safety. The scheme shall protect the identity of the reporter and include the provision for anonymous reporting;
  - c) evaluation of relevant information relating to incidents and accidents and the promulgation of related information, but not the attribution of blame; and
  - d) the appointment of a person accountable for managing the programme.
- 1.2 Proposals for corrective action resulting from the accident prevention and flight safety programme should be the responsibility of the person accountable for managing the programme.
- 1.3 The effectiveness of changes resulting from proposals for corrective action identified by the accident prevention and flight safety programme should be monitored by the manager specified in the company's SMS.
- 1.4 Operators of aeroplanes of which the Maximum Total Weight Authorised (MTWA) exceeds 27,000 kg should establish and maintain a flight data monitoring programme as part of their accident prevention and flight safety programme. *CAP 739 Flight Data Monitoring (FDM)* provides guidance as part of an operator's accident prevention and flight safety programme.

**NOTE:** FDM is a valuable element of an accident prevention and flight safety programme for operators of aircraft of all sizes.

- 1.5 Operators structure their accident prevention and flight safety programmes in a variety of ways. In most cases Flight Safety Officers are appointed from senior staff; however, this is not always the case. Whatever structure is chosen by the operator, the terms of reference for all company appointments or post holders with associated flight safety duties should take into account the experience levels of the individuals concerned and accurately reflect their duties. In cases where a junior flight safety representative is appointed, operators should establish the overall responsibility for the programme at a higher level within the company. This is particularly important to ensure that any event such as an accident or incident investigation is managed effectively in order to achieve optimum value. The procedures to be used should be clearly explained in the Operations Manual and the various nominated responsible individuals identified by their appointment.

### 2 Safety Management Systems

- 2.1 To improve on existing levels of aviation safety in the light of the continuing growth of the industry, additional measures are needed. One such measure is to encourage individual operators to introduce their own SMS. Such a system is as important to

proper organisational governance and business protection as a financial management system and the implementation of an SMS should lead to achievement of one of civil aviation's key business goals: enhanced safety performance aiming at best practice and moving beyond mere compliance with regulatory requirements.

2.2 Safety management is that part of the overall management function which determines and implements an organisation's safety policy. The implementation of an SMS by an organisation should be endorsed by the most senior level of management within the organisation, should follow a logical programme which ensures that safety policy statements define the organisation's fundamental approach to the management of safety, and should commit the organisation at all levels to the fulfilment of its stated safety policy. An SMS provides an organised way of managing safety and a formal method for identifying hazards and assessing safety risks. Those organisations with a functioning SMS are aware of the increased financial benefits that can be achieved along with improved levels of safety. The CAA is strongly encouraging Operators and Maintenance Organisations to continue to work to the CAA SMS Guidance Material and have in place an implementation plan for SMS.

2.3 The CAA SMS Guidance Material has been written to take into account the ICAO SMS methodology and unpublished EASA draft material on SMS. The CAA has made available an SMS Gap Analysis and Checklist, which can be accessed on the CAA website at [www.caa.co.uk/sms](http://www.caa.co.uk/sms). This page also provides links to the ICAO SMS training material and the ICAO Doc 9859 *Safety Management Manual*.

### **3 Safety Risk Assessments for CAT Flights Outside Controlled Airspace (CAS)**

3.1 CAT flights in the UK predominately operate within the CAS structure and are therefore afforded the protection provided by the relevant ATS. There are, however, a number of CAT operators that regularly fly outside CAS. In order to ensure that the additional risks associated with flight outside CAS are adequately considered and appropriate measures put in place, CAT operators are expected to conduct a risk assessment.

3.2 Although currently there are no explicit requirements for CAT operators to have an SMS, operators are required to demonstrate to their assigned FOI that their flights are conducted in a safe manner. To this end the accepted safety management principles and practices for the identification of hazards and the assessment and mitigation of associated safety risks are expected to be followed.

3.3 For those operators who have yet to develop an effective SMS the guidance published in Annex 1 to Chapter 4 has been developed. The guidance aims to provide a means by which an operator can fully consider the safety risks associated with flights outside CAS and make a decision on the acceptability or otherwise of the safety risks based on sound safety management processes.

3.4 Operators who have an effective SMS should apply their own procedures to the risk assessment process. However, it is recommended that all operators should take due cognisance of the information provided in the Annexes to Chapter 4.

3.5 All operators conducting CAT, wholly outside or partially outside CAS, should ensure that such flights are subjected to a safety risk assessment and appropriate mitigation is put in place before they are conducted.

3.6 Any operator of the following should submit the safety risk assessment and mitigating actions in support of their operations to the assigned FOI prior to commencing regular flights outside CAS:

- an aeroplane with a maximum certificated take-off mass over 5,700 kg, with a maximum approved passenger seating configuration of 20 or more seats;
- a turbine-powered aeroplane; or
- a helicopter with a maximum approved passenger seating configuration of nine or more seats.

The safety risk assessment should be submitted and accepted before operations start and it is recommended that it conforms to the guidance published in Annex 1 to Chapter 4.

## 4 Legislation and Aeronautical Information

4.1 All flight crews and other operating staff who may be concerned should have access at their normal operating base to:

- United Kingdom (or other local) Class II NOTAMs - Supplements to the United Kingdom Aeronautical Information Publication (AIP);
- The United Kingdom (or other local) AIP;
- The Air Navigation Order and Regulations currently in force, amended to date;
- Class I NOTAMs affecting facilities on at least the first route stage over which the crews may be required to operate; and
- Aeronautical Information Circulars (AIC).

4.2 Where this information is readily available to flight crews in an Aeronautical Information Service (AIS) unit, it may not be necessary for the operator to duplicate the service: however, it is his responsibility to ensure that the information is available.

## 5 Powers of Authority (Inspectors)

5.1 FOIs and Training Inspectors from the CAA are authorised in accordance with the relevant statutory provisions and the conditions of AOCs to examine documents, premises and equipment, to enter and remain on the flight deck of an aircraft in flight and, if necessary, to issue Directions to prevent aircraft flying. They have extensive experience of the operation of aircraft and a wide knowledge of the operational aspects of airline and air taxi organisation. Training Inspectors are particularly experienced in the techniques of training and testing pilots; they are authorised Instrument and Type Rating Examiners and are empowered to observe pilots' flying tests and to inspect licences and records of training and tests. Suitable flying experience and other facilities are provided to maintain the qualifications of Inspectors for their work. The primary duty of the Inspectors is to ascertain facts and to report them; this duty must be fully discharged.

5.2 Airworthiness Surveyors from the CAA are also authorised persons and may require access to the aircraft and its documentation, while on the ground.

## **6 Insurance Requirements for Air Carriers and Aircraft Operators – Documents to be Carried**

6.1 The following documentation is required to be carried by operators on board aircraft to demonstrate compliance with the insurance requirements, and to avoid delays resulting from inspections carried out, both in the UK and abroad.

6.2 Regulation (EC) No. 785/2004 applies to all air carriers and to all aircraft operators flying within, into, out of or over the territory of an EU Member State. Its objective is to establish minimum insurance requirements for air carriers and aircraft operators in respect of passengers, baggage, cargo and third parties. The UK Civil Aviation (Insurance) Regulations 2005 supported its implementation.

6.3 The EC and UK Regulations therefore affect CAT, Corporate, Aerial Work and most General Aviation operators and aircraft. The Regulations do not apply to:

- State aircraft;
- model aircraft weighing less than 20 kg;
- foot-launched flying machines;
- captive balloons;
- kites; or
- parachutes, including parascending parachutes.

6.4 In the UK, insurance documentation has to be submitted, and checked, as part of the application process for an Operating Licence, as well as at initial aircraft registration and subsequent renewals.

6.5 During flight and ramp inspections, CAA Inspectors may check the insurance documentation carried on board UK-registered aircraft. Operators should be aware that Inspectors will need to see evidence of the following to be satisfied that the required insurance is in place (in either an original document or a copy):

- The aircraft registration and aircraft type on the document refer to the specific aircraft being checked. In many cases air carriers buy insurance for the fleet, and the registration(s) may not always be mentioned. In cases where a fleet policy is provided that does not cite the specific registration(s) of the aircraft being checked, such documentation will be considered acceptable provided it clearly relates to the air carrier that operates that aircraft.
- The name of the air carrier on the document is the same as that of the operating air carrier being checked.
- The period of validity on the document is current.
- If the document is conditioned in geographical terms, that the aircraft is insured to operate within the State in which the check is being made.
- It is highly recommended, though not mandatory, that the insurance certificate includes a statement that the air carrier is insured in accordance with the minimum insurance cover requirements of Articles 6 and 7 of Regulation (EC) No. 785/2004. Whilst such a statement may be included on the insurance certificate, a separate written statement to this effect from the broker of the air carrier concerned will also be acceptable, provided that statement clearly makes reference to that air carrier's principal insurance document.
- The document is signed on behalf of the broker and dated.

6.6 Inspectors in other EU countries are also likely to request sight of insurance documentation, and some may expect to find not only the details above, but also evidence that the sums insured are appropriate. Operators should ensure that the documentation carried includes this information.

6.7 Provided that the documentation on board covers all the above points, no further action will be needed. In the event that an inspection in the UK shows that no insurance documentation is carried by a UK AOC holder, or where the insurance documentation is not adequate to show that the aircraft is properly insured, the operator (and/or the commander) will normally be served with a Notice to Produce - requiring satisfactory documentation showing that the aircraft was properly insured on the date of the inspection to be presented to the CAA within 14 days. However, if the CAA Inspector concludes that the aircraft is not adequately insured the Inspector is under a duty to prevent the aircraft taking off. In other EU countries, the aircraft may be detained until satisfactory documentation is produced.

6.8 It is therefore in the interests of all concerned to ensure not only that adequate insurance is in place, but also that suitable documentation to demonstrate compliance with the requirements, covering at least the above points, is carried on board every flight.

6.9 Operators should ensure that insurance documentation is carried on board every flight.

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*Requirement*

## **7 Carriage of a Certified True Copy of the Air Operator Certificate**

7.1 ICAO Annex 6 Parts I and III require the following:  
'An aeroplane/helicopter shall carry **a certified true copy** of the Air Operator Certificate (AOC) and a copy of the operations specifications relevant to the aeroplane/helicopter type, issued in conjunction with the certificate.'

**NOTE:** The certified true copy only applies to the AOC itself and not any associated documents.

7.2 EU-OPS and JAR-OPS 3 require that 'the original or **a copy**' of the AOC is carried on each flight, while the ANO 2009, Article 150 and Schedule 9 regarding the carriage of documents do not include the AOC.

7.3 The UK requires UK AOC holders to carry only those documents specified in the ANO and, if applicable, EU-OPS or JAR-OPS 3. However, an ICAO Member State complying with the Standard may expect an AOC holder, operating into their territory, to have available a 'certified true' copy of the AOC and a copy of the operations specifications during a ramp check. Operators conducting international flights should consider providing 'certified true copies' of their AOC for carriage on each of their aircraft.

*Requirement End*  
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*Requirement*

## **8 Journey Log Books**

- 8.1 ICAO mandate that all aircraft engaged in international operations maintain and carry on board a Journey Log Book (JLB). The responsibility for completion of the JLB rests with the PIC.
- 8.2 The JLB shall contain the following items and the corresponding Roman numerals:
  - I — Aircraft nationality and registration.
  - II — Date.
  - III — Names of crew members.
  - IV — Duty assignments of crew members.
  - V — Place of departure.
  - VI — Place of arrival.
  - VII — Time of departure.
  - VIII — Time of arrival.
  - IX — Hours of flight.
  - X — Nature of flight (private, aerial work, scheduled or non-scheduled).
  - XI — Incidents, observations, if any.
  - XII — Signature of person in charge.
- 8.3 Where the General Declaration contains all information required by the JLB, that General Declaration may be considered to be an acceptable form of JLB.
- 8.4 Completed JLBs shall be retained to provide a continuous record of the last six months' operations.

*Requirement End*  
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*Requirement*

## **9 Passenger and Cargo Manifests**

- 9.1 ICAO mandate that all aircraft engaged in international operations complete and carry on board:
  - where passengers are carried, a passenger manifest containing passengers' names, and their places of embarkation and disembarkation; and
  - where cargo is carried, a cargo manifest containing detailed declarations of the cargo.
- 9.2 A copy of each of these documents, where prepared, shall be left at the aerodrome of departure.

*Requirement End*  
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## 10 SAFA Ramp Inspections on UK Aircraft

10.1 The European Civil Aviation Conference (ECAC) Safety Assessment of Foreign Aircraft (SAFA) programme has been established for over 10 years and is intended to complement ICAO's Universal Safety Oversight Audit Programme in Europe by inspecting aircraft operations. Many ECAC countries are increasing the number of ramp checks they conduct and others are starting their own programmes. It is therefore increasingly likely that UK aircraft operating to ECAC countries will be subject to inspections by teams from those countries' National Aviation Authorities (NAAs). Some general information on the SAFA programme, the items inspected and a list of ECAC countries can be found at <http://easa.europa.eu/home.php> > Aviation Professionals & Industry > SAFA.

### 10.2 SAFA Ramp Check Procedures

10.2.1 A SAFA Ramp Check may be performed on arrival or departure and will comprise a number of items from a standard checklist depending on the time available.

10.2.2 Findings, resulting from the ramp checks, are classified as Category 1 (minor), Category 2 (significant) or Category 3 (major) depending on their effect on the safe operation of the aircraft. Category 1 findings are notified to the commander. Category 2 findings are additionally communicated to the operator and the CAA in writing. Category 3 findings, in addition to the actions for a Category 2 finding, may include restrictions on the flight operation, corrective actions before flight, detention of the aircraft by the inspecting NAA or revocation of the operator's entry permit.

10.2.3 Where Category 3 findings establish that an aircraft is no longer airworthy, the CAA will be informed immediately by the NAA. Based on the information provided by the NAA, the CAA will decide, in liaison with the NAA, what final corrective actions need to be taken and under which conditions the aircraft will be allowed to resume its flight.

### 10.3 Findings Follow-Up

10.3.1 All SAFA findings should be processed through the operator's quality system. Operators should aim to identify actions to prevent the recurrence of non-compliances rather than purely corrective action which, in some cases, may well have been taken before the return flight. Operators may respond directly to the inspecting NAA on Category 2 and 3 findings but, to enable a co-ordinated response by the operator and the CAA, operators should copy their responses to their assigned CAA FOI.

10.3.2 To facilitate follow-up actions of SAFA findings, operators may wish to instruct commanders to report details of a SAFA Ramp Check via a robust system, particularly if corrective action is required before flight. Operators may also wish to ensure that the operator's copy of the Proof of Inspection and Inspection Report is returned to the relevant department promptly.

### 10.4 Findings Concerning Operations Manual and MEL Approval

10.4.1 A number of SAFA findings recur because of confusion concerning the method used by the CAA to show that parts of the Operations Manual and the MEL have been approved. Approval in some States is signified by an entry in the relevant documents by the NAA whereas in the UK approval is signified by an appropriate entry in the Operations Approval document.

10.4.2 The CAA has written to the SAFA co-ordinators in the ECAC states explaining the UK system. However, to reduce the number of findings in this category, operators should ensure that a copy of their Operations Approval is carried on board their aircraft. Operators should also ensure that commanders are briefed on what it contains and where it is held, and the need to show the document to SAFA inspectors when/if the need arises.

## 10.5 Disputed Findings

10.5.1 Operators wishing to challenge findings should contact the inspecting NAA directly. Only the inspecting NAA can amend findings on the SAFA database. Contact details can be found on the Proof of Inspection and Inspection Report given to the commander.

10.5.2 Only in those cases where both parties strongly disagree over a significant finding should the UK Co-ordinator – National Operators be involved.

## 10.6 Recommendations

- a) SAFA findings should be processed through the operator's quality system.
- b) Responses to inspecting NAAs on Category 2 and 3 findings should be copied to the operator's assigned FOI.
- c) Any unserviceability notified by the SAFA ramp inspector should be entered in the aircraft Technical Log as appropriate.
- d) Operators should ensure that a copy of the Operations Approval document is carried on board the aircraft.
- e) Operators should ensure that crews are familiar with, and have access to, the Operations Approval document on board the aircraft.

## 11 Operator Audits of Ground Handling Service Providers

11.1 The International Air Transport Association (IATA) has developed and implemented the IATA Safety Audits for Ground Operations (ISAGO) programme. The main aims of the ISAGO programme are to raise global safety standards, reduce ground handling incidents and accidents, and eliminate redundant audits.

11.2 IATA has developed a comprehensive set of IATA Standards and Recommended Practices (ISARPs) against which ground handling organisations applying for registration under the programme will be audited. The CAA believes that full compliance with the ISARPs should provide an acceptable (and in many cases, greatly improved) level of safety performance. Participation in the programme is available to all operators - IATA membership is not a prerequisite.

11.3 Operators are required to meet certain criteria relating to the competence of operations personnel under JAR-OPS 3.205 or EU-OPS 1.205. Furthermore, operators are advised to include the safety-related activities of third-party providers of services in their Quality Assurance Programme under the provisions of JAR-OPS 3, AMC OPS 3.035 paragraph 5.1.2 or TGL 44 AMC OPS 1.035 paragraph 5.1.2. Both these stipulations apply to contracted ground handling organisations.

11.4 In order to meet their responsibilities, operators currently conduct audits of all the ground handling organisations with which they are contracted and, except for the provisions under JAA Administrative and Guidance Material, Section 4, Part 3, Temporary Guidance Leaflet (TGL) 21, can take no credit for successful audits performed by other operators. The ISAGO programme is intended to create an audit pooling arrangement whereby registration of the organisation itself, and of each ground station, will be accepted by IATA as demonstrating an acceptable standard of safety performance to any operator, without that operator having to conduct its own audit. Clearly, the programme will only be useful if it is acceptable to the operators' regulatory authorities.

11.5 ISAGO audits will address compliance with the ISARPs, but it is appreciated that there may be other standards (e.g. service-related) that operators will still wish to audit themselves. Neither IATA nor the CAA therefore expect that, even when fully implemented, the ISAGO programme will eliminate all other operator audits of ground handling organisations.

11.6 The CAA has been involved with the ISAGO programme from the outset and, in the present absence of any ICAO Standards or Recommended Practices or EASA Implementing Rules relating specifically to ground handling, believes that the ISARPs represent a valuable step forward. However, the programme's full acceptance as satisfying operators' responsibilities under JAR-OPS 3 or EU-OPS will depend upon the evidence of how the programme develops in practice. Therefore for the time being, operators wishing to take advantage of the ISAGO audit pooling arrangements and to reduce their own auditing activity accordingly will need to demonstrate to the CAA in each case that they have assessed the ISAGO results, and are themselves satisfied that an acceptable level of safety is thereby assured.

11.7 Further information is available from the IATA website at [www.iata.org/ps/certification/isago](http://www.iata.org/ps/certification/isago).

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# Annex 1 to Chapter 4

## The Safety Risk Assessment Process for CAT Flights Outside CAS

### 1 Introduction

1.1 The safety risk assessment process is described in Safety Management Systems - Guidance to Organisations, available via [www.caa.co.uk/sms](http://www.caa.co.uk/sms). The process involves identifying the hazards associated with the activity (in this case specific flights outside CAS), considering the seriousness of the consequences of the hazard occurring (the severity), evaluating the likelihood or probability of it happening, deciding whether the consequent risk is acceptable and within the organisation's safety performance criteria (acceptability), and finally taking action to reduce the safety risk to an acceptable level (mitigation).

### 2 Hazard Identification

2.1 A hazard is any situation or condition that has the potential to cause adverse consequences. Table 1 below lists some of the hazards that should be considered when conducting a safety risk assessment for CAT flights outside CAS.

**Table 1** Hazards for Flights Outside CAS

Hazard	Guidance
Glider activity	Known area of glider activity (ridges, clubs etc. nearby).
General Aviation (GA) activity	Known high levels of GA activity, e.g. near to flight schools, clubs, popular routeings or where airshows or displays are prevalent.
Airspace funnelling	Areas of airspace where high concentrations of Class G traffic may congregate due to factors in the environment such as terrain, danger areas, adjacent controlled airspace.
Autonomous fast jet manoeuvres or ad hoc formations	Military fast jets on manoeuvres including various sized formations having some aircraft not transponding. Non-notified activity not predictable.
Other military activity	Notified predictable military activity such as re-fuelling, major exercises or airshows.
Very Light Jets (VLJs)/Air Taxi	Routes adjacent to areas of known business activity, e.g. event venues, racetracks with aviation facilities.
Low-level activity	Random Visual Flight Rules (VFR) manoeuvres at low levels (e.g. pipeline inspection, police, survey work, military training).
Lack of ATS availability	Potential for ATS to be unavailable or withdrawn without prior notice due to insufficient ATS provider personnel, communications or surveillance resource, including ATS equipment failures.

**Table 1** Hazards for Flights Outside CAS (Continued)

Hazard	Guidance
Multi-agency ATS provision	Regions of airspace where ATS Outside CAS may be being provided by a variety of providers at the same time (e.g. Airborne Warning and Control System, military Air Traffic Control (ATC), civil ATC etc.) - leading to possible confusion, ambiguity or lack of co-ordination between services.
Helicopters	Flight-planned helicopter operations mixing with fixed-wing including Instrument Flight Rules (IFR), e.g. servicing offshore facilities etc.
Commercial airline activity	Other commercial operators operating through the same airspace.
Balloons/Airships	Powered or non-powered lighter than air traffic.
Terrain	Mountainous regions or nearby high ground.
Parachuting activity	Areas of known activity/drop zones or clubs nearby.

**NOTE:** The above list is not necessarily exhaustive and operators must make their own assessments of the hazards on the specific routes they fly.

2.2 In considering the hazards associated with a particular route, operators can use the information at Table 1 above, but should ensure that they regularly review the list and update it based upon data from accident, incident and flight data monitoring data and (where available) voluntary incident reporting, confidential reporting schemes, safety surveys, operational safety audits and safety assessments.

2.3 The hazards along a route will change depending upon the segment of the route being flown. For example, the hazards in the proximity of an aerodrome will not necessarily be those encountered during the cruise. To aid clarity in hazard identification, and to provide focus when considering what mitigation can be put in place (see paragraph 3.7 below), operators should firstly define the route they are considering and then divide the route into segments. Operators should consider any significant differences that there might be at various points along the route and whether particular alternative routes (depending on runway orientation or approach/departure) are sufficiently different to warrant separate consideration. Any differences between route sectors at different times of the day, week or year should also be considered and noted. The route segments considered must include the aerodrome of departure and/or arrival if situated outside CAS.

2.4 This definition and division of the route is an important step in the risk assessment process. A good definition of the route is required to ensure that all appropriate hazards are given due consideration.

### 3 The Safety Risk Assessment

3.1 Risk is an assessment of the likelihood and the severity of adverse consequences resulting from a hazard.

3.2 To help an operator decide on the likelihood of a hazard causing harm, and to assist with possible mitigation of any perceived safety risk, all relevant stakeholders should be consulted. The identification of the stakeholders will be helped by the process of defining the route segments. Stakeholders may include but not necessarily be limited to:

- Local providers of Flight Information Services outside CAS.
- Local GA airspace users and their representative bodies.
- Aerodromes in the vicinity of the route.
- Military airspace users.
- Other commercial users of the airspace.

3.3 The safety risk from each hazard should be assessed using a suitably calibrated safety risk assessment matrix. An example risk assessment matrix is given in Safety Management Systems - Guidance to Organisations, but an alternative which aligns with an organisation's own SMS would be equally appropriate. The safety risk should be derived by considering the severity of the safety outcome arising from the hazard, together with the likelihood of the outcome.

3.4 The severity of any adverse consequences resulting from a particular hazard should be assessed using a suitably calibrated severity scale. An example scale is given in Safety Management Systems - Guidance to Organisations, but an alternative which aligns with an organisation's own SMS would be equally appropriate. Note that, for any flight, the safety outcome of a mid-air collision is likely to be Catastrophic.

### **Risk Likelihood**

3.5.1 The likelihood or probability of adverse consequences resulting from a particular hazard should then be assessed. The likelihood should be agreed using a suitably calibrated likelihood or probability scale. An example probability scale is given in Safety Management Systems - Guidance to Organisations, but an alternative which aligns with an organisation's own SMS would be equally appropriate.

3.5.2 When assessing likelihood or probability the following factors should be taken into account:

- The degree of exposure to the hazard.
- Any historic incident or safety event data relating to the hazard. This can be derived from data from industry, regulators, other operators, Air Navigation Service Providers, internal reports etc.
- The expert judgement of relevant stakeholders.

3.5.3 The results of the assessment should be recorded in a hazard log, sometimes referred to as a risk register. An example of a hazard log is available via [www.caa.co.uk/sms](http://www.caa.co.uk/sms).

### **Risk Tolerability**

3.6.1 At this stage of the process the safety risks should be classified in a range from acceptable to unacceptable. A suitable set of definitions for Risk Classification is given in Safety Management Systems - Guidance to Organisations.

3.6.2 Appropriate mitigations for each identified hazard should then be considered, recorded on the hazard log and implemented. Mitigations must be adopted in order to reduce the safety risks to an acceptable level, but additional mitigation wherever reasonably practicable should also be considered where this might reduce an already acceptable safety risk even further. Thus, the mitigation process should reduce the safety risk to be as low as reasonably practicable.

- 3.6.3 Not all hazards can be suitably mitigated in which case the operation cannot proceed.
- 3.6.4 Annex 2 to Chapter 4 provides examples of typical mitigation that can be employed and what their effectiveness is likely to be in relation to specific hazards. Each operator will have their own view on the effectiveness of their own mitigating actions.

### **3.7 Mitigating Actions**

- 3.7.1 Mitigating actions by themselves can introduce new hazards. Where an organisation has an effective SMS then procedures will exist for continual monitoring of hazard, risk and involvement of qualified personnel in accepting the mitigating actions or otherwise. Operators without an effective SMS should repeat the safety risk assessment following any mitigation process and at regular intervals as the circumstances on which the original assessment was predicated may have changed. This ensures ongoing safety management or monitoring.

### **3.8 Records**

- 3.8.1 The results of the safety risk assessment should be documented and promulgated throughout the organisation and, when requested, shared with the operator's assigned FOI. Actions should be completed and mitigations verified and supported by evidence prior to the start of operations.
- 3.8.2 Any assumptions should be clearly stated and the safety risk assessment reviewed at regular intervals to ensure the assumptions and decisions remain valid.
- 3.8.3 Any safety performance monitoring requirements should also be identified and undertaken through the organisation's safety management processes.

## Annex 2 to Chapter 4

### Example of Mitigations and Effectiveness for Flights Outside CAS

Mitigations	Guidance	Effectiveness Against Identified Hazards		
		High	Medium	Low
Provision of appropriate ATS.	This relates to the availability of an appropriate level of service (e.g. deconfliction, traffic etc.). Note: consideration needs to be given to the fact that this may not be guaranteed.	Autonomous Fast Jet Manoeuvres or ad hoc formations. Multi-agency ATS service provision. Commercial Airline Activity. Helicopters. VLJs/Air Taxi.	Parachuting Activity. Glider Activity. GA Activity. Low-level Activity. Airspace Funnelling. Other Military Activity.	
Awareness.	Proactive measures taken to ensure that all flight crews are briefed/trained on the hazards present on the route and dealing with those hazards.	Terrain.	Autonomous Fast Jet Manoeuvres or ad hoc formations. Glider Activity. Multi-agency ATS provision. GA Activity. Helicopters. VLJs/Air Taxi. Airspace Funnelling. Other Military Activity. Balloons/Airships.	
Sharing of information and awareness of activity - NOTAM/Schedules.	Measures are in place to share information with other stakeholders (e.g. military, other operators, flying schools etc.).		Autonomous Fast Jet Manoeuvres or ad hoc formations. Parachuting Activity. Glider Activity. Low-level Activity. Other Military Activity. Balloons/Airships.	

<b>Mitigations</b>	<b>Guidance</b>	<b>Effectiveness Against Identified Hazards</b>	
		<b>High</b>	<b>Medium</b>
Airborne Collision Avoidance System (ACAS).	Are your aircraft equipped with serviceable ACAS?	Autonomous Fast Jet Manoeuvres or ad hoc formations. GA Activity. Commercial Airline Activity. Helicopters. Low-level Activity. VLJs/Air Taxi. Airspace Funnelling. Other Military Activity.	Low
See-and-avoid.	Flight crew are trained and practised in the use of see-and-avoid when VMC prevail.	Autonomous Fast Jet Manoeuvres or ad hoc formations. GA Activity. Commercial Airline Activity. Helicopters. Low-level Activity. Airspace Funnelling. Other Military Activity.	Parachuting Activity. Glider Activity. VLJs/Air Taxi.
Terrain Awareness Warning System (TAWS).	Are your aircraft equipped with serviceable TAWS?	Terrain.	Balloons/Airships.
Scheduling or Routing (vertical or laterally).	Selective use of particular routes or flight times to avoid known hazards.	Multi-agency ATS provision. Low-level Activity.	Glider Activity. GA Activity. Commercial Airline Activity. Terrain. Balloons/Airships.

## Chapter 5 Crew Composition

### 1 Flight Crew to be Carried

1.1 Generally only the minimum flight crew prescribed in the ANO for PT flights or JAR-OPS 3 / EU-OPS for CAT flights need be specified for each type of aircraft. The minimum flight crew for PT will not necessarily be the same as the minimum flight crew specified in the aircraft's Certificate of Airworthiness (Flight Manual). In some cases the operator will need to consider whether a particular circumstance of the operation, for example long range flights, calls for the carriage of additional crew. It is emphasised that an aircraft shall have a flight crew adequate in number and description to ensure the safety of the flight.

### 2 Single Pilot Operation – Approved Autopilot

2.1 When an operator elects to conduct single pilot IFR flights the aircraft must be fitted with an approved autopilot. An approved autopilot means an autopilot that is specified in the AFM as approved for use with that aircraft and capable of providing, as a minimum, both altitude and heading holds. However, in the case of an aeroplane, if it is not cleared for controlling the aeroplane whilst coupled to both the glide path and the localiser of an ILS down to Category I Decision Height (DH), the Runway Visual Range (RVR) for all single pilot instrument approaches shall be either that specified in EU-OPS Subpart E for a Category I approach, or 800 m, whichever is the higher.

### 3 Employees' Experience

3.1 The claimed experience of potential employees must be substantiated. Log book entries must be checked to see if they are realistic and further checks made with flying clubs, previous employers and, if necessary, the CAA's Personnel Licensing Department (PLD) where any doubt arises.

### 4 JAA Operational Multi-Crew Limitation (OML)

4.1 JAR-FCL states that certain Class 1 medical certificate applicants, who had a small but increased risk of in-flight incapacitation, may be certificated if their medical certificate and/or licence were endorsed with a 'Valid Only As Or With Qualified Co-Pilot' OML. This prevented single pilot operations, but permitted multi-pilot operations, for either a captain or co-pilot. JAR-FCL 1.035(d)(2) and JAR-FCL 3.035(d)(2) do not permit two pilots holding a JAR OML to operate together on the same flight deck. This is despite a risk analysis showing that the chance of a double incapacitation is extremely improbable.

4.2 Accordingly, the Medical Department of the CAA has informed Central JAA that the UK will no longer apply the parts of JAR-FCL 1.035 and 3.035 which prevented two pilots holding an OML from operating together. The CAA's action is in full compliance with the ICAO Standards and Recommended Practices (SARPs). However, should a pilot with an OML wish to operate an aircraft registered in a non-UK State, the regulatory authority of the state of registration is likely to refuse to allow two pilots, each with an OML, to operate together on the flight deck.

Operators may now roster two pilots to operate together on the flight deck, both of whom have an OML endorsement on their licence.

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## Chapter 6 Crew Health Precautions

### 1 Abstention from Alcohol and Drugs

1.1 Crew members must not be under the influence of alcohol, drugs or medication during flying duty periods. Operators are to issue instructions for crews as to their personal responsibilities. They should include clear guidance on abstention from alcoholic drinks for a suitable period prior to duty. The minimum acceptable period will be eight hours but may need to be longer depending upon the amount of alcohol consumed. Aircraft crews should also be advised of the precautions to be taken if they are taking medication. AICs issued from time to time on the subject will form a useful basis for instructions in manuals. Operators encountering any special difficulty in framing their instructions may ask the CAA's Medical Department for advice.

### 2 Antihistamines

2.1 In a number of fatal accidents in recent years, traces of antihistamines and other 'over the counter' medications have been found during the post-mortem of the pilot. Whilst it is rarely possible for the pathologist to categorically state that the cause of the accident was altered judgement caused by such drugs, this possibility remains, especially when a known side effect is drowsiness or dizziness. All drugs have side effects, i.e. effects other than the one which is desired. Some individuals are affected more than others: some say they experience no effect, others a marked change. However, even when individuals report no effect, when tested scientifically an adverse change in variables such as reaction time and judgement can often be found. Over the counter drugs are available for a wide range of conditions such as pain relief, coughs and colds/influenza and diarrhoea. Many have undesirable effects on crew members. Extra care should be taken with herbal medications since the active ingredients may not be documented (or even known). When medication is taken by flight or cabin crew that can affect judgement, e.g. those with drowsiness or dizziness listed as potential side effects, a suitable period should elapse after the last dose to enable any effects to dissipate. Advice from the Medical Department of the CAA is that if the dosage regime is 'every 4 - 6 hours' the crew member should not fly until 12 hours has elapsed after the last dose. If dosage is 'every 10 - 12 hours' then they should not fly until 24 hours has elapsed after the last dose.

### 3 Melatonin

3.1 Melatonin has been marketed as an aid to ease adaptation to time zone changes and to assist sleep when using on-board rest facilities. In the UK, this compound is available only under strict medical supervision and on a named patient basis, but in the USA and some other countries it is classified as a foodstuff/dietary supplement and it can be obtained from health food stores and at airports. Although no clinical trials have been carried out in the USA upon the use of melatonin, it is known that inappropriate timing of taking this compound can cause disturbed sleep and undesirable shifts in circadian rhythms. An informal CAA survey revealed that some users experienced nightmares, morning grogginess, mild depression, nausea and genital pain. In the light of what is now known about melatonin, its use by flight and cabin crew is not recommended. Because melatonin will cause sleepiness and impair performance immediately after ingestion, and because the after-effects could be detrimental to operational efficiency, operators should forbid its use less than 12 hours before the start of a flying duty period and during the duty period.

## 4 Implementation of the Railway and Transport Safety Act 2003 – Aviation: Alcohol and Drugs

4.1 This information is consistent with the criteria contained in an allied Police Protocol that has been developed to assist police officers in the application and enforcement of this legislation. The overall aim is to secure a consistent approach, in order to provide a common understanding to those aviation personnel who might in the future encounter the application of the statutory provisions and police procedures. It is directed towards United Kingdom legislation; other individual states may be more restrictive.

4.2 The effect of intoxication, through alcohol or drugs, on aviation personnel has significant safety implications. The ANO, which is the main aviation safety regulatory legislation, provides that no member of an aircraft's crew, licensed maintenance engineer or Air Traffic Control Officer (ATCO) shall be under the influence of drink or drugs to such an extent as to impair his capacity to so act. The ANO, however, does not set a blood alcohol limit nor does it require a person who is suspected of a drink or drugs offence to be subjected to a test.

4.3 The blood alcohol limit for aviation personnel is lower than that in shipping or on our roads or railways, but reflects EU-OPS/JAR-OPS 3 which requires that crew members of commercial aircraft should not commence a flight duty period with a blood alcohol level in excess of 20 mg of alcohol per 100 ml of blood. The adoption of this limit will go towards the harmonisation of standards across most of Europe.

4.4 Part 5 of the Railways and Transport Safety Act 2003 extends to the flight and cabin crew of an aircraft, air traffic controllers and licensed aircraft maintenance engineers in the United Kingdom. It also applies to the crew of an aircraft registered in the United Kingdom, wherever it may be in the world.

4.5 A person commits an offence under Section 92 of the Act (Being Unfit for Duty) if:

- he performs an aviation function at a time when his ability to perform the function is impaired because of drink or drugs; or
- he carries out an activity that is ancillary to an aviation function at a time when his ability to perform the function is impaired because of drink or drugs.

In this section "drug" includes any intoxicant other than alcohol.

4.6 A person commits an offence under Section 93 of the Act (Prescribed Limit) if:

- he performs an aviation function at a time when the proportion of alcohol in his breath, blood or urine exceeds the prescribed limit; or
- he carries out an activity that is ancillary to an aviation function at a time when the proportion of alcohol in his breath, blood or urine exceeds the prescribed limit.

4.6.1 When performing an aviation function or ancillary activity, other than acting as a licensed maintenance engineer, the prescribed limit of alcohol referred to in paragraph 4.6 is:

- In the case of breath: 9 µg of alcohol in 100 ml.
- In the case of blood: 20 mg of alcohol in 100 ml.
- In the case of urine: 27 mg of alcohol in 100 ml.

4.6.2 When acting as a licensed aircraft maintenance engineer the prescribed limit of alcohol referred to in paragraph 4.6 is:

- In the case of breath: 35 µg of alcohol in 100 ml.
- In the case of blood: 80 mg of alcohol in 100 ml.
- In the case of urine: 107 mg of alcohol in 100 ml.

4.6.3 The different limits reflect the fact that although licensed aircraft maintenance engineers perform an equally important role in aviation, they do not necessarily require the same speed of reaction that aircrew or air traffic controllers may need in an emergency situation.

4.7 For the purposes of paragraphs 4.5 and 4.6, an aviation function is:

- acting as a pilot, cabin crew, flight engineer, flight navigator or flight radio-telephony operator of an aircraft during flight;
- attending the flight deck of an aircraft during flight to give or supervise training, to administer a test, to observe a period of practice or to monitor or record the gaining of experience;
- acting as an air traffic controller in pursuance of a licence granted under or by virtue of an enactment (other than a licence granted to a student); or
- acting as a licensed maintenance engineer.

4.8 For the purposes of paragraphs 4.5 and 4.6, an ancillary function is one undertaken:

- in preparation of performing an aviation function;
- by someone holding himself ready to perform an aviation function by virtue of being on duty or on standby; or
- by a person commencing a period of duty in respect of the function, and as a requirement of, for the purpose of or in connection with the performance of the function during the period of duty.

For example, the pre-flight briefing of the flight and cabin crew and any post-flight activity such as filing reports is considered to be an 'ancillary' function.

4.9 Section 96 of the Act provides that the police have the power to require a person to co-operate with a preliminary test. A person can be tested at any time after commencing duty, including standby. The police will determine when to test based on reasonable suspicion, either that someone is over the prescribed limit, under the influence of alcohol and drugs, or following an accident. The police are empowered to breathalyse and to perform subsequent tests (i.e. blood and urine tests). Police officers have been advised to exercise their powers under the Act as discreetly as circumstances allow and, if possible, in private, particularly where passenger aircraft are concerned.

4.10 Flight safety demands that flight crew and cabin crew should have no ingested alcohol in their bodies when duty is commenced. The reason for the 20 mg level is that all human beings can create small amounts of their own alcohol. This may appear in their blood as an alcohol level, but it will not reach 20 mg per 100 ml, and anyone who is breath- or blood-tested to that level would have ingested alcohol in the recent past.

4.11 Humans absorb and excrete alcohol at very different rates. These depend on factors such as sex, body weight, tolerance to alcohol, and the presence of food. It is therefore impossible to construct any meaningful chart that an individual can use to predict a future alcohol level after a period of drinking. Flight crew and cabin crew

should not commence duty for at least eight hours after taking small amounts of alcohol, and proportionally longer if larger amounts are consumed. It is likely, but cannot be guaranteed, that if a person consumes a maximum of five units of alcohol dispersed over some hours before the eight-hour ban, then his blood alcohol level will be zero at the end of the ban (half a pint of ordinary strength beer (3-3.5%) contains one unit of alcohol).

- 4.12 Flight crew and cabin crew who are required to take a preliminary test, with a negative result, may decide that it is unsafe for them to operate because of the emotional impact. It is for individual flight crew and cabin crew to determine their fitness to fly in such circumstances regardless of individual operator policy. It would be advisable for flight crew and cabin crew to seek guidance from company management or company representatives.
- 4.13 The CAA has a well-defined protocol when it is informed that a medical certificate holder (flight crew or air traffic controller) may be misusing alcohol or drugs. For example, this would be activated if a pilot had failed a breathalyser test whilst performing an aviation function. The person would be medically assessed, including blood testing, and a decision made whether there was alcohol or drug dependency that could be a risk to flight safety. If that were so, the pilot's medical certificate would be temporarily suspended. He would then be invited to take part in a treatment and rehabilitation schedule. If that were successful, the pilot would be returned to flying with the requirement to provide regular reports and to attend for follow-up assessments. Abstinence would be required. The CAA has found that approximately 85% of professional pilots with such problems can be returned to flying under this regime.

# Chapter 7 Flight Time Limitations

## 1 Overview

- 1.1 Operators must satisfy the statutory provisions prescribed in the ANO and the requirements contained in *CAP 371 The Avoidance of Fatigue in Aircrews*.
- 1.2 In accordance with the statutory provisions, operators' schemes for the prevention of fatigue of all crew must be approved by the CAA and incorporated in the Operations Manual. Any amendment to the Operations Manual in this connection must be approved by the CAA in advance. Applications for Approval, Amendment or Variation of schemes should be addressed to the assigned FOI. Instructions issued for the guidance of rostering, planning or scheduling staff must be compatible with the provisions of the scheme and a copy must be lodged with the CAA.
- 1.3 Responsibility within an operator's organisation for issuing instructions and making decisions on questions of flight duty and rest periods and for processing discretion reports must be clearly defined and assigned to a member of the management staff. The name of the person concerned or the job title must be included in the Operations Manual.
- 1.4 Operators are required to maintain and provide readily interpreted records for each aircraft crew member. It follows that suitable arrangements must exist for collecting the information necessary to compile the records. Accurate records are essential to persons responsible for the rostering of aircraft crews.

## 2 The Status of CAP 371

- 2.1 European legislation provides for a Member State to continue to maintain national provisions regarding flight and duty time limitations, provided that commonly established procedures are complied with, and until Community rules based on scientific knowledge and best practices are established. CAP 371 contains the UK national provisions.

## 3 The Responsibility for Management of Fatigue Risk

- 3.1 Regulations place responsibilities for avoidance of fatigue on both operators and crew members. The operator is responsible for operating safely, which entails the appropriate management of all safety risks affecting their flights; crew fatigue is one of these risks. Appropriate mitigations for the risk include an approved FTL Scheme with provision for good rostering practice, and other best practice recommendations of CAP 371. The approved FTL Scheme needs to be properly owned, implemented and monitored by the operator. The operator has the responsibility for ensuring that all staff know their duties, how their duties are to be carried out, and what limitations apply; this will involve training as well as written guidance.

## 4 CAA Oversight

- 4.1 The operator's Quality System should ensure compliance with the approved FTL Scheme. Operators can expect audits to confirm that their Quality System makes adequate provision for this monitoring and that it can be shown to be effective in dealing reactively with reported FTL non-compliances and issues. In addition, sample inspections of records to verify the effectiveness of the operator's Scheme and

process audits of specific aspects of FTL management may be conducted. For operators with SMS and/or Fatigue Risk Management Systems, appropriate internal audits of fatigue risk management should be carried out. All oversight will have the aim of confirming that the operator continues to comply with requirements and adequately manages their fatigue risk.

## 5 Interpretations

5.1 Since a Scheme is owned by the operator and submitted to the CAA for approval, the operator should, prior to submission, confirm that the guidance is clear, appropriate to their operation and unambiguous. If a condition within an approved Scheme becomes unclear to crews, rostering teams or the management of a company, 'interpretations' are sometimes used. On occasions these 'interpretations' have been provided officially by the CAA in communications such as Flight Operations Division Communications (FODCOMs), or verbally through the assigned FOI or other CAA staff. However, no official records of these additional 'interpretations' have been maintained. Most 'interpretations' meet the intent of the guidance in CAP 371, but cases where excessive duty periods are being worked or rostered have been noted, putting individuals and companies at risk from the effects of fatigue. If any doubt arises about the interpretation of the operator's Scheme, then the operational management should determine their relevant policy and intentions, and draft any required amendment to the Scheme to clarify these. The amended Scheme should be submitted as an NPA in the normal way through the assigned FOI.

## 6 Roster Planning and Staff Training

6.1 Occasionally, rosters exhibit creative scheduling including misinterpretation of CAA guidance often coupled with unrealistic planned turnaround times, which may be attributable to commercial pressures. Operators are strongly urged to consider crew rostering in the early planning of commercial schedules to minimise such problems and to ensure that all staff required for rostering and crewing duties receive appropriate initial and recurrent training as recommended in CAP 371. The training should include education on the effects of sleep deprivation and circadian rhythm disturbance.

## 7 Standard Level 1 and Level 2 Variations

7.1 It is essential that operators' Schemes contain guidance to all involved in the use of Standard Level 1 and Level 2 Variations on the full range of applicable conditions. The variations were made available to allow an increase in the planned Flying Duty Period (FDP) of 30 and 60 minutes respectively for a flight crew consisting of two pilots only, provided certain conditions were met that provided equivalent protection from fatigue risks. The applicability of the variations remains to permit a two-pilot crew to operate two consecutive sectors, either:

- outbound from the UK to a final destination outside the UK; or
- a return trip from the UK and back; or
- two sectors from outside the UK with a final destination within the UK, within a single extended FDP. A positioning sector within the extended FDP is not permitted when applying these variations.

## 8 Level 2 Variation - Out of Base Use

8.1 A number of operators have been permitted to implement the Level 2 Variation for flights departing from or returning to an airport in the British Isles other than the crew members' home base(s) (out of base operation). One of the conditions of a Level 2 Variation is that a rest period of two local nights and 34 hours must be achieved before operating the extended FDP. However, in order to achieve the benefits of rest at home it has been accepted that a short positioning duty of no more than four hours, followed by at least a minimum rest period before operating the extended flight, gives adequate rest. Similarly, an extended flight returning to the British Isles can be followed by a similar short positioning duty to allow the required Day Off to be taken at home. The out of base use of a Level 2 Variation is not permitted unless provided for by an operator's approved FTL Scheme. When the use of this type of variation results in very long duty periods, even where no direct flight safety risk is involved, as in travel home after duty, operators may wish to consider any implications for the duty of care towards staff of requiring such work patterns.

## 9 Facilities for In-Flight Relief

9.1 When In-Flight Relief is used to extend an FDP, the resting crew member must be provided with a comfortable reclining seat or bunk (see paragraph 8.4 of CAA Paper 2003/8), which must be separated and screened from the flight deck and passengers, and free from disturbance. The minimum specifications for a seat to meet this requirement is that it reclines to at least 40 degrees, has leg and foot support and is screened by the use of a thick curtain. The operator must ensure that levels of light and noise affecting the seat location will permit adequate rest to be achieved.

## 10 Use of Commander's Discretion and Reporting

10.1 CAP 371 permits aircraft commanders to extend FDPs or reduce rest periods as a consequence of unforeseen events during the execution of a schedule or roster. However, rosters should never be planned in such a way that minor unforeseen events will automatically require the use of discretion. Furthermore, the use of discretion should be monitored closely. Guidance on the use of discretion is provided in individual FTL Schemes. Operators are reminded that the use of discretion rests solely with the aircraft commander, who should take into account the ability of all the crew members to continue to operate safely. Operators should maintain a trend analysis relating to the use of discretion in order to manage the process.

## 11 Secondary Employment

11.1 CAT (PT) flights or flights operated by an air transport undertaking must be conducted by crews adhering to the requirements of an approved FTL Scheme. These Schemes specify the accountability of all flight and duty times of crew members. Some additional work-related activities, undertaken during assigned Days Off, could significantly impact on a crew member's ability to sufficiently recover from both transient and cumulative fatigue. Certain activities, therefore, need to be recorded so that a crew member's duty records adequately represent the overall potential for fatigue.

11.2 An example of when these activities need to be recorded is where a pilot undertakes secondary employment for which he has received the authority of the CAA and/or according to the privileges of a professional pilot's licence, e.g. duties undertaken in a flight simulator. The time engaged on these duties must be recorded and the crew member is required to provide this information to their primary employer (see Article 145(3) of the ANO 2009). The primary employer's responsibility is to ensure that the minimum rest periods and Days Off requirements contained in their approved FTL Scheme are met.

11.3 Attempting to control other secondary and recreational activity through a similar process would create a significant administrative burden for both operators and crew members. In particular, it would be very difficult to define and account for 'relevant activities'. Operators should therefore ensure that crew members are aware of the need to act in a professional manner in discharging their legal responsibilities under Article 146 of the ANO 2009, by ensuring that effective use is made of all planned rest periods.

## 12 Report Times

12.1 Report times (and post-flight duty times) are specified in FTL Schemes and are intended to give crew members sufficient time to complete all pre-flight or post-flight duties. The guidance suggests, for large companies, one hour as a **minimum** for pre-flight duties with half an hour for post-flight duties. However, the CAA occasionally receives reports that indicate that operators are very reluctant to change report times even if there has been a considerable change in circumstances at the report location (e.g. in security or crew baggage handling requirements). FOIs will expect operators to demonstrate that report times will allow all required duties to be accomplished within the specified times under normal circumstances. If a significant number of operators prove unable to do so, the CAA may consider raising the minimum allowable report time.

## 13 Use of Split Duty

13.1 The ability to extend an FDP by a Split Duty was never intended for use as an 'on the day' operational tool. The use of Split Duty was developed as a planning or rostering device so that affected crew members could plan their pre-flight rest and off-duty activities accordingly. Instances have been reported where normally rostered FDPs have been extended by declaring any unexpected delay as part of a Split Duty. Operators are advised to check that this unintended use of Split Duty is not occurring in their operation.

13.2 When planned Split Duty involves rest in a hotel, the accommodation should be located within 15 minutes of the report location, using the normal means of transportation. If the accommodation is further than 15 minutes away then the additional travelling time should be added to the post-flight and pre-flight duty allowance in order to calculate the allowable Split Duty.

13.3 Where the Split Duty period has been over six hours, and especially in the case of more complex operations (i.e. those involving complex aircraft types or more than basic pre-flight planning requirements), operators should increase the pre-flight duty allowance in order to calculate the allowable Split Duty.

13.4 Exceptionally, where there is a significant delay which could not have been foreseen, and with the agreement of the Commander, an unplanned Split Duty may be used. The Commander will consult with the rest of the crew, who must remain undisturbed

until the agreed report time. Operators should keep a record of the use of Split Duty as part of their roster monitoring processes, which should be made available to FOIs on request.

## 14 Standby Accountability

14.1 CAP 371 allows for the discounting of Standby Duty towards Cumulative Duty totals at 50% only where:

- the Standby Duty occurs during the period 2200-0800 hours local time where the crew member can take undisturbed rest at home or in suitable accommodation, and is not called out for duty; or
- the crew member has been given notice, prior to the commencement of the Standby Duty, that any call out period will be at least three times the standard report time of that Scheme.

14.2 In all other circumstances, all Standby Duty is accountable in full towards Cumulative Duty totals.

## 15 Additional Standard Variations

15.1 Operators can apply to use the following variations:

### a) Self-Drive Positioning Variation

Whilst Positioning is defined in CAP 371 and applies to crew travelling as passengers, a number of operators have requested that consideration be given to a Variation allowing crews to Self-Drive using company or car hire facilities as a matter of convenience. Since the task of driving requires a significant level of attention and therefore impacts on the crew member's level of alertness, the conditions under which this activity should take place as part of an FDP require to be controlled. The following conditions apply:

- A maximum driving period of two and a half hours shall be allowed within an FDP and will constitute a sector when calculating the maximum FDP for any crew member driving.
- For helicopter operators the daily maximum flying time is reduced by the driving period. (There is no equivalent maximum flying time for aeroplane operators.)
- Driving as part of a non-FDP or subsequent to an FDP shall be allowed.

### b) Alternate Base Variation

This is designed to allow crews to report at an alternate base within an area allowing 90 minutes' travelling time to both the main base of employment and that alternate base. A notional and additional duty time counted as positioning shall not then apply, given the following conditions:

- Crew members shall nominate a place of rest within the above area.
- The duty will commence and the maximum FDP will be based on the report time and airport notified prior to the start of the previous rest period.
- When an FDP finishes at other than the airport notified for report, the company shall provide transport to, and the end of duty will be on arrival at, that airport notified for report.
- Adequate crew planning facilities shall exist at the alternate base.

- 15.2 Whilst not a flight safety issue, operators may find that such a Variation is most effectively implemented on a voluntary basis.
- 15.3 Operators wishing to apply for either of the above Variations, valid for an initial period of six months, should contact their assigned FOI.

## Chapter 8 Operating Procedures – Flight Preparation

### 1 Establishment of Minimum Flight Altitudes (MFAs)

1.1 MFAs are to be prescribed by the operator for each sector from take-off on each route to be flown, including routes to alternate aerodromes. For this purpose 'sector' means the intended track from a reporting or turning point to the next, until the aircraft starts the instrument approach procedure or joins the traffic pattern at the aerodrome to be used for landing. MFAs must be specified by the operator in the appropriate volume of the manual, in a prepared navigation flight plan or in the commander's flight brief.

1.2 To provide the commander with guidance for the calculation of MFAs, when he is obliged to depart from the planned or normal route, operators must include a formula in the manual, expressed as simply as possible, from which the MFA can be calculated. The formula must secure at least the normal terrain clearance standards laid down by the operator. When specifying MFAs, operators must take account of local regulations. The criteria upon which MFAs are based relate to the track guidance facilities available to the commander. Guidance on the calculation of MFAs is given in JAR-OPS 3.250 and EU-OPS 1.250. The prescribed requirements for MFAs apply equally to helicopter operations; however, they may be interpreted as prescribing, for day (VMC) operations, general requirements for minimum heights to be flown that take into account the requirements of Rules of the Air 2007, Rule 5; terrain clearance; airspace regulations; and the ability, especially for Performance Class 3 helicopters, to be able to manoeuvre into wind and land safely following a power unit failure.

#### 1.3 Corrections to Planned MFAs for Flights Over High Ground

1.3.1 When the selected cruising altitude or flight level or One-Engine-Inoperative (OEI) stabilising altitude is at or close to the calculated MFA and the flight is within 20 NM of terrain having a maximum elevation exceeding 2,000 ft, the previously calculated MFA must be increased as follows:

**Table 2** Height Increase for Flight Over High Ground

Windspeed in kt				
Elevation of terrain	0 - 30	31 - 50	51 - 70	Over 70
<b>2,000 - 8,000 ft</b>	500 ft	1,000 ft	1,500 ft	2,000 ft
<b>Above 8,000 ft</b>	1,000 ft	1,500 ft	2,000 ft	2,500 ft

**NOTE:** Relevant instructions must be included in the Operations Manual.

1.4 Operations Manuals must include a reference to the effect of mountain waves on the maintenance of vertical separation and instruct commanders to take suitable precautions when such conditions are reported or forecast.

1.5 Adequate allowances to calculated MFAs must be made when the ambient temperature on the surface is much lower than that predicted by the standard atmosphere. When the ambient temperature is lower than International Standard Atmosphere (ISA) -15°C, the following additions to MFA must be made:

1.5.1	Lower than	ISA -15°C	Not less than 10%
	" "	ISA -30°C	Not less than 20%
	" "	ISA -50°C	Not less than 25%

1.6 For any route the maximum altitude obtainable with all power units operating, or the appropriate stabilising altitude with one-engine-inoperative, must be greater than the calculated MFA for that route. Consideration can be made to fuel jettisoning and driftdown techniques published in JAR-OPS 3/EU-OPS Subpart G.

## 2 Aerodrome Operating Minima (AOM) – Take-off and Landing

2.1 Minima for airfields in regular use and associated alternates must be listed in the Operations Manual for take-off, landing and visual manoeuvring. For airfields visited infrequently the minima may be listed in the Commander's Brief: a copy must be retained for six months.

**NOTE:** Proprietary documents (Jeppesen etc.) can be included in the Operations Manual.

2.2 Operators' instructions on AOM are particularly important. They should be stated clearly for the benefit of flight crew members. The instructions and tables have two purposes:

- a) to enable the commander to appreciate the operator's intentions and requirements; and
- b) to decide whether to commence or continue an approach.

2.3 Minima for take-off and landing must be specified for each type of aircraft and for each runway and associated approach aid at each aerodrome. Take-off Minima will vary with the Performance Group of the aircraft. Minimum values acceptable to the CAA are published in EU-OPS/JAR-OPS 3 Subpart E as the sole code against which AOM calculations can be made. Landing minima, and the method of calculation, are also shown in Subpart E.

2.4 It is the responsibility of operators to establish and specify appropriate minima. The CAA and its Inspectors cannot assume any responsibility for the minima specified and every instruction issued. The operator must designate a suitably qualified person to keep the instructions under review and amend, as necessary.

2.5 Guidance on the calculation of landing minima for Category II and III operations is given in EU-OPS Subpart E.

2.6 Minima and associated instructions must be presented so that the information is readily available to and easily interpreted by the flight crew. Only 'notified' or approved instrument approach procedures may be included in the tables. Runways or landing strips and approach aids which are not authorised for either take-off or landing must be specified either in the AOM tables or by a general instruction. In addition, operators should provide clear policy to crews on the use/non-use of airfields which are not listed in the Operations Manual.

2.7 For the guidance of commanders, who may be obliged to take off from or land at aerodromes for which values have not been specified, operators must give data and instructions which allow for the calculation of minima. The data and instructions should be expressed as simply as possible and secure as a minimum the normal operating standards observed by the operator. In these circumstances it may not be practicable for the commander to give the same detailed consideration to all the relevant factors as the operator. Therefore, the minima calculated in this way will usually be higher than those which would have been precalculated. When an aircraft commander calculates AOM in accordance with these criteria, the calculations must be retained with other flight documentation. Operators must state that a commander is authorised to exercise discretion and apply minima higher than those prescribed by the operator, when it is necessary to secure the safety of the aircraft.

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*Requirement*

## 2.8 Take-Off and Destination Alternate Minima – Helicopters

- 2.8.1 Operators shall establish procedures in their Operations Manuals for the selection of take-off alternate and destination alternate heliports when planning a flight.
- 2.8.2 The procedure shall define the requirement for the commander to select a take-off alternate within one hour flight time at normal cruise speed for a flight under Instrument Meteorological Conditions (IMC), if it would be impossible to return to the heliport of departure due to meteorological reasons.
- 2.8.3 Where a flight is to be conducted in accordance with IFR, or when flying VFR and navigating by means other than by reference to visual landmarks, the commander must nominate at least one destination alternate heliport in the operational flight plan unless:
  - a) the destination is a coastal heliport; or
  - b) the meteorological conditions prevailing at the destination are such that at the estimated time of arrival an approach and landing can be made under VMC; or
  - c) the heliport of intended landing is isolated and no alternate is available, in which case a Point of No Return (PNR) shall be determined.
- 2.8.4 Two destination alternates must be nominated when:
  - a) the appropriate weather reports or forecasts for the destination indicate that, during a period commencing one hour before and ending one hour after the estimated time of arrival, the weather conditions will be below minima; or
  - b) no weather reports or forecasts are available for the destination.
- 2.8.5 Any required alternate(s) must be specified in the operational flight plan.

*Requirement End*

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## 3 Rescue and Fire-Fighting Services (RFFS) Category Required at a Nominated Diversion Aerodrome (NDA) Within the UK for Aeroplane Flights

- 3.1 ICAO Annex 14 states that the RFFS level of protection provided at an aerodrome should be equal to the RFFS category for the largest aeroplanes normally using the aerodrome. The exception is that where the number of movements in the highest category is less than 700 in the busiest consecutive three months, the level of protection shall be not less than one category below the published category. This concession to use an aerodrome one category below the required category is known as remission.
- 3.2 The UK policy is to adopt the ICAO recommended practice that, for normal use, the aerodrome RFFS category shall be equal to the aerodrome category for the largest aeroplanes normally using the aerodrome irrespective of the number of movements.
- 3.3 The UK follows the ICAO interpretation of 'normal use' as applying to planned departure and destination aerodromes, but not NDAs.
- 3.4 The likelihood of having to divert to the NDA is small, as is the likelihood of having a survivable accident with a post-crash fire causing fatalities. This combination gives such a small likelihood of having a survivable accident with a post-crash fire causing fatalities at the NDA that operators are allowed to use an NDA with RFFS one category lower than the aeroplane RFFS category. This brings operational and environmental advantages.

3.5 This remission is allowed subject to an agreement between the aerodrome licence holder and each affected airline. Such agreements should cover all operational issues, not just RFFS provision.

#### **4 Aerodrome RFFS Category Required for Cargo Aeroplanes Carrying Dangerous Goods**

4.1 OPS 1.220 requires operators to use 'aerodromes that are adequate for the type of aeroplane and operation concerned'. In OPS 1.192 'adequate aerodrome' is defined as an aerodrome which an operator considers satisfactory taking account of, amongst other things, emergency services.

4.2 The UK requires a minimum RFFS Category of 3 for aeroplanes of categories 1 and 2. With the exception of these aeroplanes, Table 3 below reflects text which has been proposed to ICAO for inclusion in the Airport Service Manual, Part 1 - Rescue and Fire Fighting (Doc 9137). Although aimed at aerodrome authorities, this will assist operators in determining whether the level of RFFS at an aerodrome is adequate for their operation. The RFFS categories in Table 3 are an appropriate level of RFFS for aeroplanes carrying cargo which includes dangerous goods.

**Table 3** Aerodrome RFFS Categories for Cargo Aeroplanes Carrying Cargo which Includes Dangerous Goods

<b>Category of aeroplane</b>	<b>RFFS category for cargo aeroplanes</b>
1	3
2	3
3	3
4	4
5	5
6	5
7	6
8	6
9	7
10	7

#### **5 Prevailing Visibility In Meteorological Observations, Forecasts and Reports**

5.1 The global standard for observing and reporting visibility, based on the ICAO definition, is 'prevailing visibility'. Prevailing visibility is the visibility value that is reached or exceeded within at least half of the surface of the aerodrome. Pilots, operators and ATS staff will receive information both on the general visibility around the aerodrome as well as, under certain conditions, information on specific directions of significantly poorer visibility.

5.2 Prevailing visibility encountered could be significantly less than that reported. Prevailing visibility alone is forecast or reported unless the minimum visibility (in any sector of the aerodrome) is less than 50% of that prevailing or below 1,500 m

(whichever is worse). In those circumstances, a minimum visibility value and direction is given in addition to the prevailing visibility. When two visibilities are given, the lower figure should be used for operational decisions if it could affect the aircraft's approach to land.

5.3 When a decision to carry out a non-precision or circling approach is based on prevailing visibility, crews should bear in mind that the visibility in certain sectors could be up to 50% less than that forecast or reported. Similarly, operators of North Sea helicopters should consider the implications for fuel planning when considering the carriage of VFR fuel to specified coastal aerodromes.

## 6 Aircraft Loading

6.1 The correct loading of an aircraft is essential for safe operations. Over the years, the worldwide aviation industry has seen many loading errors compromise flight safety. Aircraft have been loaded to exceed structural limitations and also beyond forward and aft limits of the safe flight envelope, sometimes with fatal consequences. The reported occurrence statistics continue to identify three dominant factors:

- actual traffic load did not reflect mass and balance documentation;
- unsecured traffic load; and
- incorrect Aircraft Prepared for Service (APS) and Index data.

**NOTE:** Traffic load includes passengers, cargo, mail, flight spares and ballast.

### Duties, Responsibilities and Training

6.2.1 To eliminate the possibility of loading errors, the operator should ensure that flight crew, cabin crew, ground handling agents and the loading teams are all aware of their duties and responsibilities within the operation that relates to the loading of the aircraft. The operator should provide comprehensive documented information and instructions to support the stated duties and responsibilities.

6.2.2 Training of the appropriate personnel is required to ensure that instructions are properly understood and implemented. The importance of correct aircraft loading should be highlighted. Training should consist of initial, qualification and refresher to enable personnel to accomplish and maintain competency to fulfil their roles within the operation. The training syllabus should include the following:

- duties and responsibilities;
- aircraft type and series familiarisation;
- mass and balance planning;
- loading;
- restraint of load;
- carriage of dangerous goods;
- last minute changes;
- the completion and use of associated documentation; and
- familiarisation with the operator's related AOC requirements.

6.2.3 In addition, personnel should be given an overview of the duties and responsibilities of everyone involved in the operation (whether employed by operator or agent) and particular emphasis placed on the interfaces between personnel, along with the delegation of duties and responsibilities at the interfaces. Personnel should be clear not only of the scope and boundaries of their responsibilities, but also those with

whom they interface during the loading operation; only with this understanding can they exercise vigilance for actions and responsibilities of others which may have been omitted. The operator should consider providing sub-contractors with contact details of the appropriate accountable person so, if necessary, knowledge and support is readily available.

### 6.3 Load Planning, Supervision and Loading

- 6.3.1 All personnel responsible for load planning, supervision and loading should receive appropriate instructions and training in the tasks allocated to them by the operator.
- 6.3.2 Aircraft mass and balance should be carefully calculated and the load/trim sheets and loading instructions should be prepared ensuring that the correct data is used and entered. When this duty has been delegated to sub-contractors, operators should employ robust procedures to ensure that the mass and balance documentation and, in particular, the data is kept up to date. It is essential that the masses of all traffic loads are accurately established, either by weighing or the use of approved standard masses.
- 6.3.3 The person responsible for the preparation of the aircraft mass and balance should give clear and comprehensive written or electronic instructions to the person responsible for the loading of the aircraft. The name of this person should be stated on the document.
- 6.3.4 There should be no doubt as to how the load is to be distributed within the aircraft. It is essential that the identification of the aircraft holds, bays and compartments is clearly marked. The configuration used should be reflected on the mass and balance documentation.
- 6.3.5 If the operator chooses to utilise an electronic device for load planning, then the integrity and security of the equipment and programme should be proven. A manual back-up should be made available.
- 6.3.6 Those responsible for supervising the loading of the aircraft should reconcile the distribution of the traffic load with the loading instructions. After checking that the load is properly restrained throughout the holds, bays and compartments, they should then confirm by signature that the load and its distribution are in accordance with the mass and balance documentation. Those responsible should take additional care when holds and cabin areas are only partially filled with traffic load, which could have a significant effect on the aircraft balance condition.

**NOTE:** Some cargo nets have strap fastenings which are simple to pull tight but difficult to release when fully tightened. This should not be a reason for the loading teams not to tighten the straps fully.

- 6.3.7 The commander should advise the cabin crew of any applicable seating restrictions. Passenger head counts and gender identification should be conducted carefully in order to achieve accurate figures. Personnel should remain vigilant identifying and actioning any deviation from standard passenger and baggage masses, if used.
- 6.3.8 Whilst final responsibility for accepting the load rests with the commander, the operation should contain robust procedures to enable the commander to be satisfied that the information declared on the load/trim sheet is a true reflection of the aircraft's mass and balance condition. Communications should be maintained between flight and ground crews, so that if last minute changes occur, sufficient time should be available for amendments to be carried out correctly before the aircraft departs.

- 6.3.9 If any positions within the hold, bays or compartments are to be left void, then the operator should establish a procedure to ensure that there is no movement of Unit Load Devices (ULD) or migration of bulk-type traffic loads.
- 6.3.10 If any damage to the aircraft's loading or restraining equipment is observed, this should be reported to an appropriate person so the deficiency can be entered into the aircraft's technical log. If restraint equipment is inoperative, there may be restrictions on the operational limitations. The operator should establish a programme of inspection to ensure the continued maintenance of the restraining equipment; this will also consider any applicable certified time expiry dates.
- 6.3.11 All personnel involved, from those who are tasked with preparation of documentation through to those who physically load the aircraft, have a responsibility to ensure the aircraft is correctly loaded. If in any doubt, personnel should be encouraged to ask questions or report any deviations from the planned load to an appropriate supervisor. It is imperative that the documentation given to the crew, before departure, provides an accurate reflection of the aircraft's mass and balance condition.

#### 6.4 Aircraft Loading Instructions

- 6.4.1 Operators should provide appropriate guidance for flight crew, cabin crew, ground handling agents and loading teams, including agents at overseas aerodromes, regarding the mass and balance and loading of the aircraft. The guidance provided should remain relative to the particular personnel involved in the loading operation.
- 6.4.2 Information and instructions for all types, marks and variants should include a minimum of the following:
  - a) all operational limiting masses and C of G (ZFM, TOM and LM);
  - b) current APS mass and index data (all items and details of equipment used to modify basic to APS masses);
  - c) clarification regarding units of measurements;
  - d) identification, configuration and maximum masses of aircraft cabins, holds, bays and compartments;
  - e) loading procedures (including ground stability and preferred distribution, if used);
  - f) examples of current documentation (content and completion);
  - g) limitations regarding floor loading (cumulative, running load and load spreading);
  - h) the use of standard masses (where applicable);
  - i) last minute changes (limitations and procedures);
  - j) ULD fitment, handling, loading, securing and serviceability guide;
  - k) calculation, positioning and securing of bulk traffic load;
  - l) calculation, positioning and securing of flight spares or ballast;
  - m) the types, use and strength of all available restraint devices and equipment (if equipment becomes inoperative, details of imposed limits);
  - n) operation of Cargo Loading System or similar;
  - o) diagrams and dimensions of aircraft cabins and holds/bays/compartments to facilitate maximum allowable package sizes;
  - p) any applicable imposed seating restrictions;
  - q) the operation of cabin, cargo and hold doors;
  - r) fuel (mass, balance and loading); and
  - s) carriage of dangerous goods.

6.4.3 Where traffic staff and handling agents are responsible for calculating the RTOW, operators should ensure that they are provided with all relevant information and have proven competency.

## 6.5 **Mass and Balance Documentation**

6.5.1 Mass and balance documentation should be prepared before every flight to ensure the aircraft departs within all operational and C of G limits. The mass and balance documentation can be presented in a number of ways and is not limited to a single document; they can vary in type, from manual index and dropline versions to electronic produced printouts. If the operator chooses to utilise an electronic load/trim sheet, then the integrity and security of the equipment and programme should be proven. The device should be expected to provide the same data as the manual equivalent and a manual back-up should be made available. There should be no doubt as to the units of measurement used and they should be stated on the mass and balance documentation.

6.5.2 Where a 'loading plan' method is used, the basic assumptions upon which the plan is formulated must be given and must specify C of G limits more stringent than those permissible under the C of A. It must also be stated that loading in accordance with the 'plan' ensures that the laden C of G always falls within the restricted limits. If this is done, a simple statement should be included on the load sheet that the laden C of G is between the operator's more stringent limits and is acceptable.

6.5.3 Copies of the mass and balance documentation should be retained on the flight deck and on the ground until the aircraft has arrived at destination. On completion of the flight, the operator should store the flight deck copy for a minimum period of three months.

6.5.4 The mass and balance documentation should contain a minimum of:

- a) aircraft and flight identification;
- b) the departure and destination airfields;
- c) the commander's name;
- d) ZFM, TOM and LM and the corresponding C of G;
- e) the identity of the person who prepared the document;
- f) APS mass and reference;
- g) the breakdown and distribution of all traffic load;
- h) the loading supervisor's signature;
- i) indication as to whether standard masses have been used;
- j) the take-off and trip fuel;
- k) the mass of other consumables (water methanol, drinking water); and
- l) flight spares/tools, Aircraft on the Ground (AOG) spares, spare hydraulic and de-icing fluid.

This document should be acceptable to the commander; his acceptance indicated by his signature.

6.5.5 Special attention should be paid to the wording of the loading certificate to ensure compliance with the individual operator's own requirements and standards. It may be possible for the commander of a smaller type of aircraft to check whether the aircraft has been loaded in accordance with the mass and balance documentation, whereas the commander of a larger type aircraft may have to delegate this duty.

6.5.6 The APS form should account for all items of the laden weight. Although they may not always be specified individually, the following are examples of items to be included:

- a) aircraft crew and baggage;
- b) passenger seats, children's cots, cabin floor covering, removable bulkheads;
- c) navigation bag or aircraft library and navigation equipment;
- d) emergency equipment, including dinghies, all lifejackets/flotation cots, survival packs, blankets, pillows;
- e) galley equipment including urns, hot cups;
- f) all catering and bar stores including carriage containers;
- g) load spreading devices, lashing, ballast;
- h) aircraft spares;
- i) toilet water; and
- j) all items of removable equipment carried.

The APS form used should be referred to on the load sheet.

## 6.6 Additional Considerations

6.6.1 Depending on the scope and nature of the operation, there may be other operational factors that impact aircraft loading, including:

- a) instructions for special loads (e.g. vehicles, oversized, stretchers and live animals);
- b) tail post/tether devices;
- c) re-role of Quick Change aircraft;
- d) ground support equipment requirements; and
- e) carriage of cargo within the passenger cabin.

## 6.7 Ad-hoc/Charter Flights

6.7.1 Whilst the majority of operations are conducted between regular destinations, many operators undertake ad-hoc/charter flights and extra vigilance should be exercised with these types of operation. The destination airfields may not be familiar with the operators' procedures and requirements, or in some cases the aircraft type. The computer generated mass and balance documentation may not be available, so manual versions should be supplied for use.

6.7.2 At diversion airfields the flight crew may need to control and supervise the handling and loading of the aircraft more carefully than usually expected under normal operations.

## 6.8 Operator's Quality System

6.8.1 The operator should ensure the audit schedules of their quality system include the oversight of mass and balance and aircraft loading. These audits should establish compliance with current legislation and the operator's own requirements and procedures. Aircraft loading falls within several audit categories and may include related sub-contractor activities.

## 7 Navigation/Operational Flight Plan Form

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### Requirement

7.1 Operators will be expected to supply, for the use of flight crews, navigation flight plan forms or prepared flight plan/logs to be used on all flights, except those sectors flown both regularly and of less than 45 minutes' duration in VMC within a radius of 50 NM of the aerodrome and helicopter flights onshore in VMC. The operator shall ensure that, at least for the duration of each flight or series of flights, the information relevant to the flight and appropriate for the type of operation, including the operational flight plan, is preserved on the ground. That information must be retained until it has been duplicated at the place at which it will be required to be stored. If this is impracticable, the same information must be carried in a fireproof container in the aircraft. The Operations Manual must describe the content and use of the flight plans/logs.

### Requirement End

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7.2 Operators should ensure that detailed instructions are specified on procedures to be adopted in setting up navigation systems. Such information should include:

- a) initialisation procedures;
- b) comparison of standard routes against flight plans;
- c) insertion of random routes;
- d) cross-checking of random route waypoints, tracks and distances;
- e) accuracy checks prior to entering areas where on-board navigation equipment cannot be monitored by external sources;
- f) gross navigation error checks;
- g) checks to be carried out after reprogramming in flight; and
- h) procedures to be followed in the event of navigation system failures.

## 8 Commander's Flight Brief

8.1 For flights on routes not normally flown, commanders should be provided with a detailed brief. The brief should include guidance on the schedule to be maintained and on all operational aspects of the voyage not fully covered in the Operations Manual, such as details of the routes to be flown, aircraft performance data, specific AOM for all aerodromes likely to be used, including alternates, and details of the navigation and terrain clearance procedures to be used.

## 9 Route Guide

9.1 The route guide provided in accordance with the provisions of the ANO or JAR-OPS 3/EU-OPS should be a volume or series of volumes separate from the rest of the Operations Manual. Publications such as Aerad (Thales), Jeppesen or similar will normally meet the requirement, provided that flight crews are given adequate advice on the route to be followed. An operator providing his own guide should ensure that it meets the needs of crews in every respect. If flights are to be made only on airways or Advisory Routes (ADRs), it will be sufficient to include instructions to that effect; otherwise routes regularly flown should be specified in detail, normally on prepared

navigation flight plans. For other flights, routes should be specified in a commander's flight brief, a copy being retained at base. Operators are not required to lodge copies of standard flight guides with the CAA.

9.2 Particular care should be taken to ensure that adequate information is provided on search and rescue facilities, obstructions in the approach pattern, radio failure procedures, prohibited and danger areas and standard Terminal Manoeuvring Area (TMA) routes. Only recognised instrument approach or let-down procedures in general use and approved by the CAA should normally be included in the flight guide. Exceptionally, a special 'break cloud' procedure proposed by the operator may be considered acceptable, provided it has been approved by the CAA and is acceptable to the appropriate Airport Authority. Proposals to use such special procedures, accompanied by the associated AOM, should be submitted for approval, through the assigned FOI, to the CAA's Aerodrome Standards Department.

9.3 Neither Aerad nor Jeppesen approach plates display the vertical limits of controlled airspace, although this information is available on some area and en-route charts.

9.4 Normally, the cancellation of IFR flight plans at night or in congested terminal areas should be prohibited and instructions to this effect included in the Operations Manual. If an operator does not wish to impose a total prohibition, detailed instructions should be included in the Operations Manual setting out the minimum conditions that must be satisfied before cancellation of an IFR flight plan.

**NOTE:** Aircraft are not permitted to fly under VFR at night in UK airspace. A visual approach does not require the cancellation of an IFR flight plan (see ICAO definition of visual approach).

9.5 In some circumstances an abbreviated approach procedure may be adopted; the conditions under which this procedure may be followed should be detailed in the Operations Manual.

9.6 In order to facilitate effective monitoring of an instrument approach the pilot not flying, monitoring the approach, should be able to refer to a copy of the Instrument Approach chart without undue interruption of his monitoring duties.

9.7 Information obtained from research has indicated that some altitude violations could be traced back to misinterpretation of flight profiles - typically Standard Instrument Departure (SID) and Standard Arrival (STAR) procedures - published in charts provided by commercial organisations. Operators are responsible for ensuring that the flight crews they employ are able to interpret the charts provided. Flight crew who need such training may not be limited to those new to commercial operations but may also include experienced crew unused to the content and format of the charts. This may be because, although experienced in commercial operations, they have no previous experience of the documents used by their new employer or because new routes require the use of unfamiliar charts and other documents obtained from a supplier who is different from the source they used before.

9.8 Operators are also responsible for ensuring that their flight crews have been trained to understand and to comply with the most commonly encountered differences in phraseology and procedures used by regional ATC agencies that differ significantly from those normally encountered. Consideration should be given to all areas of operation approved for use in the company's AOC.

## 10 Meteorological Reports – Special Aircraft Observations

10.1 Operators should ensure that crews are briefed that Special Aircraft Observations are required whenever:

- severe turbulence or severe icing is encountered; or
- moderate turbulence, hail or cumulo-nimbus clouds are encountered during transonic or supersonic flight; or

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*Requirement*

- other meteorological conditions are encountered which, in the opinion of the PIC, might affect the safety or markedly affect the efficiency of other aircraft operations; for example, other en-route weather phenomena specified for SIGMET messages, or adverse conditions during the climb-out or approach not previously forecast or reported to the PIC. To assist other users, ATS providers and the Volcanic Ash Advisory Centre (VAAC), observations are required if volcanic ash cloud is observed or encountered, or if pre-eruption volcanic activity or a volcanic eruption is observed; or

*Requirement End*  
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- exceptionally, they are requested by the meteorological office providing meteorological service for the flight; in which event the observation should be specifically addressed to that meteorological office; or
- exceptionally, there is an agreement to do so between the Meteorological Authority and the aircraft operator.

## 11 Instrument Approach Procedures Designed to United States Standard for Terminal Instrument Procedure (TERPS) Criteria

11.1 Some pilots and operators may not be aware of some of the significant differences in obstacle clearance criteria between approaches designed in accordance with United States Standard for Terminal Instrument Procedure (TERPS) as opposed to ICAO Doc 8168-OPS/611 *Procedures for Air Navigation Services – Air Operations (PANS-OPS)*. The majority of approaches within the European area, including all in the United Kingdom AIP, are designed in accordance with PANS-OPS. Many countries throughout the world have adopted these standards. The United States produces their own set of standards, TERPS, and some countries have adopted these standards. The design criteria used for a particular approach is marked on some of the commercially available flight guides or may be determined by reference to that state's aeronautical information publication. However, care should be taken, as some states appear to use an amalgam of both methods and this may not be readily apparent.

11.2 The following highlights the different radii from runway threshold used by PANS-OPS and TERPS to construct the circling obstacle clearance area. TERPS uses a minimum obstacle clearance of 300 ft whereas PANS-OPS uses 394 ft for Category C and D aircraft.

**Table 4** PANS-OPS and TERPS Circling Clearance Areas

Aircraft Category	PANS-OPS Radii from threshold	TERPS Radii from threshold
CAT A	1.68 NM	1.30 NM
CAT B	2.66 NM	1.50 NM
CAT C	4.20 NM	1.70 NM
CAT D	5.28 NM	2.30 NM

11.3 Operators should review their circling approach documentation to determine which do not comply with PANS-OPS, and should add an increment to the circling approach minima for any that are not PANS-OPS compliant. Flight crew should be aware of the differences between PANS-OPS and TERPS in providing obstacle protection for circling approaches, and be able to recognise where TERPS minima apply. Where TERPS minima apply, flight crew should ensure that the increment to the circling approach minima has been applied in order to maintain adequate obstacle clearance.

## 12 Use of Cellular Telephones

### 12.1 Cellular Telephone Interference of Vulnerable Avionic Equipment

12.1.1 Tests carried out for interference exposed a set of aircraft avionic equipment to simulated cellular telephone transmissions and revealed various adverse effects on the equipment performance. Although the equipment demonstrated a satisfactory margin above the original certification criteria for interference susceptibility, that margin was not sufficient to protect against potential cellular telephone interference under worst-case conditions. The following anomalies were seen at interference levels above 30 volts/metre, a level that can be produced by a cellular telephone operating at maximum power and located 0.3 m from the victim equipment or its wiring harness:

- compass froze or overshot actual magnetic bearing;
- instability of indicators;
- digital VHF Omnidirectional Range (VOR) navigation bearing display errors up to 5°;
- VOR navigation To/From indicator reversal;
- VOR and ILS course deviation indicator errors with and without a failure flag;
- reduced sensitivity of the ILS Localiser receiver; and
- background noise on audio outputs.

12.2 In addition, most anomalies were observed at 1719 MHz.

12.3 Consequently, the current CAA policy restricts the use of cellular telephones in aircraft. All crews should be alerted to the specific risk from active cellular telephones on the flight deck and should review their procedures to ensure they are switched off. Operators should introduce procedures seeking confirmation from passengers at check-in that their cellular telephones in hold baggage have been switched off.

## 12.4 Mobile Phones with Flight Mode Facility and Palm Held Devices

12.4.1 Currently, there are a number of mobile phones that are fitted with a 'flight mode' facility and Personal Digital Assistant "palm" devices that include a mobile phone function.

12.4.2 A current AIC on the "Use of Portable Electronic Devices in Aircraft" includes guidance and information on this subject. The following is an extract from the AIC which is relevant to this issue:

*'However, a number of cellphones are now marketed as provided with an operating mode that permits the device to be used with the transmitter switched off. Examples are described as having a 'flight' or 'plane safe' mode. It is the operator's responsibility to ensure that any use of such a device in the non-transmitting mode does not pose any interference risk and any use of such a device be controlled to ensure that the device is not transmitting. PDAs or Notebook computer devices that contain embedded or 'plug-in' network devices are capable of being operated with the transmitting element turned off. Any such operation of these devices when the transmitter has **not** been turned on should be controlled in the same manner as for any unintentionally transmitting device, use of which may be permitted during non-critical phases of flight.'*

**NOTE:** *If the means by which it can be shown that such a device is in its transmitting or non-transmitting mode is not clearly evident and easily distinguishable by the flight crew or cabin crew, it remains the operator's responsibility, in accordance with JAR-OPS 1.110 (reference 5) and discharged through the aircraft crew, to ensure that the use of such a device is not permitted. Prior to permitting the use of such devices, an aircraft operator should give consideration to the following:*

- a) Ensure that use of any device with a 'safe' mode that operates as an intentional transmitting PED when initially switched on, prior to being put into its 'safe' mode is prohibited.*
- b) Provision of clear instructions to flight crew and cabin crew to enable them to:
  - i) Easily distinguish between accepted and non-permitted devices;*
  - ii) Determine that the devices are being operated in their 'safe' modes;*
  - iii) Determine that any displayed 'safe' mode was actually preventing transmissions of the actual device and was not continuing to transmit. Phone signal detectors, either portable or installed in the aircraft, have the potential to assist the cabin crew in detection of device transmissions or operation of non-permitted devices, and enable appropriate follow-up action.**
- c) Ensure the ability to continue to efficiently prevent the use of non-permitted devices.*
- d) Ensure that all devices with 'flight', 'plane safe' or equivalent modes are switched OFF when the announcements to switch OFF **all** devices are made.*

*In summary, the use of any cellphone type device in its transmit/receive mode is prohibited during the entire duration of the 'flight', from the moment that the aircraft doors are closed prior to commencement of the flight, until the moment that a passenger door has been opened after completion of the flight, except when expressly permitted by the aircraft's commander which may be granted in the event of a prolonged departure delay provided that sufficient time is available to check the cabin before the flight proceeds or in the event of a prolonged delay for parking/gate position.'*

## 12.5 Use of Cellular Telephones during Aircraft Refuelling

12.5.1 The CAA is satisfied that fuel vapour ignition, due to the use of cellular telephones on the aircraft, is unlikely when passengers are on board during fuelling operations. This position takes account of the energy levels of cellular telephone transmissions, absorption and attenuation of that energy within the cabin, and the separation that would exist between an on-board cellular telephone and an external fuel vapour source. Operators may permit the use of cellular telephones inside the aircraft during fuelling operations.

## 13 Portable Electronic Devices (PEDs) – Hybrid Tracking Devices

13.1 The use of certain PEDs on board aircraft, such as mobile phones and certain other transmitting devices, is prohibited during flight due to the identified risk of interference to aircraft systems. The operational requirements and regulations place the responsibility with the aircraft operator to determine whether any PED can be used or carried on board their aircraft. The Home Office has introduced electronic tagging whereby a person is required to wear one of the "hybrid tracking" devices which cannot be disabled. The Home Office stated that they are aware of the risks of interference by "hybrid tracking" devices and have established a policy that all offenders carrying such devices are NOT allowed to fly. All aircraft operators are within their rights to refuse passage to 'tracked offenders' who are unable to fly whilst subject to the requirement to be tracked.

## 14 Emergency Locator Transmitters (ELTs)

14.1 All ELTs carried on board an aircraft, including those contained within liferafts, are required to meet the frequency specifications of ICAO Annex 10, Volume III, Part II, Chapter 5: 'From 1 January 2005, emergency locator transmitters shall operate on 406 MHz and 121.5 MHz simultaneously.'

## 15 Carriage of Animals

### 15.1 General

15.1.1 Operators who intend to carry animals must hold a copy of the Transit of Animals (General) Order and a current edition of the IATA *Live Animals Regulations*. The Order sets out the responsibilities of both the operator and the person in charge of an animal; the Live Animals Regulations give guidance on such things as the types of containers that should be used, labelling and marking of containers, animal health and hygiene, feeding, loading and sedation.

15.1.2 Where it is intended to carry animals, their carriage must comply with the Transit of Animals (General) Order and the IATA *Live Animals Regulations*.

### 15.2 Livestock, Horses and Other Large Animals

15.2.1 Where livestock or other large animals are carried, the information must be given on action in emergencies, as well as the carriage and use of animal first aid and emergency kits, including the use of the captive bolt humane killer.

15.2.2 The determination of the mass of the consignment and where this mass is recorded on the load sheet must be given. Guidance on loading should include:

| a) the mass, dimensions, construction, method of attachment and required restraint for horse boxes or animal pens;

- b) the checks necessary, before loading horse boxes or animal pens, on the general condition and serviceability of fitting and lashing points;
- c) the loading of horse boxes and the tethering of horses;
- d) the stowage of loose equipment such as food and water containers and horse paraphernalia; and
- e) the number and type of food and water containers and the quantities of food and water required, based on the duration of the flight and the number of animals carried.

15.2.3 Instructions must be given on checking an aircraft after a flight on which livestock, horses or other large animals have been carried for damage to the structure, fittings, wiring etc. and for any adverse effects resulting from high humidity and urination.

15.2.4 When horses are carried, the minimum number of grooms for particular loading configurations must be specified.

15.3 **Carriage of Guide Dogs and Assistance Dogs in the Aircraft Cabin**

15.3.1 The following guidance is issued to those operators that wish to carry such dogs in the cabin, to assist them in including sufficient additional material in their Operations Manuals to ensure that cabin safety is maintained.

15.3.2 The definition of a guide dog is one that is trained to provide mobility assistance to a blind or partially sighted person. In the UK a guide dog is trained, assessed and accredited by the Guide Dogs for the Blind Association. Outside the UK, the definition of a guide dog is one that is trained by an individual or organisation that is accepted by and affiliated to the International Guide Dog Federation.

15.3.3 An assistance dog is one that has been specifically trained to assist a disabled person and that has been qualified by one of the charitable organisations registered as members of Assistance Dogs (UK). An assistance dog trained by members of Assistance Dogs (UK) will have formal identification. It will also have been granted certification by the UK Department of Health on the basis that the dog's high standards of training, behaviour, health and welfare are such that it should be permitted to accompany its client, owner or partner at all times and in all places within the United Kingdom. Assistance dogs from other nations, when entering the UK, should meet the full membership criteria of the established international assistance dog organisations: Assistance Dogs International and Assistance Dogs Europe, or other such bodies as may from time to time be recognised.

15.3.4 Those dogs that comply with the above definitions should generally be permitted to be carried in an aircraft passenger compartment. Any dog not meeting the above criteria, or any other animal, must be treated as a pet and other arrangements must be made for its carriage. It should be noted that assistance dogs could be of any breed and size from a large Labrador to a miniature Yorkshire terrier.

15.3.5 Suitable arrangements should be made in advance of a flight where a guide dog or assistance dog is to be accommodated. The actual seating arrangements are for individual operators to determine but the dog and its owner must not be seated in a row adjacent to an emergency exit. A suitable harness, which should be provided by the owner and then attached to the owner's seat belt, should be utilised to provide the dog with an effective level of restraint during take-off, landing and turbulence. In the cruise it would be acceptable for the dog to be subject to less constraint, sufficient to enable it to achieve a comfortable position. This should take into account the potential problems of trip-hazards associated with passengers using the aisles and cross-aisles. Larger dogs should be accommodated on the cabin floor at the owner's feet but smaller, lighter dogs may be carried on the owner's lap, suitably restrained with the harness as outlined above.

15.3.6 There is one type of dog harness that attaches to a seat belt buckle, requiring an empty seat to be provided next to the passenger. There may be other devices available with alternative attachment points that would also provide adequate restraint. Therefore, any arrangement that adequately secures the guide dog or the assistance dog is acceptable.

15.3.7 Due to the intense training that guide dogs and assistance dogs receive and the fact that they are selected for their temperament, it is unlikely that such a dog would be adversely affected by a cabin emergency to such an extent that the safety of other passengers would be compromised. Operators should provide guidance as to the number of guide dogs and/or assistance dogs that may be carried at any one time in the same aircraft passenger compartment. A person travelling with a guide dog or other assistance dog will have already received a briefing from either The Guide Dogs for the Blind Association or the appropriate Assistance Dog organisation, on 'pet passport' paperwork, equipment, identification etc.

15.3.8 Operators should ensure that their cabin crew are advised of the relevant operational cabin safety aspects. Such information should be included in the Operations Manual.

## **16 Carriage of Musical Instruments and Diplomatic Bags**

16.1 The commander of an aircraft registered in the United Kingdom, flying for the purpose of CAT and capable of seating more than 30 passengers, may allow particular items of baggage (musical instruments and diplomatic bags) carried in accordance with the conditions below to be carried in the passenger compartment without being stowed in stowage spaces approved for the purpose.

- In relation to musical instruments, they are only able to be stowed in the passenger compartment if in the reasonable opinion of the aircraft commander they are not capable of being properly stowed in an approved stowage space.
- In relation to diplomatic bags, they must be accompanied by a passenger on the flight. A passenger may accompany a maximum of two of these bags.

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*Requirement*

16.2 Any item of musical instruments and diplomatic bags allowed to be carried in the passenger compartment shall be secured in accordance with the following conditions:

- The item of baggage shall be carried either on a passenger seat or on the floor of the aircraft immediately in front of a passenger seat, which seat is, in either case, dedicated to the carriage or securing of that item on the flight.
- No seat shall be used for the carriage or the securing of such an item of baggage unless it is either:
  - immediately adjacent to the side of the aircraft fuselage; or
  - part of a row of seats, one of which row is immediately adjacent to the side of the aircraft fuselage and another is immediately adjacent to an aisle and each seat in the row is being used for the carriage or the securing of an item of baggage.
- No seat in the row of seats adjacent to an emergency exit shall be used for the securing of such an item of baggage.
- Any such item of baggage shall not exceed 75 kg in mass and shall be properly secured to the seat on which or in front of which it is situated by means of a safety belt including, where necessary, an extension piece fitted thereto so that the centre of mass is not more than 0.3 m above the top of the seat cushion.

*Requirement End*

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## 17 Passenger and Cargo Handling Procedures

17.1 All personnel who are to be made responsible for the ground handling of the company's aircraft, including the loading and offloading of both passengers and freight, are to be given detailed guidance in the completion of their duties in respect of each aircraft type for which they may be responsible. Such personnel include flight and cabin crews and the company's own ground personnel. In the event of usage of non-company ground personnel, it is the responsibility of the commander to ensure that those personnel are adequately briefed.

### 17.2 **Passengers**

17.2.1 As far as is possible, subject to mass and balance requirements, passengers are to be allowed a free choice of seating from the space available on the aeroplane when they arrive at check-in. Regard must be paid, however, to seat allocation affecting emergency evacuation of the aircraft. To this end passengers are to be categorised into three groups and seats allocated accordingly.

- a) Passengers likely to assist evacuation. Only those persons who appear reasonably fit and strong should be seated adjacent to self-help (type III and type IV) exits.
- b) Passengers likely to impede evacuation. Passengers who should be seated where they will not obstruct emergency equipment or exits, or otherwise impede the crew in carrying out their duties, include:
  - i) passengers who are physically or mentally handicapped to the extent that they would have difficulty in moving quickly if asked to do so;
  - ii) passengers whose sight or hearing is impaired to the extent that they might not readily become aware of instructions given to begin evacuating the aircraft;
  - iii) children and infants, whether or not they are accompanied by an adult;
  - iv) passengers in custody and those who are being deported; and
  - v) passengers whose physical size would prevent them from being able to move quickly.
- c) Passengers who are unlikely to affect evacuation performance. Passengers with no seating restrictions except for (a) above.

#### **NOTES:**

- 1 Multiple occupancy of seats is only permitted when one occupant is an infant under two years old and the other is a responsible adult aged 16 years or more.
- 2 When Persons of Reduced Mobility (PRM) are carried as passengers then paragraph 17.2.1(b) applies. A PRM is understood to mean a person whose mobility is reduced due to physical incapacity (sensory or locomotory), an intellectual deficiency, age, illness or any other cause of disability when using transport and when the situation needs special attention and the adaptation to a person's need of the service made available to all passengers. When the number of PRM forms a significant proportion of the total number of passengers carried they must not exceed the number of Able-bodied Persons (ABPs) capable of assisting with an emergency evacuation.

17.2.2 There may be a wide variation in the circumstances in which passengers are accepted and conveyed to an aircraft, depending on the aerodrome of departure, the type of aircraft and its crew composition, the use of a check-in desk or rendezvous point, the availability of a courtesy vehicle and the proximity of the parked aircraft to the exit from the terminal building. Irrespective of the circumstances, however, passengers are to be either taken from the terminal building to the aircraft in approved transport, or escorted by a crew member, nominated company employee or representative of the appointed handling agent, as appropriate.

17.2.3 Once at the aircraft, passengers should be guided to their allocated seats in an order which will ensure that the aircraft remains stable during the loading process. When seats are allocated, the aim should be to locate disabled or handicapped passengers clear of the normal/emergency exits so that they will not delay the evacuation process in case of emergency. In order that this aim is achieved the cabin crew will ensure as far as practical that passengers are seated in accordance with their seat allocation.

17.2.4 Similarly to paragraph 17.2.2 above, on arrival at the destination, passengers are to be advised to remain on the aeroplane until the engines have been shut down, and arrangements have been made for the passengers to proceed to the terminal by vehicle, or with an escort. In the case of helicopters, prior to arrival at destination passengers are to be advised whether they are to leave the helicopter with rotors turning or with the rotors and engines stopped. If the rotors are turning, it is essential that competent persons escort passengers by a safe route until outside the rotor disc. Every care is to be taken to ensure that passengers remain in a unified group; refrain from smoking; and are kept well clear of propeller or rotor wash, main and tail rotors, and jet engine intake and exhaust danger areas while on the aircraft movement area.

17.2.5 Once the passengers are seated, a flight or cabin crew member is to close the aircraft doors and/or confirm by inspection that they have been properly closed and secured.

17.2.6 If the company is required to carry such normally inadmissible passengers as deportees or persons charged with criminal offences, special arrangements, including the provision of escorts, will be made and full details will be included in the commander's flight brief.

17.2.7 In addition to having their attention drawn to the safety cards, passengers are to be carefully briefed on their contents. Particularly in aircraft which are not carrying cabin crew, emphasis should be placed on the operation of the normal/emergency exits, the use of safety belts/harnesses, the position of seat backs during take-off and landing, and the general requirements for cabin security at all times.

### **17.3 Cabin Baggage**

17.3.1 Cabin baggage will normally be restricted to handbags, briefcases, cameras, outdoor coats and other items that can be reasonably stowed in approved stowages, unless the carriage in the cabin of other items has been cleared with the company at the time of booking. At check-in, or prior to boarding the aircraft, passengers will be informed as to items of hand baggage that are considered to be dangerous goods and must not be carried. Warning notices or placards sufficient in number will be prominently displayed, at each of the places at an airport where tickets are issued and passengers checked in, in aircraft boarding areas and at any other place where passengers are checked in. In addition a warning will be issued with the passenger ticket. This may be printed on the ticket, on a ticket wallet or on a leaflet.

17.3.2 The mass of individual cabin baggage items should reflect that passenger's standard allowance, unless the pieces are weighed and accounted for. The size and number of items to be allowed per passenger is determined by the aircraft type, route and load factor and will be detailed in Part B of the Operations Manual or the Mass, Balance and Loading instructions. Stowage of items of cabin baggage is to be as shown below:

- each item carried in a cabin must be stowed and restrained in an approved stowage;
- mass limitations placarded on or adjacent to stowages must not be exceeded;
- underseat stowages must not be used unless the seat is equipped with a restraint bar and the baggage is of such size that it may adequately be restrained by this equipment and not obstruct egress from the seat row;

- d) items must not be stowed in toilets or against bulkheads that are incapable of restraining articles against movement forwards, sideways or upwards and unless the bulkheads carry a placard specifying the greatest mass that may be placed there;
- e) baggage and cargo placed in lockers must not be of such size that it prevents latched doors from being closed securely;
- f) baggage and cargo must not be placed where it can impede access to emergency equipment; and
- g) checks must be made before take-off, before landing, and whenever the fasten seat belts signs are illuminated, or it is otherwise so ordered, to ensure that baggage is stowed where it cannot impede evacuation from the aircraft or cause injury by falling (or other movement) as may be appropriate to the phase of flight.

#### 17.4 Hold Baggage

- 17.4.1 Hold baggage is to be stowed and secured only in those areas and compartments which are designated for its carriage, and subject to the floor loading limitations of the particular area. It may be necessary to restrict the type of luggage carried in particular areas (e.g. to grips and holdalls in smaller aircraft wing lockers) or to restrict the mass carried for balance purposes rather than structural considerations. The commander is to ensure that all personnel who may be responsible for loading the aircraft are made aware of such additional restrictions.

#### 17.5 Freight

- 17.5.1 Freight is not to be carried unless the particular aircraft has been cleared for operations in the freight role, and the appropriate spreader boards, freight lashings, nets and anchor points are available and approved. For such approved aircraft, details of the freight configuration(s) and loading restrictions for the aircraft type will be found in Part B of the Operations Manual.

**NOTE:** If the Company holds a permission for the carriage of dangerous goods, additional instructions must be included in Part A of the Operations Manual, and further general information is contained in Section 9 of Part A of the Operations Manual.

#### 17.6 Ground Operations

- 17.6.1 Whenever an aircraft is to be positioned on the ramp, whether under tow or under its own power, the assistance of marshallers or wingtip guides, as appropriate, should be obtained if there is any doubt about the clearances available for manoeuvring. Once on the hardstanding, positioning of the aircraft should represent the best available compromise between the requirements of the aerodrome and/or ATC authorities, the prevailing wind direction, and the proximity to buildings and other aircraft.
- 17.6.2 Once the aircraft has been parked, ground support vehicles should be stationed clear of its extremities and if possible parallel to the fuselage or mainplane centreline, so that in the event of brake failure they will not collide with the aircraft itself. Ground equipment should also be positioned so that inadvertent movement will not endanger the aircraft structure. In all cases, free access to the aircraft main exit must be preserved.
- 17.6.3 When departing from the ramp, local procedures for start-up and taxi clearance are to be followed. Engine start is not to be initiated until all passengers or freight have been loaded, the aircraft doors and hatches have been closed, and all ground equipment, except for a Ground Power Unit (GPU) when used, has been removed from the vicinity of the aircraft. In the case of helicopters, loading and unloading of passengers and freight may take place with engines running and rotors engaged, using safe procedures. Similarly to the arrival, the assistance of marshallers should be arranged when manoeuvring in relatively confined or crowded areas of the apron.

- 17.6.4 Ground staff must have been briefed on all aspects of ramp safety with particular reference to fire prevention, blast and suction areas, the dangers from main and tail rotors particularly during rotor engagements, downwash effects and the need to be constantly alert to remove loose objects and/or debris.
- 17.6.5 Procedures for push back, engine start during push back, and power back are, if relevant, detailed in Part B of the Operations Manual.
- 17.6.6 It is not permitted for a helicopter rotor to be turned under power without a qualified pilot at the controls.

#### **17.7 Procedures for the Refusal of Embarkation**

- 17.7.1 The aircraft commander has the statutory authority to refuse entry to his aircraft of anyone whose presence in flight could represent a hazard to the safety of the aircraft or its passengers. Such persons could include those suspected of being under the influence of alcohol or drugs to the extent that the safety of the aircraft or its occupants is likely to be endangered, or of suffering from any form of mental or physical illness which could put the remaining passengers at risk. In the case of known or declared illnesses, arrangements may be made for such sufferers to be carried if prior medical approval has been given, and qualified nursing personnel accompany the patient(s).
- 17.7.2 In order to assist the commander in the proper exercise of this authority, all company personnel engaged in passenger handling and loading, including other crew members, handling agents and check-in personnel, should alert the commander if at any time they consider that the condition of particular passengers could jeopardise the safety of a proposed flight.
- 17.7.3 If difficulty is encountered in dealing with such passengers, particularly those who may require physical restraint, the assistance of the aerodrome or local police should be requested.

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# Chapter 9    Ground Handling Instructions

## 1    Fuelling Procedures

### 1.1    Introduction

1.1.1 The aerodrome authority, the aircraft operator and the fuelling organisation each have responsibilities in respect of the safety measures to be taken during fuelling operations. Guidance for aerodrome authorities is available in *CAP 748 Aircraft Fuelling and Fuel Installation Management*. The following guidance, taken from *CAP 74 Aircraft Fuelling: Fire Prevention and Safety Measures*, which is no longer published, is intended to complement operating procedures that may have been developed to meet requirements imposed by special equipment, or other regulations.

### 1.2    Definitions

1.2.1 The following definitions are employed in this section:

- a) **Fuelling** in this publication embraces both fuelling and defuelling.
- b) **Fuelling Areas** The fuelling of aircraft at an aerodrome should normally be carried out in the open air and should only be carried out in areas approved by the aerodrome authority. As a general guide, fuelling areas should be sited to avoid bringing fuelling equipment or aircraft fuel tank vents to within 15 m of any building other than those parts constructed for the purpose of direct loading or unloading of aircraft, such as nose loaders, loading bridges etc.
- c) **Fuelling Zone** The fuelling zone should be regarded as extending not less than 6 m radially from the filling and venting points on the aircraft and the fuelling equipment and, when applicable, from the hydrant valve in use for the fuelling. When defuelling is taking place, the vehicle will be venting and will generate a fuelling zone radiating from the tank vent.

### 1.3    Precautions Prior to Fuelling

#### 1.3.1    Aerodrome Fire Service

All personnel involved in the fuelling of aircraft should be familiar with the procedure for summoning the Aerodrome Fire Service.

#### 1.3.2    Fire Extinguishers

Suitable fire extinguishers should be provided at readily accessible positions. The owners of such fire extinguishers should ensure by regular inspection and maintenance that this equipment is kept in a fully serviceable condition and in accordance with the manufacturer's instructions. Fuelling staff (or in the case of an integrated system of ramp safety all ramp staff including subcontractors) should be instructed in the use of these extinguishers.

#### 1.3.3    Fire Warnings

When an aircraft is displaying a fire or engine overheat warning on the flight deck, the flight crew should warn the fuelling operative that fuelling should not begin until the cause of the warning has been established and the appropriate action taken to ensure that fuelling can be safely carried out.

### 1.3.4 **Overheated Undercarriage Assemblies**

The airline or aircraft operator should ensure that when any part of an aircraft undercarriage (e.g. wheels, tyres or brakes) appears abnormally hot, the aerodrome fire service is called. Fuelling should not take place until the heat has dissipated and the aerodrome fire officer confirms that it is safe to proceed. Fuelling equipment should not be positioned at an aircraft until the Flight Crew, Ground Engineer, Fuelling Overseer or Aerodrome Fire Service has advised that no risk remains.

**NOTE:** In checking for high temperatures, care should be taken in approaching the wheels. Approach only from the front and rear, never from the sides.

## 1.4 **Supervision of Fuelling**

### 1.4.1 **Fuelling Oversight**

Aircraft operating companies should either appoint a competent person (referred to here as the Fuelling Overseer) or demonstrate that they have an integrated system of ramp safety that includes training of all staff including subcontractors of the risks and safety aspects of fuelling including hazard and incident reporting. The Fuelling Overseer or person to whom the fuelling is delegated (e.g. Flight Crew, Ground Engineer or Authorised Refueller) should know how to ensure the observance of correct fuelling procedures and be responsible for liaison with the fuel company's fuelling operatives. The Fuelling Overseer should identify himself to the fuelling company operator so that there is an obvious contact if a problem occurs.

The Fuelling Overseer, or in the case of an integrated system of ramp safety all ramp staff including subcontractors, should be familiar with the safety measures for the refuelling operation referred to in the introduction to this chapter. This will ensure interoperability of procedures, which is essential for the safe conduct of the fuelling operations.

The person to whom the fuelling has been delegated should ensure that there is adequate restraint of the aircraft by checking that the wheels are adequately chocked and confirming that the brakes are applied (unless this is not recommended for the particular type of aircraft), or that an acceptable alternative is in place. The person to whom the fuelling has been delegated should remain in the vicinity of the aircraft whilst fuelling operations are in progress and should ensure the correct positioning of service equipment and fuelling vehicles.

### 1.4.2 **Clear Exit Paths**

The Fuelling Overseer, or in the case of an integrated system of ramp safety all ramp staff, should ensure that a clear path is maintained from the aircraft to allow for the quick removal of fuelling vehicles and equipment. Fuelling equipment should be positioned so that there is no requirement for vehicles to reverse before departure. All vehicles and equipment should be positioned to allow the unobstructed exit of persons from the aircraft in an emergency.

### 1.4.3 **Fuelling Zone**

During fuelling operations, air and fuel vapour are displaced from the aircraft fuel tanks. This potentially explosive vapour is expelled via vent points. Within the fuelling zone, smoking and the use of naked lights should be prohibited. Radios, radiotelephones and pagers and the operation of switches on lighting systems of other than intrinsically safe types should be forbidden. Personnel working within the fuelling zone and those engaged in fuelling should not carry matches or other means of ignition or wear footwear with exposed iron or steel studs, nails or tips.

Only authorised persons and vehicles should be permitted within the fuelling zone and the numbers of these should be kept to a minimum. Passengers should not be allowed within the fuelling zone and baggage/passenger reconciliation checks should be carried out away from the fuelling zone.

Unless fuelling takes place in a designated No Smoking Area, 'No Smoking' signs should be displayed not less than 15 m from the fuelling equipment and aircraft tank vents.

Aircraft-borne APUs, which have an exhaust efflux discharging into the fuelling zone, should, if required to be in operation during fuelling, be started before filler caps are removed or fuelling connections made. GPUs may be operated provided they are positioned not less than 6 m from aircraft filling and venting points, hydrant valves and other fuelling equipment when in use.

Equipment with all-metal wheels or metal studded tyres capable of producing sparks should not be moved in the fuelling zone whilst fuelling is in progress. The airline or aircraft operator should ensure that all personnel working on, inside or in the immediate vicinity of the aircraft are made aware that fuelling is taking place. All hand torches and inspection lamps and their cable connections used within the fuelling zone should be certified for use in such an environment or 'Intrinsically Safe'. Vehicle engines should not be left running unnecessarily in the fuelling zones. Photographic flash bulbs or electronic flash equipment should not be used within 6 m of the fuelling equipment or any filling or venting points of the aircraft.

#### 1.4.4 Hazards from Adjacent Aircraft Operations

Before and during fuelling the person to whom the fuelling has been delegated and all ramp staff should be aware of the precautions needed to ensure that no hazard arises to the personnel or equipment, including such hazards as efflux from other aircraft or APUs. If any person considers that a hazard exists fuelling should be stopped immediately until conditions permit resumption.

**NOTE:** The engine efflux of modern jet aircraft when taxiing can have a speed of up to 65 kt and a temperature of approximately 52°C at a distance of 30 m from the jet pipe. This temperature may not be dangerous from a fire point of view, but the blast could be dangerous to aircraft, personnel and equipment.

#### 1.4.5 Operation of Radar

Aircraft should not be fuelled within a minimum distance of 30 m from operational radar or High Frequency (HF) radio equipment in aircraft or ground installations.

During fuelling, the prevention of fire risks due to static electricity discharge is dependent upon effective bonding between the aircraft and the fuel supply source. When fuelling from hand-operated equipment including pumping from cans or drums, similar precautions should be taken to bond the pumping equipment, hose nozzle and containers. If funnels are used, they should be bonded both to the nozzle of the hose or can and to the aircraft using wires provided for this specific purpose.

**NOTE:** On no account should either the fuelling vehicle or the aircraft be bonded to a fuel hydrant pit.

## 1.5 Precautions During Fuelling Operations

### 1.5.1 General

The following general precautionary measures should be taken during aircraft fuelling operations:

- a) The main aircraft engine(s) should not be operated (except for helicopter engine(s)). The main aircraft engines should not be used to power the aircraft electrical systems during fuelling.
- b) Bonding, as appropriate, should be carried out.
- c) Fuelling vehicles and equipment should be positioned so that:
  - i) Access to aircraft for Rescue and Fire-Fighting (RFF) vehicles is not obstructed.
  - ii) A clear route is maintained to allow their rapid removal from the aircraft in an emergency.
  - iii) They do not obstruct the evacuation routes from occupied portions of the aircraft in the event of fire, including chute deployment areas.
  - iv) Sufficient clearance is maintained between the fuelling equipment and the aircraft wing as fuel is transferred.
  - v) They are not positioned beneath the wing vents.
  - vi) There is no requirement for vehicles to reverse before departure.
- d) All other vehicles performing aircraft servicing functions should not be driven or parked under aircraft wings while fuelling is in progress.
- e) All ground equipment such as rostrums, steps etc., should be positioned so that the aircraft settling under the fuel load will not impinge on the equipment.
- f) If an APU located within the fuelling zone or which has an exhaust efflux discharging into the zone is stopped for any reason during a fuelling operation it should not be restarted until the flow of fuel has ceased and there is no risk of igniting fuel vapours.
- g) Aircraft batteries should not be installed or removed nor should battery chargers be connected, operated or disconnected.
- h) The practice of connecting and disconnecting ground power generators and the use of battery trolleys to supply power to an aircraft during the fuelling process within the fuelling zone should be prohibited. No aircraft switches, unless of the intrinsically safe type, should be operated during this time. However, connections may be made prior to the start of fuelling and the circuit should then remain unbroken until fuelling has ceased.
- i) No maintenance work which may create a source of ignition should be carried out in the fuelling zone.
- j) Oxygen systems should not be replenished.
- k) Extreme caution should be exercised when fuelling operations are conducted during the likelihood of lightning and electrical storms. Consideration should be given to restricting operations during lightning activity in the immediate vicinity of the aerodrome. The aerodrome authority and fuelling organisation(s) should include guidance regarding this matter in the Aerodrome Manual and relevant operating procedures.
- l) Aircraft external lighting and strobe systems should not be operated.

- m) Aircraft combustion heaters should not be used.
- n) Only checking and limited maintenance work such as the exchange of units should be allowed on radio, radar and electrical equipment. Any use or testing of such equipment should be deferred until fuelling is completed.
- o) When passengers are embarking or disembarking during fuelling their route should avoid the fuelling zone and be under the supervision of an airline official. The 'NO SMOKING' rule should be strictly enforced during such passenger movements.

## 1.6 **Additional Precautions to be taken when Passengers Remain on Board During Fuelling Operations**

- 1.6.1 To reduce turnaround time and for security reasons, airline operators of fixed wing aircraft may allow passengers to embark, disembark or remain on board during fuelling operations provided the following safety procedures and the guidance in EU-OPS 1.305 are followed:
  - a) Passengers should always be required to disembark when the fuel is AVGAS.
  - b) Fixed wing aircraft with a seating capacity of less than 20 should not be fuelled with passengers on board.
  - c) When wide cut turbine fuels (e.g. Jet B, JP4, Avtag) are involved and the fuel being supplied does not contain an anti-static additive, it is advisable that passengers should disembark before fuelling. At ambient temperatures in excess of 40°C aviation fuels such as Jet A and Jet A-1 may present a hazard if fuel vapours accumulate into the range of flammability limits. Consideration should be given to excluding passengers from the aircraft and hazard area in such circumstances.
  - d) Cabin crew, passengers and other responsible staff should be warned that fuelling will take place and that they must not smoke, or operate electrical equipment or other potential sources of ignition. Operators may permit the use of cellular telephones inside the aircraft during refuelling.
  - e) The aircraft illuminated 'NO SMOKING' signs should be on together with sufficient interior lighting to enable emergency exits to be identified. Such lighting should remain on until fuelling operations have been completed. The 'Fasten Seat Belts' signs should be switched off and passengers should be briefed to unfasten their seat belts.
  - f) Provision should be made, via at least two of the main passenger doors (or the main passenger door plus one emergency exit when only one main door is available), and preferably at opposing ends of the aircraft, for the safe evacuation of passengers in the event of an emergency. Throughout the fuelling operation, each of these doors should constantly be manned by at least one cabin crew member per door.
  - g) Two-way communication shall be established and shall remain available by the aircraft's inter-communication system or other suitable means between the Ground Engineer, Flight Crew, Authorised Refueller or the ground crew supervising the refuelling and the qualified person on board the aircraft.
  - h) Ground servicing activities and work within the aircraft, such as catering and cleaning, should be conducted in such a manner that they do not create a hazard or obstruct exits.
  - i) Inside the aircraft cabin the aisles, cross aisles, all exit areas and exit access areas should be kept clear of all obstructions.

- j) Whenever an exit with an inflatable escape slide is designated to meet the requirements for refuelling with passengers on board, the ground area beneath that exit and the slide deployment area should be kept clear of all external obstructions and the Fuelling Overseer and/or relevant ramp staff informed accordingly.
- k) The access paths to and from areas where potentially additional slides may be deployed if an evacuation is initiated should remain clear to enable service vehicles and personnel to clear these areas expeditiously if necessary.

## 1.7 **Wide Bodied Aircraft and All Other Aircraft Equipped with Automatic Inflatable Escape Slide**

- 1.7.1 When a loading bridge is in use no additional sets of aircraft steps need be provided. However, either the left or right rear door should be manned constantly by a cabin crew member and should be prepared for immediate use as an emergency escape route using the automatic inflatable escape slide. Where slide actuation requires the manual fitting of an attachment to the aircraft, e.g. girt bar, the slide should be engaged throughout the fuelling process.
- 1.7.2 As a precautionary measure when a loading bridge is NOT available for use, one set of aircraft passenger steps should be positioned at the opened main passenger door normally used for the embarkation and/or disembarkation of passengers.

## 1.8 **Aircraft NOT Equipped with Automatic Inflatable Escape Slide**

- 1.8.1 When a loading bridge is in use, one set of aircraft steps should be positioned at another opened main passenger door and preferably at the opposing end of the aircraft.
- 1.8.2 When a loading bridge is NOT available for use, aircraft passenger steps should be positioned at two of the main passenger doors (i.e. preferably one forward and one aft), which are to be open.
- 1.8.3 Where aircraft are fitted with integral stairways and these are deployed, each may count as one means of egress.

## 1.9 **Fuel Spillage**

- 1.9.1 In the event of a fuel spillage, action should be taken immediately to stop the fuel flow and ensure that the aircraft commander/crew is informed. The following action may be appropriate although each spillage will need to be treated as an individual case because of such variables as the size and location of spillage, type of fuel involved, prevailing weather conditions, etc. In the case of a spillage occurring which measures more than 2 m in diameter the Fuelling Overseer, Flight Crew, Ground Engineer or Authorised Refueller should:
  - a) consider evacuation of the area. It is generally safer upwind and upslope of any fuel spillage;
  - b) notify the aerodrome fire service and comply with laid down aerodrome procedures;
  - c) prevent the movement of persons or vehicles into the affected area and ensure that all activities in the vicinity are restricted to reduce the risk of ignition; and
  - d) ensure that engines of vehicles within 6 m of a spillage are not started until the area is declared safe.

## 1.10 **Fuel Mixtures**

1.10.1 Mixtures of wide cut and kerosene turbine fuels can result in the air-fuel mixture in the tank being in the combustible range at common ambient temperatures during fuelling and the extra precautions set out below are advisable to avoid sparking in the tank due to electrostatic discharge. The risk of this type of sparking can be minimised by the use of a static dissipater additive in the fuel being supplied. When this additive is present in the proportions stated in the fuel specification the normal fuelling precautions set out in this publication are considered adequate.

1.10.2 When fuelling with turbine fuels not containing a static dissipater and where wide cut fuels are involved, a substantial reduction in fuelling flow rate is advisable. Wide cut fuel is considered to be 'involved' when it is being supplied or when it is already present in the aircraft tanks. It is recommended that when wide cut fuel has been used the Fuelling Overseer should be informed by the aircraft operator and the next two uplifts of fuel treated as though they too were wide cut.

## 1.11 **Reduced Flow Rate**

1.11.1 Reduced flow rate has three benefits:

- it allows more time for any static charge built up in the fuelling equipment to dissipate before the fuel enters the tank;
- it reduces any charge that may build up due to splashing; and
- it reduces the extension of the flammable range of the fuel that can occur due to misting in the tank before the fuel inlet point is immersed.

## 1.12 **Sources and Dissipation of Electrical Energy that may develop during Aircraft Fuelling Operations**

1.12.1 Distinct types of electrical potential difference, with the accompanying hazard of spark discharge, are possible during aircraft fuelling operations. Electrostatic charge may be accumulated on the surface of the aircraft or fuelling vehicle, when conditions are favourable. The hazard of sparking can be eliminated by ensuring that the fuelling vehicle is bonded to the aircraft so that a difference in electrical potential cannot occur between the two. Bonding between the aircraft and vehicle is made by connecting a conductor between designated points on clean and unpainted metal surfaces of both the aircraft and the fuelling vehicle. It is extremely important that the bonding connection between the aircraft and fuel supply vehicle or source is made before any filler caps are removed or fuelling hoses connected. The bonding connections should remain in place until hoses have been disconnected and filler caps replaced.

## 1.13 **Training**

1.13.1 It is necessary that all personnel concerned with fuelling operations, whether employed by aerodrome authorities, fuel companies or aircraft operators, are adequately trained in the duties they are to perform and are supplied with appropriate instructions and guidance on safe operating procedures. Personnel should be fully trained and practised in the operation of fire protection equipment provided to cover fuelling operations, and the initiation of emergency procedures.

1.13.2 In the case of an operator employing an integrated system of ramp safety all ramp personnel, including subcontractors, should, in addition to the safety aspects of their specific task, be trained to be aware of the risks and safety aspects of fuelling operations that will be conducted while they are performing their duties on or around the aircraft. It is recommended that this training should enable employees to:

- recognise fuel hazards, know how to report them and how to take appropriate action;

- b) follow safe practices and procedures;
- c) work in accordance with instructions issued by their supervisor or line manager; and
- d) challenge any unsafe acts, omissions or hazardous conditions and ensure corrective action is taken.

#### 1.14 **Contamination of Jet Aviation Fuel by Fatty Acid Methyl Ester (FAME)**

- 1.14.1 There is potential for jet aviation fuel to be contaminated by FAME or bio-diesel. The UK aviation jet fuel specification for FAME is given in Defence Standard 91-91, available via [www.dstan.mod.uk](http://www.dstan.mod.uk).
- 1.14.2 Operators should have measures in place, wherever fuel is uplifted, that require the supplier to ensure that the fuel continues to meet the required specification.
- 1.14.3 Operators should provide written guidance to flight crews, preferably based on information from the aircraft and engine manufacturers, on the appropriate actions if contaminated fuel has been uplifted.
- 1.14.4 Operators should instruct flight crews not to take off if any uplifted fuel which contains FAME above the allowable limit (either the Defence Standard 91-91 specification or as varied by the aircraft or engine manufacturer) is reported to the commander.
- 1.14.5 Operators must report any case of FAME contamination using the MOR scheme.
- 1.14.6 Manufacturers are working towards a higher threshold of FAME than the current limit of 5 mg/kg. In the meantime, operators should liaise with aircraft and engine manufacturers to prepare instructions, under their design approval, that permit limited operation with FAME above 5 mg/kg, with appropriate operating and/or maintenance restrictions as necessary.

#### 1.15 **Fuel Uplift Reconciliation**

- 1.15.1 Operators are to ensure that the instructions for the refuelling of aircraft specifically require the commander to reconcile the initial fuel contents, and the known added fuel quantity as per the refueller's written records, with the total contents indicated by the aircraft's fuel gauge at the end of refuelling. If the uplifted fuel is not delivered through a calibrated meter, other means of confirmation such as a visual check of fuel contents will be necessary, which may require the aircraft to be shut down.

## 2 **Ground Handling and Ramp Safety**

- 2.1 Operators are responsible for the safe dispatch of their aircraft following cargo and passenger loading, refuelling, cleaning, catering and the completion of pre-flight maintenance and servicing. Instructions must be given to ensure that dispatch tasks are carried out in a standard manner, that each task is fully and correctly completed, and that any damage is reported immediately. Where dispatch tasks are contracted out to other organisations, contracts must include the operator's requirements for safe conduct of the task and the performance of the contractor, in respect of safety, must be monitored regularly.
- 2.2 Operators should nominate a post holder with the responsibility for ground operations, which would include: airside safety management; the use of airbridges and other means of embarkation/disembarkation for the purposes of evacuation and the subsequent handling of passengers; and the allocation of responsibilities between co-ordinating agencies for passenger safety during embarkation and

disembarkation. Reference should be made to *CAP 642 Airside Safety Management* which describes accepted good practice on:

- a) The Management of Health and Safety of People Airside;
- b) Airside Safety Management System;
- c) Airside Planning;
- d) Airside Vehicle Operation and Driving;
- e) Aircraft Movements;
- f) Training for Safety; and
- g) Performance Management.

2.3 An aircraft operator and the handling agent involved in embarking and/or disembarking passengers generally share responsibility for safety whilst the passengers are moving between the terminal building and the aircraft. The allocation of these areas of responsibility should be clearly set out in the Operations Manual and taught to all staff who are involved. Items should include:

- a) responsibility for passenger safety and the point(s), during the embarkation/ disembarkation process, at which responsibility for their safety is transferred;
- b) how liaison is to be established between an aircraft operator and any appointed ground handling agent to ensure that their individual emergency procedures are compatible and effective;
- c) clarification that any decision to initiate an unplanned disembarkation and the selection of an appropriate method of achieving this is the responsibility of the aircraft commander or delegated aircraft crew member;
- d) advice that, in some instances when an aircraft is on stand, a precautionary disembarkation using the normal access/egress routes may be more desirable than initiating an emergency evacuation using slides. Operators must consider when and how such a rapid disembarkation may be safely managed and how staff are to be informed of the intended method. Consideration should be given to producing a 'rapid disembarkation' checklist procedure for use in circumstances that will not involve the deployment of evacuation slides. The use of normal egress routes during the initial stages of a rapid disembarkation does not preclude use of evacuation slides if the situation demands. Crew training should include selection and implementation of appropriate rapid disembarkation or evacuation measures;
- e) an instruction that the aircraft commander or nominated crew member should be inside an aircraft whenever passengers are embarking, on board or disembarking. The Operations Manual must specify how this responsibility is to be discharged. If the aircraft commander is not present during embarkation/disembarkation, then a member of the aircraft crew must be delegated to be responsible for passenger safety;
- f) confirmation that when any passengers are on board or in the process of embarking or disembarking, the aircraft commander or the aircraft crew member delegated to be responsible for passenger safety may initiate aircraft rapid disembarkation or evacuation procedures. This person should broadcast intended actions and the need for external assistance. Crew training should stress that from the time an aircraft comes on a stand until it departs, excluding periods when there are no persons on board, an external means of disembarkation should be available. Aircraft operators' procedures for arming and disarming evacuation slides should be clearly defined and compatible with the provision of external support;

- g) advice that when an airbridge is in use, and passengers are on board the aircraft, the aircraft commander or the aircraft crew member delegated to be responsible for passenger safety should ensure through the ground handling agents that egress from the airbridge into the terminal can be maintained in the event of an emergency. In this context the term "in use" means the period from when an aircraft stops on the stand and the airbridge is attached until the time when, after the aircraft has left the stand, it is able to move under its own power;
- h) confirmation that, in exceptional circumstances, if company procedures and arrangements with handling agents have not ensured the availability of airbridges when a rapid disembarkation becomes necessary, then evacuation via normal evacuation methods should take place;
- i) advice to ascertain the availability of an airbridge or steps before deciding what would be the best method to use;
- j) advice to make no assumption that emergency services have already been alerted. Training should include specific procedures for the alerting of emergency services should an incident occur during the routine embarkation/disembarkation of passengers and when passengers are on board and the aircraft is parked;
- k) a need to ensure that ground handling staff (engineers, loading and catering staff) whether employed by the operator or under contract to him should ensure that the aircraft commander is apprised of any emergency situation that is observed; and
- l) managing responsibility for an 'out of service aircraft'. The operator retains responsibility for nominating a suitably trained individual to be in charge of that aircraft when any person is on board, e.g. cleaners, engineers, etc. Training should include emergency procedures for the rapid disembarkation of occupants of an out of service aircraft should the need arise.

2.4 Other ramp safety issues that the operator should address through the person responsible for ground operations, working in co-operation with contracted organisations (who could include handling agencies and airport authorities) to ensure that safety hazards are quickly identified and corrective measures are instituted to the satisfaction of all parties, include:

- a) co-ordination, by the operator, of the ground handling of the aircraft. The operator is ultimately responsible for the safe operation and fitness of the aircraft for the intended flight;
- b) the need for disciplined adherence to carefully planned procedures for aircraft handling on the ramp, both to ensure safety of the aircraft and to minimise the danger of injury to, or death of, ground handling personnel who include maintenance engineers, agency staff, fuelling, loading, catering, servicing and any other persons employed in connection with the arrival, preparation and dispatch of the aircraft. Risks can be associated with complacency or a lack of awareness of the dangers inherent when in proximity to aircraft, coupled with inadequate training and procedures, and poor individual self-discipline;
- c) the need to report immediately any damage caused to aircraft by vehicles. If this is not reported before an aircraft departs, the safety of the aircraft, passengers and crew will be endangered. The operator is responsible for ensuring that any damage to the aircraft, or failure to close doors and panels etc., is identified prior to flight and that loading, fuelling, catering, servicing and manoeuvring are safely accomplished. This can be achieved by a final inspection carried out by a member of the operator's maintenance or operating staff. Any damage to the aircraft must be reported and assessed for airworthiness significance prior to flight;

**NOTE:** Where various elements of ground handling are contracted to specialist agencies, and where regular direct surveillance by the operator is impractical, it is essential that quality system personnel, or those of the maintenance organisation, participate in the initial contracting process and that they subsequently monitor the agency's performance. Quality involvement should be directed towards the manner in which the agency trains and qualifies its personnel for work on and around the aircraft, including its performance monitoring practices and its response to hazardous actions by personnel. The adequacy and maintenance of ground handling equipment essential to safety should also be taken into account.

d) knowledge that, in the UK, duty to ensure the safety of ground handling personnel is covered primarily under the Health and Safety at Work (HSW) etc. Act 1974. The Health and Safety Executive (HSE) is empowered to inspect the ramp area and activities and has considerable powers, under Sections 20 - 22 of the HSW Act, including the power to interview witnesses and to issue Improvement and Prohibition Notices.

2.5 Failure to follow the above recommendations could result in enforcement action by the HSE.

2.6 The aerodrome authority, the aircraft operator and the fuelling organisation each have responsibilities in respect of the safety measures to be taken during fuelling operations. Guidance for aerodrome authorities is available in *CAP 748 Aircraft Fuelling and Fuel Installation Management*.

2.7 Operators should be aware that some combinations of tug and tow-bar (e.g. a Mercury Standard Tug and a Universal Tow-Bar Assembly designed for the Airbus A320/321 aircraft) can lead to contact between the cab of the tug and the fuselage underside of the aircraft when the aircraft, tow-bar and tug are not in a straight line.

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Requirement

### 3 Reporting of Inadequacy of Facilities

3.1 Operators shall ensure that a flight will not be commenced unless it has been ascertained by every reasonable means available that the ground facilities available and directly required on such flights are adequate for the type of operation under which the flight is to be conducted and are adequately operated for this purpose.

3.2 An operator shall ensure that any inadequacy of facilities observed in the course of operations is reported to the authority responsible for them, without undue delay.

Requirement End  
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### 4 Foreign Object Damage (FOD) to Aircraft and Aircraft Engines

4.1 FOD can have an economic impact on operators and, in extreme cases, can lead to loss of aircraft and life.

4.2 Airport audits have revealed varying amounts of foreign objects on aircraft manoeuvring areas including stands, taxiways and runways. On one occasion, an aircraft chock was found on a main runway. Other items that have been retrieved have included oilcans, mobile radios, items of ground servicing equipment and catering equipment.

4.3 FOD to engine rotating assemblies, causing vibration, has led to aircraft returning to an airfield or diverting, resulting in an engine replacement. Boroscope inspection of

engines, following reports of surging, often reveals FOD. Examples of FOD to the airframe include damage to horizontal stabiliser leading edges, pressure hull penetration and landing gear damage. Tyre tread detachment is a common result of FOD and can result in damage to wings, flaps, lift dumpers, engine intakes and compressors. Aircraft have been lost, with significant loss of life, due to FOD to landing gear tyres. Tyre tread detachment often occurs within a few take-offs/landings of an earlier penetration of the tread by a foreign object.

4.4 Operators should consider the following measures as part of their FOD Awareness and Prevention Campaigns:

- a) Implementing procedures to prevent their aircraft being positioned on arrival/departure stands that do not meet acceptable levels of cleanliness.
- b) Placing the topic of FOD on standing agendas for all airport users committee meetings and internal safety meetings.
- c) Nominating an individual with responsibility for the implementation of its policy on FOD.
- d) Including the subject of FOD in induction and continuation training programmes for all staff.
- e) Including potential FOD hazards in their ramp area audits.
- f) Ensuring that contracted aircraft cleaning and ground handling organisations have sufficient procedures in place to help reduce potential FOD hazards.
- g) Encouraging flight deck crews to report stands contaminated by foreign objects to the airport authority immediately and not to start engines until any item, adjacent to the engines and likely to cause FOD, is removed.
- h) Encouraging flight deck crews to report concerns of the levels of foreign object hazards at overseas airports, internally within the airline and if necessary to the CAA's Aerodrome Standards Department.

## 5 Ice Falls from Aircraft

5.1 Damage to property can be caused by blue or clear ice falling from aircraft. Blue ice emanates from leaking toilet system servicing points, whereas the clear ice, in the majority of cases, is believed to come from leaking water system servicing points or overflow points. When higher ambient temperatures exist at lower levels, the ice may either dissipate or melt, reaching the ground as slush or fluid. Apart from the potential for falling ice to damage property and injure or even kill people on the ground, ice detaching from an aircraft can present a serious airworthiness threat. There are cases on record of engine detachments from aircraft during flight due to the engine being struck by ice from leaking toilet system servicing points and damage to engine compressor sections, mainplane and stabiliser leading edges is common.

5.2 Toilet system fluid in contact with aircraft structure is a potential source of corrosion and, if allowed to leak past toilet system servicing point seals, may eventually lead to the need for expensive repairs to be carried out. It should be noted that what might appear to be a small seep/leak on the ground will be significantly greater when the aircraft is pressurised. During ramp audits of aircraft, any evidence of leakage at toilet and water systems servicing points may well result in the aircraft being delayed whilst investigations are carried out.

## 6 Operation of Aeroplanes With an Inoperative Exit

(See ANO 2009 Article 117(5) and (6).)

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*Requirement*

### 6.1 Policy

6.1.1 An operator shall not operate an aeroplane with an inoperative exit, even if permitted by the MEL, unless the appropriate Maximum Permitted Aeroplane Capacity (MPAC) tables have been specified in that document. Such tables will in no circumstances permit operation outside the constraints of the Master Minimum Equipment List (MMEL).

6.1.2 MPAC tables are to be produced for each inoperative exit in every aeroplane type and passenger seating configuration used. The operator is responsible for the accuracy and amendment status of these tables.

6.1.3 Cabin crew procedures should reflect those detailed in paragraph 6.4, and are to be specified in the Cabin Crew volume of the Operations Manual.

6.1.4 On single deck aeroplanes not more than one exit may be inoperative. On aeroplanes that have more than one deck, not more than one exit may be inoperative on each deck.

**NOTE:** Flights with an inoperative exit on the upper deck of Boeing 747 aeroplanes should only be made in accordance with the policy detailed in paragraphs 6.5 and 6.6. The Airbus A380 aeroplane should be assessed in accordance with the policy detailed in paragraph 6.7.

6.1.5 The operator must take the following into account:

- An exit is considered to be inoperative when:
  - the exit does not function correctly;
  - the evacuation slide, if required, is not serviceable;
  - the exit sign is not serviceable;
  - the floor proximity exit identifier is not serviceable;
  - the exit interior emergency lighting is not serviceable; or
  - the exit exterior emergency lighting is not serviceable during night-time operations.
- The MEL entry shall specify the Rectification Interval as Category A, with an entry in the Remarks column stating:
  - it is not reasonably practicable to repair the inoperative exit before the commencement of the flight;
  - not more than 72 hours have elapsed since the exit became inoperative; and
  - the aircraft will not exceed five further flights with the exit inoperative.
- Aeroplanes with inoperative exits may only operate in accordance with the appropriate MPAC tables included in the aeroplane type MEL.
- The inoperative exit must be secured closed prior to passengers boarding and must not be used for any purpose whilst passengers are on board. In the event of an exit that has been used for boarding becoming unserviceable, all passengers must be fully briefed before take-off on the inoperative exit and the revised emergency procedures that are to be used. The unserviceable exit must be secured in accordance with paragraph 6.4.3.

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*Requirement End*

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*Requirement*

**6.2 Calculation of Reduced Passenger Capacity for Aeroplanes Operated with Inoperative Exits**

- 6.2.1 The calculation assumes that the other exit of the exit pair is also inoperative.
- 6.2.2 The total number of passengers allowed shall not exceed the combined exit capacities of the remaining exit pairs or, for operations on which liferafts are required to be carried, the combined rated capacity of the usable slide/raft pairs, whichever is most limiting.
- 6.2.3 The maximum number of passengers permitted for each inoperative exit pair is calculated as follows:

**Table 5** Passenger Exit Ratings for Different Exit Door Types

| <b>Exit Door Type</b>       | <b>Passenger Exit Ratings<br/>(per exit pair)</b> |
|-----------------------------|---------------------------------------------------|
| Type A                      | 110                                               |
| Type B                      | 75                                                |
| Type C (with means assist)  | 55                                                |
| Type C (no means assist)    | 45                                                |
| Type I (Large) – see Note 1 | 60                                                |
| Type I                      | 45                                                |
| Type II                     | 40                                                |
| Type III                    | 35                                                |

**NOTES:**

- 1 A Type I (Large) Exit is defined as being not less than 762 mm (30 inches) in width.
- 2 Twin pairs of over-wing emergency exits are to be considered as a single exit when an associated slide or common exit sign is unserviceable. In these circumstances passenger reduction figures are to be calculated as if both exit pairs were inoperative.

Step 1 A plan of the passenger compartment clearly showing the position of exits, type of exits, zones and the number and position of all passengers in each zone must first be constructed.

**NOTE:** A zone is defined as that space between longitudinally adjacent exits or between an exit and the front or rear of the aeroplane.

Step 2 Add together the passenger exit ratings for all operative exit pairs and note the total this produces.

Step 3 If liferafts are required to be carried, add together the rated capacities of all usable slide/raft pairs and note the total this produces.

Step 4 The more limiting figure of Step 2 and Step 3 above now becomes – for that inoperative exit pair – the MPAC. This number is to be entered in the appropriate column of the MPAC table.

Step 5 Within each column, the passenger capacity of any zone is calculated by subtracting from the MPAC the passenger capacities of all other zones that are **not** affected by the inoperative exit pair.

6.2.4 Passenger capacity in a zone must be reduced from that calculated above when the maximum calculated capacity of that zone exceeds the number of passengers that can use the associated pair of exits.

6.2.5 No passenger shall have to pass an exit, operative or inoperative, to get to their nominated exit except in those compartments of an aeroplane where very limited numbers of passengers can be accommodated, such as in First- or Business Class.

6.2.6 Where the calculation described above results in a reduced passenger capacity, the operator is to identify a number of seats equal to the reduction, in a block in the affected zone closest to the inoperative exit.

- The seats shall be blocked off with conspicuous tapes or ropes that contrast with the interior, prior to loading passengers. Only the seats in these areas shall be blocked: passenger aisles, cross aisles and exits must not be blocked.
- Cabin crew should, if appropriate, remain stationed in the vicinity of each exit within the blocked areas. The existence of an inoperative exit does not affect the required number/distribution of cabin crew.

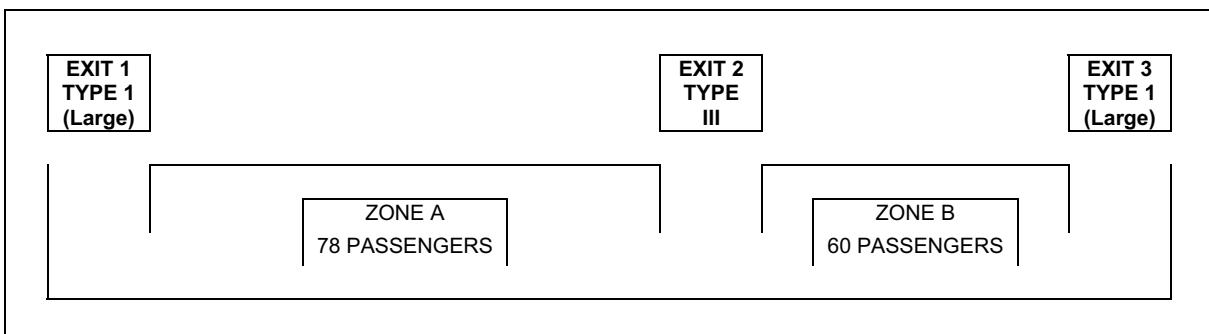
6.2.7 The mass and balance documentation must be revised as necessary to ensure safe loading and, if applicable, a revised tail trim setting.

*Requirement End*  
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### 6.3 Example of an MPAC Table

**NOTE:** The example is for illustration purposes only and may not reflect the actual passenger seating layout of any particular aeroplane. It is assumed that the slide/raft capacity calculated in accordance with paragraph 6.2.3, Step 3 is greater than the passenger exit rating calculated in accordance with paragraph 6.2.3, Step 2.

Maximum Approved Passenger Seating Configuration (MAPSC) = **138** passengers



**Figure 1** Aeroplane Plan

**Table 6** MPAC Table

<b>AEROPLANE WITH INOPERATIVE EXIT 138 PASSENGER LAYOUT (OPERATOR LOAD)</b>			
	<b>Exit 1</b> inoperative L/H or R/H	<b>Exit 2</b> inoperative L/H or R/H	<b>Exit 3</b> inoperative L/H or R/H
	Passenger Exit Rating: 60	Passenger Exit Rating: 35	Passenger Exit Rating: 60
MPAC	<b>95</b> (60+35)	<b>120</b> (60+60)	<b>95</b> (60+35)
Passenger capacity of ZONE A	<b>35</b> (95-60) Passengers leave by Exit 2  (MPAC less Zone B capacity)	<b>60</b> (120-60) Passengers leave by Exit 1  (MPAC less Zone B capacity)	<b>78</b> (95-17) 60 passengers leave by Exit 1 18 passengers leave by Exit 2
Passenger capacity of ZONE B	<b>60</b> (95-35) Passengers leave by Exit 3	<b>60</b> (120-60) Passengers leave by Exit 3  (MPAC less Zone A capacity)	<b>17</b> (95-78) Passengers leave by Exit 2  (MPAC less Zone A capacity)
Total number of seats to be blocked by inoperative exit.	<b>43</b> (138-95)	<b>18</b> (138-120)	<b>43</b> (138-95)

**NOTES:**

- 1 There are other valid combinations. For example in the case of Exit 3 being inoperative, 35 passengers could be accommodated in Zone B with Exit 2 as their nominated exit, with the capacity in Zone A being reduced to 60 with Exit 1 as their nominated exit.
- 2 No seating/number combinations may be used in an aeroplane with an inoperative exit unless the individual cases have been evaluated and have been included in the MPAC table.

**6.4 Cabin Crew Procedures****6.4.1 Cabin Crew Briefing**

The senior cabin crew member should include the following in a special pre-departure briefing of **all** cabin crew members:

- a) the condition and location of the inoperative exit;
- b) the revision to the passenger pre-flight safety briefing;
- c) the revision of emergency drills for all affected crew member(s) – the brief should take into account an assessment of exit, redirection strategy and any other appropriate evacuation techniques for cabin crew member(s) normally responsible for the operation of the inoperative exit; and
- d) the status of other exits in their vicinity and the control of passenger movement to operative exits, away from inoperative exits.

**6.4.2 Seating of Passengers**

When load factor permits, passengers should be seated as far away from the inoperative exit as the aeroplane mass and balance allows, within the constraints of the approved passenger reduction table. Liaison with the flight deck crew on this issue is essential.

#### 6.4.3 **Dis-identification of Exit**

All the 'emergency exit' and exit markings, signs and lights associated with the affected exit should be obscured prior to passenger embarkation. The 'exit unserviceable' placard (usually stowed on the flight deck) should be affixed to the inoperative exit prior to passenger embarkation.

#### 6.4.4 **Passenger Pre-Flight Briefing**

The pre-take-off briefing to passengers should accurately represent the current state and condition of the aeroplane's escape facilities. An oral briefing by cabin staff, or a briefing using automatic audio/visual means, or a briefing by cabin staff with reference to a briefing card, should be immediately qualified by an oral announcement to draw the passengers' attention to the fact that a particular exit is inoperative.

#### 6.4.5 **Assessment of Inoperative Exit Usability in Extreme Circumstances**

In the event of an emergency evacuation being required, in **extreme** circumstances and as a last resort, it may be possible for the exit to be used, i.e. if no other exits are available. For example an exit without a slide on one side of the aeroplane in an undercarriage collapse situation may provide a suitable means of egress. Cabin crew should assess the conditions on the day and make appropriate judgements as to possible actions.

### 6.5 **Boeing 747-100/-200 (Upper Deck Policy)**

#### 6.5.1 **Passenger, Cargo or Combination Configuration with One Exit on the Upper Deck**

The single exit on the upper deck may be inoperative provided that only those flight crew members essential to the flight (including an official observer in the forward observer seat) occupy the upper deck during take-off or landing (total of five flight crew members).

#### 6.5.2 **Passenger, Cargo or Combination Configuration with Two Exits on the Upper Deck**

One of the two exits on the upper deck may be inoperative provided that upper deck occupancy is limited to 16 passengers. Both may be inoperative provided that only those flight crew members essential to the flight (including an official observer in the forward observer seat) occupy the upper deck during take-off or landing (total of five flight crew members).

#### 6.5.3 **Cargo Configuration, or Cargo with Upper Deck Occupants with Two Exits**

One of the two exits on the upper deck may be inoperative provided that only those flight crew members essential to the flight (including an official observer in the forward observer seat), plus those persons as identified by the AFM, occupy the upper deck during take-off or landing (total of eight flight crew members). Both may be inoperative provided that only those flight crew members essential to the flight (including an official observer in the forward observer seat) occupy the upper deck during take-off or landing (total of five flight crew members).

### 6.6 **Boeing 747-300/-400 (Upper Deck Policy)**

#### 6.6.1 **Passenger, Cargo or Combination Configuration with Two Exits on the Upper Deck**

One of the two exits on the upper deck may be inoperative provided that upper deck occupancy is limited to 24 passengers and aircraft capacity is limited to 550 passengers. Both may be inoperative provided that only those flight crew members essential to the flight (including an official observer in the forward observer seat) occupy the upper deck during take-off or landing (total of five flight crew members).

### 6.6.2 **Freighter with One Exit on the Upper Deck**

The single exit on the upper deck may be inoperative provided that only those flight crew members essential to the flight (including an official observer in the forward observer seat) occupy the upper deck during take-off or landing (total of five flight crew members).

### 6.7 **Airbus A380**

The Airbus A380 aeroplane should be assessed with each deck considered as a separate aircraft, with not more than one exit to be inoperative on each deck.

## 7 **Training for Ground De-icing and Anti-icing of Aircraft**

7.1 The operator is responsible for ensuring that all whose actions could have an effect on the standard of de-icing/anti-icing delivered have been properly trained. Training is not restricted to ground staff, but covers all who may be involved, either actively or otherwise, e.g. Flight Crew, Cabin Crew and Ground Service Provider's staff.

7.2 In the past, inadequacies have been identified in the standard of de-icing/anti-icing delivered and can be attributed to inadequate training, which is a factor in insufficient knowledge and performance. Therefore, it is important that all those involved with aircraft de-icing/anti-icing operations are competent and trained in accordance with a recognised syllabus. Training is more effective if it is carried out on an initial and (pre-season) recurrent basis. In addition, it is likely that keeping staff up to date with the latest information on and operational procedures for the ground de-icing of aircraft will improve their effectiveness. Effective training should include proper validation, including a theory test to check knowledge and a practical evaluation to check operational competence.

7.3 Operators should ensure that training (whether it is delivered by the operator or his agent) is standardised and appropriate for each job function, as follows:

- Initial and recurrent training and checking should cover both theoretical and practical knowledge. Training should be specific to the duties that individuals will perform and should be validated so that the individual's level of understanding and ability is not in doubt. Questions should check key knowledge and learning points.
- Recency issues should also be addressed by practical refresher training which should be carried out, in addition to the normal recurrent training cycle, if a person to whom the training requirements apply has not carried out duties related to de-icing/anti-icing within a period acceptable to the FOI, and in any case no more than four months.
- A recognised syllabus accepted by the operator/carrier should be followed, for example the latest Association of European Airlines (AEA) or Society of Automotive Engineers (SAE) training document or acceptable equivalent.
- Where appropriate, NVQs (once approved) should be used as a vehicle for ensuring appropriate knowledge and performance for ground handling staff, as long as the requirements of the accepted syllabus are met. In addition to keeping records of training, consideration should be given to issuing individuals with a certificate and/or a qualifications card.
- The AEA/SAE Training Manuals provide a useful baseline for training requirements. It may be acceptable to develop an equivalent document, based on the above, that includes a syllabus affording an equivalent level of training. Aircraft type-specific issues must also be addressed.

- f) All those involved in delivering training should be properly qualified and have relevant experience. Trainers need to be formally trained in instructional techniques and have an in-depth knowledge of de-icing/anti-icing. Additionally they should have practical experience of aircraft de-icing/anti-icing. Operators should ensure that training policies, guidance, syllabi and procedures used in the training of all staff involved in de-icing/anti-icing of their aircraft conform to the above principles.
- g) The training process must be demonstrably Quality Assured through the operator's Quality System.

7.4 The following references will help to provide reference material for de-icing/anti-icing training courses:

- a) The Winter Operations page on the CAA website ([www.caa.co.uk/winteroperations](http://www.caa.co.uk/winteroperations)).
- b) The AEA is one of several organisations that provide guidance material. Their recommendations document and training manual is available via their website: [wwwaea.be](http://wwwaea.be).

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# Chapter 10 Pre-Flight, Post-Flight and Taxiing Procedures

## 1 Ground Manoeuvring in Low Visibility

1.1 Procedures should be established that cover the following:

- a) a means to ensure that cockpit procedures do not conflict with the necessity to maintain increased vigilance;
- b) increased emphasis on the importance of ensuring that the correct taxiway or runway is being used and of complying with ATC procedures. Full use should be made of ATC and visual aids;
- c) an appreciation that there may be differences in runway/taxiway lighting and guidance systems between aerodromes in the UK and the rest of the world;
- d) the necessity to use standard and unambiguous RTF transmissions and to verify instructions or clearances, when there is any doubt;
- e) the necessity to maintain increased vigilance in monitoring RTF transmissions in order to determine the position of other traffic on the aerodrome;
- f) guidance on how to make the maximum use of aircraft lighting in order to be visible to others; and
- g) a reminder about the need for general awareness and the use of all flight deck resources.

## 2 Runway Incursion Prevention – Recommended Best Practice for RTF Phraseology, Procedures and Airport Taxiing Operations

2.1 Runway Incursions (RIs) are a major risk to the safety of aircraft both in the UK and internationally. The RI accident in Milan (Linate) has only served to emphasise the need for concerted and intensive action by all involved parties. As a result, Aviation Authorities worldwide have recognised RIs as a major safety risk with both the Federal Aviation Administration (FAA) and Eurocontrol implementing safety initiatives. Thirty per cent of MORs received concerning RIs include reports of Conditional Clearances (CCs) as being either misunderstood by pilots or read back incorrectly and which were not challenged by ATCOs. It is vital that CCs are both read back correctly and complied with exactly. Research has shown that there is a wide variation in the quality of RTF phraseology being used in day-to-day operations. The use of standard RTF phraseology is not generally monitored during line operations or recurrent training and the use of standard RTF phraseology as a best practice approach should be reinforced through improved guidance in SOPs and during recurrent training. All UK Type Rating Examiners (TREs) will continue to monitor and promote standard RTF phraseology as a key item during recurrent simulator training.

2.2 A recent survey of operators' Operations Manuals revealed that many operators did not include adequate guidance for pilots during ground operations and that taxiing operations should be regarded as a critical phase of flight. SOPs should incorporate a best practice approach to such operations. Annex 1 to this Chapter contains guidance outlining best practice for taxiing operations. *CAP 413 Radiotelephony Manual* provides a guide to the standard RTF phraseology.

### **3 Calculation of Take-Off Performance - Line-Up Allowance**

- 3.1 A Boeing 737 aeroplane suffered significant damage to its flying controls whilst taking off from Aberdeen Airport. The Air Accidents Investigation Branch (AAIB) in its report of the investigation into the incident (June 2007 Bulletin, G-DOCT) identified a number of issues.
- 3.2 Before take-off, the aeroplane was lined up very close to the runway threshold in accordance with the commander's wish to make maximum use of the runway available. As take-off power was achieved, the brakes were released. At that instant, sections of a blast pad positioned at the runway threshold lifted and broke up, causing damage to the aeroplane's tailplane and elevator. The crew were unaware of the damage to the aeroplane and completed the take-off and flight to their destination without further incident. The AAIB investigation identified issues concerning the construction and marking of the blast pad and other factors concerning the conduct of both the take-off and the lining-up of the aeroplane before the take-off run.
- 3.3 The AAIB recognised that taxiway lead-on lines are not taken into account when defining the start of the runway declared distances available (Take-Off Run Available (TORA), Take-Off Distance Available (TODA), Accelerate-Stop Distance Available (ASDA) etc.) used for performance calculations. The positions of the lines are not included in runway parameter datasets nor is there any international standard for them. Following lead-on markings will not generally position the aeroplane at the point coincident with the line-up allowance on which performance data compliant with EU-OPS performance requirements is normally based; however, they will assist crews in guiding the aeroplane to/from the runway and assist in avoiding obstructions.
- 3.4 Operators should provide crews with clear guidance on the line-up techniques to be used for all runways. This should include the use of markings on taxiways and runways when lining up, and any corrections to be made to performance calculations as a result of using line-up techniques that position the aeroplane at a point different to that used as the reference point for the take-off performance calculations.

### **4 Crosswind Limits for Take-off and Landing**

- 4.1 It is not sufficient to repeat a statement in an AFM that a particular crosswind component has been found to be acceptable; operators' limitations should be stated in unequivocal terms and account taken of the effect of gusts and surface conditions. Limits in excess of any figure mentioned in the AFM will not be acceptable. In addition, consideration should be given to any reduction in limits due to narrow runways.

### **5 Windshear**

- 5.1 Operators will be aware of the extremely hazardous and insidious nature of severe low-level windshear resulting from various meteorological situations, which can produce microburst conditions and wind speeds ranging from 44 to over 175 kt. Operators are advised to ensure that their Operations Manuals and Training Manuals contain adequate instructions and guidance regarding severe low-level windshear, with emphasis on positive avoidance of encounter with these conditions during take-off and landing.

## 6 Winter Operation

- 6.1 Instructions should be published in the Operations Manual and include:
  - a) guidance on the completion of airframe ground de-icing/anti-icing, where this is required to be carried out or supervised by the flight crew, including fluid temperature and concentration and the likely duration of the de-icing effect in typical ambient temperatures;
  - b) drills conforming to the AFM and Manufacturers' Manuals;
  - c) operation of aircraft de-icing and anti-icing equipment; and
  - d) highlighting the potential dangers of airframe icing, especially when glaze ice forms very quickly.
- 6.2 Further information can be found in current AICs.

## 7 Operations on a Runway that is Notified by NOTAM as 'May be Slippery when Wet'

### 7.1 Introduction

- 7.1.1 Aerodrome operators carry out periodic runway surface friction assessments on runways and conduct additional measurements on newly resurfaced runways or runways suspected to be slippery under unusual conditions. Provided the runway friction remains above a specified level the surface is deemed to provide sufficient friction to meet the performance specified in aeroplane manufacturers' performance data calculations for normally dry and wet conditions.
- 7.1.2 If the friction level of a runway or a significant portion thereof falls below the specified minimum friction level the runway will be notified by NOTAM as one that 'may be slippery when wet'.

### 7.2 Operational Implications

- 7.2.1 A runway notified as one that 'may be slippery when wet' will have a braking action that requires the application of a lower crosswind limit and an adjustment to the take-off and landing deceleration performance calculations.
- 7.2.2 Knowing what performance decrement to apply depends entirely on the amount of information that is available about the runway that has been notified as one that 'may be slippery when wet'.

### 7.3 Performance Calculations and Maximum Crosswind Limit

- 7.3.1 When a runway is notified simply as one that 'may be slippery when wet' with no other accompanying substantive information, take-offs or landings in wet conditions should only be considered when the distances available equal or exceed those required for a slippery or icy runway, as determined from the approved information in the Aeroplane Flight Manual.
- 7.3.2 When a specified portion of a runway is notified as 'may be slippery when wet' and the location, length and breadth of that portion are specified along with its braking and/or friction characteristics, the restrictions on take-off and landing performance can be further refined. Take-offs and landings in wet conditions should only be considered after taking account of this information in accordance with the aeroplane manufacturers' recommendations with respect to performance calculations and maximum applicable crosswind limit.

## 7.4 Equivalent Conditions

7.4.1 Operators of aircraft that do not have performance tables for slippery runways or for specific braking such as medium, poor or nil can use performance tables for equivalent conditions in accordance with manufacturers' recommendations.

7.4.2 Aircraft operators are reminded that the Snow and Ice table AD 1.2.2 of the AIP should not be used to translate friction readings for wet runways as this is intended only for winter surfaces. Further information on equivalent conditions can be found on the Federal Aviation Administration website at:

[www.faa.gov > All Visitors > More Visitors > Aviation Industry > Airline Operators > Airline Safety > Safety Alerts for Operators \(SAFOs\)](http://www.faa.gov > All Visitors > More Visitors > Aviation Industry > Airline Operators > Airline Safety > Safety Alerts for Operators (SAFOs))

## 7.5 Mean Braking Action

7.5.1 A mean braking action that is an average of the friction on the whole runway must not be used in the foregoing considerations because it can mask the 'slippery when wet' portion of the runway and therefore be misleading. It is only the braking or friction information for the 'slippery when wet' portion which can be used in the manner described in paragraph 7.3.2 above. In these cases, the surface of the rest of the runway can be assumed to provide normal braking performance.

## 7.6 NOTAM Filtering

7.6.1 Operators should ensure that crews are provided with any NOTAMs containing information that a runway or portion of a runway 'may be slippery when wet' in flight briefing packs. NOTAM filtering software should be modified to ensure that information on the runway conditions is not filtered out of the flight crew briefing pack; this is information essential to flight safety.

## 7.7 Further information can be found at:

- a) ICAO Annex 14 Aerodromes:
  - Chapter 2 Aerodrome Data. Paragraph 2.9 Condition of the movement area and related facilities.
  - Chapter 10 Aerodrome Maintenance. Paragraph 10.2 Pavements.
  - Attachment A. Section 7 Determination of friction characteristics of wet paved runways.
- b) CAA CAP 683 *The Assessment of Runway Surface Friction for Maintenance Purposes*.
- c) [www.caa.co.uk/winteroperations](http://www.caa.co.uk/winteroperations).

## 8 Taxiing with Less than all Engines Operating

8.1 This practice should be carried out only when specifically permitted by the aircraft manufacturer and then only in accordance with procedures recommended by that manufacturer. The relevant procedure should be documented in the Operations Manual. Furthermore, taxiing with less than all engines running should not be undertaken if there is any indication of malfunction of the power generation systems, electrical, hydraulic or pneumatic, or of the braking, steering or engine control systems, unless specifically permitted by the aircraft manufacturer and so documented in the Operations Manual. Any malfunction occurring during the taxiing which may adversely affect the safety of the operation will be cause for the aircraft to be stopped.

## 9 Strobe Lights

9.1 Within the UK, aircraft should select strobe lights on, if fitted, whenever on an active runway.

## 10 Eyesight Damage Caused to Ground Crew by the Flashing of Landing/Taxi Lights by Aircraft on the Ground

10.1 Flight crew should be discouraged from flashing landing/taxi lights in order to gain the attention of the ground crew. Members of ground crew have suffered damage to their eyesight as a result of landing/taxi lights being illuminated when they were looking directly at the light and when only a short distance away.

## 11 Collision Avoidance During Taxiing

11.1 Following an accident relating to flight crew awareness, the accident report discussed the information available to, and the training of, flight crews to enable them to carry out safe taxi manoeuvres. Most manufacturers provide some information in the aeroplane's Flight Crew Training Manuals, for example the Boeing 767 manual states:

*'In congested areas or in the proximity of obstructions, checks will be delayed until safe taxiing conditions permit. The RHS (right hand seat) pilot will assist in keeping a lookout and will not allow copying clearances or reading the checklist to degrade his function.'*

11.2 The accident highlighted a number of common features in accidents and incidents involving taxiing manoeuvres:

- a) An aircraft on the painted centreline of a taxiway cannot be assured of separation between the aircraft and all other aircraft and obstructions. Following the line should ensure that a taxiing aircraft will remain clear of all obstructions along that route, provided that the exact parameters of aircraft in question were included in any clearance analysis. However, such analyses might take place at infrequent intervals and may not have included all aircraft types now using the taxiway. Crews, particularly those of the most modern and recently certificated types, should be aware of such possibilities.
- b) An ATC instruction concerning a taxi route does not guarantee that taxiing will be safe because ATC have "cleared" the route. It cannot account for other aircraft misunderstanding clearances received and encroaching on the cleared taxi route.
- c) An aircraft positioned at a holding point cannot be guaranteed that adequate clearance from all other aircraft is assured.
- d) Many aircraft can only be steered on the ground from one pilot's position, normally that of the left-hand seat. Thus, for crew members recently promoted to captain, a lack of familiarity with taxiing is not unusual.
- e) Manufacturers' guidance may be limited, and in certain aircraft types it may not be physically possible to see the wing tips from the cockpit.

11.3 If the above aspects of aircraft operation are considered along with the other activities that take place during taxiing which are needed to prepare the aircraft for take-off (usually in the most expeditious manner) it can be argued that taxiing an aircraft requires more concentration and effort than most other phases. Furthermore, by law it remains the responsibility of the aircraft commander to take "all possible measures" to avoid collisions as laid down in the Rules of the Air.

## 11.4 Supporting Regulations and Information

11.4.1 The Rules of the Air Regulations 2007, Rule 42 'Right of Way on the Ground' at paragraph (2) states:

*'Notwithstanding any air traffic control clearance it shall remain the duty of the commander of a flying machine to take all possible measures to ensure that his flying machine does not collide with any other aircraft or vehicle or with any obstacle.'*

11.4.2 CAP 637 *Visual Aids Handbook* gives advice and guidance for pilots and other personnel engaged in the handling of aircraft, and in Chapter 2 under the heading 'Paved Taxiway Markings' states:

*'Taxi Holding Positions are normally located so as to ensure clearance between an aircraft holding and any aircraft passing in **front** of the holding aircraft, provided that the holding aircraft is properly positioned **behind** the holding position. **Clearance to the rear of any holding aircraft cannot be guaranteed.** When following a taxiway route, pilots and persons towing an aircraft are expected to keep a good lookout and are responsible for taking all possible measures to avoid collisions with other aircraft and vehicles.'*

# Annex 1 to Chapter 10

## Flight Crew Guidance – Taxiing Operations

### 1 Planning for Pre-Departure and Taxiing Operations

- 1.1 A key issue in the prevention of runway incursions is to apply effective counter measures against the potentially catastrophic consequences of such events. This is best achieved through the use of Crew Resource Management (CRM) techniques, incorporating Threat and Error Management (TEM), during the pre-departure, arrival and taxi phases. The taxiing operation should be treated as a “safety-critical activity” and sterile cockpit procedures should be adopted, to ensure a high level of vigilance. Managing the flight deck workload will allow for increased attention to planning and briefing of these safety-critical phases, thus providing enhanced situational awareness.
- 1.2 As an operational philosophy this can be significantly reinforced by assigning the Pilot Monitoring (PM) primary responsibility for actively monitoring both the control actions of the Pilot Flying (PF) and the progress of the aircraft against aerodrome charts, so achieving appropriate task prioritisation during this safety-critical phase. Adopting such a defensive approach to assessing and dealing with the potential threats, whilst minimising distractions and so reducing the possibility of errors, will enhance the safety of operations.

### 2 Airport Familiarisation

- 2.1 Departure or arrival at an airport should be prepared for well in advance. Thorough planning of the taxiing operation is essential. This preparation should be done at the gate or prior to starting descent. The following should be considered:
  - Prepare the necessary airport layout charts for the taxi phase and have them available for use at all times during that period.
  - Take some time to study the airport layout. Often a systematic approach is used in the designation of taxiways which assists the monitoring task. Use the Automatic Terminal Information Service (ATIS) information and, if applicable, previous experience to determine possible taxi routes. This should be done prior to pushback.
  - Review the latest NOTAM for both the Departure and the Arrival airport for information concerning construction or taxiway/runway closures. Visualise this information with reference to the airport layout charts.
  - Standard taxi routes are used more often at busy airports. Review the anticipated routes.
  - Pay special attention to the location of unique or complex intersections and runway crossings where runway incursions have taken place in the past, or areas of the runway or associated taxiways which are not visible from the Control Tower. In particular, know which runways will be encountered between the aircraft’s current position and intended destination.
  - Plan the timing and execution of checklists so that no distractions occur when approaching and/or crossing runways, allowing heightened lookout during this phase for the appropriate taxiway and runway signage.
  - Conduct a detailed briefing for all flight crew members, especially during night and low-visibility operations, thus ensuring effective monitoring and lookout.

### 3 Briefings

- 3.1 The pre-take-off or departure briefing should be concise, and the understanding of the other crew member checked through facilitation techniques where questions are asked to check understanding. (This practice should also be followed with the descent briefing.) The taxi briefing should be incorporated with the departure briefing at the gate. Where possible, conduct pre-departure checklists when the aircraft is stationary. Briefing updates while taxiing should be limited to a summary of the highlights and the items that have changed since the departure briefing.
- 3.2 The departure and approach briefing should contain a complete review of the expected taxi routes. Pay special attention to temporary situations such as work in progress, other unusual activity and recent changes in airport layout. During this part of the briefing, refer to the airport charts to assist in the visualisation of all relevant information.
- 3.3 Memory is “constructive”; there is a tendency to fill in the blanks with expected information. Ensure that the clearance received is assessed against the anticipated clearance; do not assume that which was anticipated.
- 3.4 Be aware that the expectations established during the pre-departure or pre-landing planning can be significantly altered with a different and unexpected clearance. Remain flexible.
- 3.5 Effective briefing, using the following checklist, will facilitate shared understanding.
  - Brief flight- and cabin-crew supervisors on known threats and sterile cockpit procedures.
  - Review NOTAMs and ensure flight crew are familiar with the airport layout.
  - Plan timing and execution of checklists as part of cockpit tasks.
  - Flight crew should fully understand all departure briefing items through question and answer.
  - Brief taxi route thoroughly.
  - Airport Layout Charts should be immediately available for all flight crew members.
  - Monitor and review actual taxi progress at regular intervals.

### 4 Taxi Procedures

#### 4.1 Clearance

- 4.1.1 The receipt of any clearance and the taxi phase itself requires the complete attention of all flight crew on the flight deck. Always note down taxi instructions, giving particular attention to complex taxi routes, and cross-check those instructions against the airport layout chart. Resolve any uncertainties about the clearance or the current aircraft position on the airfield surface before taxiing. If any doubt exists about position or cleared route during taxiing, stop the aircraft and seek confirmation from ATC.
  - All flight crew members should ensure good CRM practice by cross-monitoring clearances for taxi, take-off and landing, thus ensuring they are continually aware of their immediate operating environment during all stages of runway operations.

## 4.2 Public Address Announcements

4.2.1 Public Address announcements or use of company frequency by flight crew members should be carried out prior to the taxi phase or when the aircraft is subsequently stationary.

4.2.2 If required to leave the ATC frequency, notify other flight crew members. Afterwards, obtain a briefing update from them.

## **TASK PRIORITISATION: AVIATE – NAVIGATE – COMMUNICATE**

### 4.3 Sterile Flight Deck

4.3.1 The sterile flight deck concept should be adopted whilst taxiing. During movement of the aircraft it is essential that the flight crew are able to focus on their duties without being distracted by non-flight related matters. Cabin crew should be aware of this requirement through prior briefing. If ATC advise clearance changes, request them to 'stand by' when necessary.

4.3.2 The operation of sterile flight deck procedures should also preclude all extraneous communications, including calls received from non-operational areas (e.g. company), entry onto the flight deck by cabin crew or non-essential interphone calls, and any crew conversations not related to the current phase of flight. It is generally accepted that a sterile flight deck should be maintained during:

- **Departure:** from when the aircraft starts engine(s) until the aircraft reaches 10,000 ft above the departure aerodrome elevation or 'top of climb'.
- **Arrival:** from when the aircraft reaches 10,000 ft above the arrival aerodrome elevation until the engine(s) is (are) shut down after landing.
- At any other time specified by the operator (e.g. in-flight emergency, security alert).

## 5 Flight Deck Monitoring

5.1 The primary task for the PM is that of monitoring the control and progress of the aircraft. The PM should address secondary tasks only when that primary task is being effectively managed.

5.2 Suspend checklist activity when crossing and entering runways. Ensure that the full concentration of all flight crew members focuses on the runway traffic situation. When on a parallel taxiway be aware of aircraft vacating the active runway and be prepared to give way.

5.3 Never cross red stop-bars, unless you have queried their status and received a specific clearance to cross them. The clearance to enter or cross a runway must be heard and confirmed by both flight crew members.

5.4 When entering any runway, carry out a thorough visual check for other traffic and include all available means of surveillance, e.g. monitoring of ATC, ACAS / Traffic Alert and Collision Avoidance Systems (TCAS) and aircraft radar.

5.5 When cleared to enter or cross any runway, whether active or inactive, position the aircraft at right angles with the runway where possible, in order to better observe both arriving and departing traffic.

5.6 The receipt of a taxi clearance to a point beyond a runway does not automatically include the authorisation to cross that runway. Each taxi clearance beyond a runway should contain an explicit clearance to cross the runway or an instruction to hold short of that runway.

- 5.7 Use aircraft lights, including logo lights, to increase aircraft visibility, thus helping controllers and other pilots to obtain visual contact. Fixed navigation lights and taxi lights should be on whenever the aircraft is moving. Strobe lighting should be activated when entering the active runway and landing lights should be activated when cleared for take-off or landing: this is particularly considered helpful by ATC units.
- 5.8 Positively check each audio control unit and volume adjustment whenever a frequency change is made.
- 5.9 Ensure all flight crew are on the appropriate frequency until all runways have been vacated after landing. Where an automatic frequency change is required action this promptly.
- 5.10 After landing, vacate the runway as soon as possible, but not by turning onto another runway, unless specifically instructed to do so. Be vigilant for conflicting traffic on a parallel taxiway.
- 5.11 When the aircraft has vacated the active runway, be prepared to stop in order that any questions about the ATC clearance or aircraft position can be resolved.
- 5.12 If necessary, resolve any uncertainty about aircraft location on the surface movement area. The crew should STOP the aircraft, advise ATC, and ask for clarification.
- 5.13 If necessary request progressive taxi instructions.
- 5.14 If it is required to shut down or start engines during the taxi phase, the PM should ensure that a listening watch is maintained.
- 5.15 Pilots should avoid stopping on a runway, unless specifically instructed to do so or in an emergency.
- 5.16 In summary, maintain effective TEM through the following actions:
  - Ensure orderly execution of pre-departure and taxi procedures.
  - Assign monitoring responsibilities and manage workload priorities.
  - Maintain sterile flight deck conditions during the taxi phase.
  - Anticipate that taxiing visibility may be less than the required Runway Visual Range.
  - Note taxi route clearance on Flight Management System (FMS) scratchpad or Flight Log.
  - Ensure effective use of lighting SOPs for maximum aircraft visibility.
  - Designate monitoring of taxiway and runway location markers to establish position.
  - Be alert for mandatory signs/markings/stop-bars and runway guard lights.
  - Ensure explicit clearance and readback before entering or crossing any runway.
  - Do not cross red stop-bars when entering or crossing a runway unless contingency measures are in force, e.g. to cover cases where the stop-bars or controls are unserviceable.
  - Before entering or crossing any runway, check for traffic.
  - Suspend checklist activity while crossing any runway.
  - Conduct pre-departure checklists when the aircraft is stationary.
  - Use standard radio phraseology.

- Manage potential disruptions and distractions by ATC and company calls.
- Monitor clearances issued to other aircraft.
- Ensure correct understanding of the ICAO phraseology “Taxi to holding position”.

## 6 Communications

6.1 Effective communication is dependent on standard RTF phraseology, based on the English language, in order to produce a common and clear understanding between pilots and ATC. Comprehensive guidance on radiotelephony procedures is contained in the United Kingdom Radiotelephony Manual (CAP 413). The aim of CAP 413 is to provide pilots and ATS personnel with a compendium of clear, concise, standardised phraseology, and associated guidance, for radiotelephony communication in United Kingdom airspace. CAP 413 is based on *ICAO Annex 10 Volume 2 (Communications Procedures) to the Convention on International Civil Aviation* and *ICAO Doc 4444 Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM)*. It is available at [www.caa.co.uk/cap413](http://www.caa.co.uk/cap413).

### 6.2 Language

6.2.1 The use of Aviation English in a busy and complicated environment should be encouraged as much as possible. The use of a common aeronautical language not only improves communication but also improves the situational awareness of all the flight crew listening out on the frequency and trying to build a picture of the traffic situation.

### 6.3 Proficiency

6.3.1 Conducting and comprehending RTF requires competence with standard phraseology as well as general proficiency in the language used for communications. Speaking at a slower rate and enunciating clearly is essential, particularly when operating in foreign regions. If you slow down your speech rate, the response will also tend to be slower and clearer. Complex and long instructions, incorporating more than one executive instruction, are difficult to absorb and understand, especially when delivered at a high rate as is common in a high-density traffic environment. Even if the same language is used universally, some essential differences in RTF phraseology remain between ICAO Member States, and commercial pilots should be familiar with such differences.

### 6.4 Phraseology

6.4.1 In addition, a supplement to CAP 413 has been issued to all UK commercial licence holders, outlining the use of correct phraseology specifically related to CAT operations, as a means of addressing communication issues in helping to prevent both RIIs and Level Busts. *CAP 413 Supplement – Quick Reference Guide to UK Phraseology* highlights RTF best practice in detail and should form part of recurrent training practice. This is available in electronic format via the CAA website at [www.caa.co.uk/cap413supplement](http://www.caa.co.uk/cap413supplement).

### 6.5 Read-backs

6.5.1 Any read-back requires a hear-back by the originator. In order to complete this “communication loop”, the read-back must be complete and clear. Always include the aircraft call-sign. This is the only way to ensure that clearances and instructions are well understood; an essential in all voice communications. In case of hold short, crossing, take-off or landing instruction read-back, always include the runway designator. **Read back the full clearance.**

## 6.6 Listen Out

6.6.1 Actively monitor the ATC frequency at all times. Try to visualise the other traffic in the vicinity. Know what runways will be encountered on the cleared taxi route. Pay particular attention to all clearances and instructions, involving those runways, issued to traffic. Listen Out before transmitting.

## 7 Other Communication Best Practices

7.1 Be extra attentive to ATC messages when another aircraft with a similar call-sign is on the frequency.

7.2 When instructed to follow other traffic, this does not automatically include the clearance to enter or cross a runway. Each aircraft requires a specific clearance to enter or cross any runway. If in doubt, seek clarification: **Ask ATC**.

7.3 If cleared to "line up and wait", then only a short delay on the runway should be anticipated. If held in this position for an extended period, advise ATC of current position and seek clarification: **Ask ATC**.

7.4 Both pilots should monitor the frequency and agree upon the acceptance of a clearance to taxi, cross a runway, take off and land on a nominated runway. Any misunderstanding or disagreement should be resolved immediately by contacting ATC for clarification: **Ask ATC**.

7.5 The use of headsets increases the readability of communications with ATC and within the flight deck.

7.6 Ensure the correct setting of the audio control panel, especially after any temporary switch in audio sources.

## 8 Other Aids

8.1 The flight deck traffic display (ACAS/TCAS) is a useful tool for detecting traffic, particularly that on approach and possibly traffic departing from an intersection. Remember, an aircraft may be out of sight when departing from an intersection closer to the landing threshold, due to restricted visibility or line-of-sight limitations. Also, SOPs generally require the use of a heading display or compass to confirm the runway or taxiway alignment with the information available from the charts, whilst the use of ILS localiser guidance system provides final confirmation of correct runway alignment.

8.2 Always exercise a positive lookout on entering a runway by scanning the entire runway and approach in both focus and direction beforehand. Do not rely on ATC to look out for you. **If in doubt: ask; never assume.**

# Chapter 11 Aircraft Technical Particulars, Performance and Operating Procedures

## 1 Technical Particulars of the Aircraft

1.1 Information on the following matters should be provided in the operator's Operations Manual in a form suitable for use as an immediate reference in day-to-day operations:

- a) Action to be taken in the event of a system malfunction that cannot be covered by an emergency checklist. Information should be provided about the effect on essential systems and services of serious faults. Information to be provided will vary with the type of aircraft and, together with the emergency drills, it should be in a readily identifiable section of the manual, e.g. on distinctively coloured pages.
- b) Operational guidance given on the actions required in the event of the failure of generated electrical power sources should include the capabilities and expected duration of the emergency or standby power sources, and advice on the effect that a failed attempt to start the APU will have on battery capability, if applicable. The Operations Manual should specify at what stage an aircraft should be diverted to an alternate aerodrome following a failure or combination of failures in the electrical system.
- c) Procedures for maintenance Check 'A' or pre-departure inspection, as required by the approved maintenance schedule, including a check of the fuel system for water contamination, where this is required to be carried out by the crew.
- d) Replenishment of the aircraft's fuel, oil, hydraulic fluid, de-icing fluid, demineralised water and water methanol supplies to an approved specification. In the case of a helicopter, a maximum rotor running time should be specified, after which the helicopter should be shut down to enable engine and gear box oil level checks to be carried out. In the case of a rotors-running-refuel, a water contamination check should be made prior to the fuel uplift.
- e) Supervision of refuelling and topping-up of tyres, oleos, de-icing and hydraulic systems, including oxygen and air reservoirs. The refuelling information should include any specific precautions called for by:
  - i) the use of wide cut fuels; and
  - ii) the 'off aerodrome' situation where either a fuelling vehicle or a barrelled supply is used.Quality control may, in appropriate circumstances, call for the flight crew to view the day's test fuel sample record, or witness the sample test themselves.
- f) Calculation of significant airspeeds and mach numbers, reduced thrust and trim settings.
- g) Manufacturer's and operator's limitations that affect the handling of engines and pressurisation systems.
- h) Compliance with any special handling instructions.
- i) Procedures to be observed in the event of lightning-strike, bird-strike, heavy landing etc.

## 2 JAR-26 Additional Airworthiness Requirements for Operations

- 2.1 Following the formation of EASA many UK additional design certification requirements have been withdrawn. Operational design requirements previously referenced in Airworthiness Notices are now enshrined in JAR-26. JAR-26, which currently contains requirements applicable to aeroplanes with a maximum certificated take-off weight of more than 5,700 kg, contains specific additional airworthiness requirements with which operators must ensure that compliance has been established if operating for the purposes of CAT. Aeroplanes certified to CS-25, or JAR-25 amendment 14 or later, will comply with the majority of the applicable requirements of JAR-26 with the exception of flight crew compartment security, required by EU-OPS 1.1255 and addressed by JAR-26.260. Operators whose aeroplanes are operated in accordance with EU-OPS are also required by EU-OPS 1.005(b) to comply with JAR-26.
- 2.2 Operators should demonstrate compliance with JAR-26 subsequent to the issue of an EASA C of A and prior to commencing operations for the purposes of CAT. Operators should keep a controlled document for each aeroplane that provides a compliance statement against each requirement. Operators should ensure that such documents are available on request to FOIs and Regional Office Airworthiness Surveyors to demonstrate compliance during audits.

## 3 Extended Range Twin Operations (ETOPS) Pre-Departure Service Check (PDSC)

- 3.1 The ETOPS PDSC is an additional pre-flight check for older aircraft types (e.g. B757, B767, A300) prior to an ETOPS sector. For new models that are type designed for ETOPS, such an inspection forms part of routine checks.
- 3.2 The PDSC is a check that should be carried out immediately before flight and should be completed in accordance with EASA AMC-20 *General Acceptable Means of Compliance for Airworthiness of Products, Parts and Appliances – AMC 20-6 Extended Range Operation with Two-Engine Aeroplanes ETOPS Certification and Operation*, Appendix 4 paragraph 2(c).
- 3.3 Where extended validity of the PDSC is currently being practised, this should now be replaced with operational procedures which include a PDSC conducted by an appropriately authorised engineer or by a suitably trained and authorised flight crew member. Flight crew required to certify the PDSC shall be trained and authorised by a Part-145 organisation. If it is not possible for pilots to be trained to carry out the PDSC and/or it is necessary to carry out a short positioning flight prior to the ETOPS sector, this may be approved by the CAA on a case-by-case basis for specific aeroplane types and routes. Operators should apply to the CAA, via their assigned FOI, requesting the approval of an extended validity for the PDSC. Such approvals will be valid for one year and reviewed annually. The maximum extended validity allowable will be 12 hours, which may include one sector of up to 90 minutes.
- 3.4 In the case of a return to stand or an en-route diversion, provided these are for non-technical reasons, then under certain conditions the PDSC may remain valid and flight may be continued as ETOPS. Such conditions must be approved by the CAA and included in the Operations Manual. These conditions may include the requirement that ETOPS critical systems components are not to be disturbed. Operators should review their ETOPS PDSC practices to ensure that they comply with the above policy, amending their Operations Manuals where necessary.

## 4 Performance

4.1 Operators must provide commanders with simplified performance information from which they can readily determine, without reference to an AFM or performance schedule, the maximum weights for take-off and landing on all flights. The maximum weight referred to is that derived from the statutory weight and performance requirements or limitations, such as zero fuel weight. In many cases, on regular or scheduled operations, it is only necessary to indicate that there is no restriction imposed by performance requirements; in others, it may be necessary to indicate which of the requirements is critical and to provide a tabular or other clear presentation of limiting weights in varying conditions of wind and/or temperature. There will also be instances where it is both practicable and desirable for the operator to indicate any special flight procedures, such as minimum height for setting course in IMC or an emergency turn after take-off in the event of engine failure, essential to secure compliance with the performance requirements. Where applicable, clear instructions must be given for the calculation and selection of reduced thrust for take-off when specifically permitted by the AFM.

**NOTE:** As SID routes do not guarantee adequate terrain clearance for all aircraft in the engine-out case, the operator must check that the requirements of the appropriate AN(G)Rs are met for all SIDs used by company aircraft. Similarly any emergency turn after take-off onto routes contained in the aircraft's Operations Manual and approved for use by the local ATC must also have been checked for compliance with the AN(G)Rs.

## 5 The Use of Performance Data Appropriate to the Existing Runway Conditions

5.1 Operators should be aware of the importance of using the performance data appropriate to the existing runway conditions.

5.2 Operators may be using 'dry' performance figures when the runway is 'wet' (UK AIP AD 1-1-1 paragraph 15). EU-OPS 1.480(a)(4) states that a dry runway is:  
'a runway which is neither wet nor contaminated, and includes those paved runways which have been specially prepared with grooves or porous pavement and maintained to retain 'effectively dry' braking action even when moisture is present.'

5.3 It is not sufficient for a runway to be considered, for performance purposes, as dry when it is wet solely on the basis that it is constructed with, for example, grooves or porous friction course pavement. Dry runway performance must only be used when the CAA has accepted in writing that the aeroplane can actually achieve the 'effectively dry' braking action referred to in the EU-OPS definition. However, there is currently no provision in the UK for notifying operators of runways having such surfaces.

5.4 The following considerations are important to the provisions of EU-OPS 1.480(a)(4):

- Although a runway may have a grooved or porous surface, it may not be possible to demonstrate that it retains an 'effectively dry' braking action when wet. This may be because the type of surface is inherently not physically capable of retaining dry braking friction characteristics in the presence of sufficient moisture to be termed 'wet'. In other cases, it may be as a result of a surface reaching the end of its design life or that the recommended routine maintenance procedures have not been sufficiently effective (see CAP 683 The Assessment of Runway Surface Friction Characteristics). This is particularly relevant in the case of accumulation of rubber deposits in touchdown zones.

b) The effectiveness of aircraft anti-skid systems is especially sensitive to the presence of water on the runway. Aerodrome operators' Continuous Friction Measuring Equipment does not record a corresponding response to the presence of water, and thus operators may not rely on runway friction reports alone for demonstrating that a runway can retain 'effectively dry' braking action. Verification of the aircraft's braking performance capability in wet conditions is also required. This would normally require support from the aircraft manufacturer.

5.5 It is the operator's responsibility to ensure that the correct performance data (dry, wet or contaminated) is used for take-off and landing. Operators should review their guidance to crews on the use of wet and dry performance data, and review the associated training requirements. The incorporation of wet runway performance issues into Line Orientated Flying Training (LOFT) or Line Orientated Evaluation (LOE) exercises should be considered. To comply with EU-OPS 1.480 when a runway, or section of a runway, is reported as wet, crews must use wet runway performance data regardless of the type of runway surface unless the operator can demonstrate to the CAA that the runway surface and the aircraft's braking capabilities fully meet the criteria of EU-OPS 1.480(a)(4).

## 6 En-Route Engine Failure

6.1 The operator should provide procedures to be followed on specific routes after failure of an engine, if the aircraft's stabilising altitude is likely to be critical in terms of MFA. The following should be considered:

- Operators should be aware of the routes on which the en-route performance of their aircraft, following the failure of one or two engines, will be critical and should include instructions, relating to such routes, in their Operations Manuals in order to reduce the risks which could arise from indecision or error in the case of engine failure.
- In the case of critical routes it may, in some cases, be possible to regulate the aircraft's planned take-off weight to such an extent that its drift-down performance following engine failure (in the case of a turbine-engined aircraft from a height not exceeding the maximum relight altitude) will enable it to clear all obstacles on its route by the required margin regardless of the point at which the failure occurs. In other cases it may be necessary to calculate a critical point, or a number of critical points, which would determine the action to be taken in the event of engine failure at any given position, i.e. turn back, continue along the planned route or divert along an alternative route.
- Instructions should take into account the accuracy of navigation which may be expected of the flight crew in view of the crew complement and the aids available. Account should also be taken of the effect of varying meteorological conditions. Assumed winds and temperatures used in the calculation of the critical point(s) must be indicated because, if forecast or actual conditions differ from those used at the planning stage, the commander may need to amend the drift-down procedure.

6.2 Training and procedures should be based upon *JAA Administrative and Guidance Material, Section 4, Operations, Part 3, Temporary Guidance Leaflet No. 25 One-Engine-Inoperative Ferry Flights*.

## 7 Noise Abatement

7.1 Special handling techniques and/or routes result from noise abatement regulations at particular airfields and runways. Noise abatement regulations frequently require special handling techniques and routes after take-off. The AFMs of the more recently certificated aeroplanes on the UK register contain performance data related to noise abatement procedures. Details of the procedures for each airfield or runway used by the operator, for which noise abatement regulations exist, should be provided in the Operations Manual. In some cases these procedures may be more restrictive in terms of take-off weight than the AN(G)Rs allow. Instructions to ignore noise abatement procedures in emergencies should also be included. Where, in exceptional circumstances, it may be appropriate in the course of noise abatement procedures to start a turn at less than 500 ft above ground level (agl), pilots should be given suitable instructions about restricting the angle of bank. Pilots should also be instructed not to reduce thrust below 500 ft agl or to an extent that would result in a gross gradient of climb of less than 4%. (See also ICAO Doc 8168.)

## 8 Aeroplane Handling in Turbulence

8.1 Due to the effects of turbulence, aeroplanes have been observed to deviate more than 300 ft from their assigned level. Some of these incidents have taken place while the aircraft were in a holding pattern and resulted in loss of separation with other aircraft in the hold. Where possible, holding speed should be increased to allow a greater operating margin but respecting any aircraft or airspace limitations. En route, the airspeed should be set to that recommended in the AFM. Fly-by-wire aircraft have built-in flight envelope protection and will therefore offer some degree of compensation for excessive vertical acceleration due to the turbulence. There is also protection against excessive incidence. It is therefore recommended that the autopilot remains engaged unless there is an unintentional disconnection. This will also assist in maintaining control of the aircraft where the pilot is having difficulty reading the instrumentation due to the turbulence.

8.2 In severe turbulence there may be large fluctuations in airspeed and the speed trend vector may go to full up or full down. However, such variations in the speed trend vector will usually be temporary and will often reverse in direction very quickly. It is therefore recommended that the auto-thrust remains engaged initially and the speed is monitored. If there is a large decrease in airspeed the recommended action is to select Climb Power by deselecting auto-thrust using the throttle push button. When the speed has increased to a satisfactory level, re-engage the auto-thrust. If large variations in speed continue, the pilot should consider disengaging the auto-thrust and controlling the speed manually. This will give a more rapid engine response than the automatics and avoid continuous power changes.

8.3 The above recommendations generally apply to more conventional aircraft but the use of auto-throttle will be slightly different in that the throttles can be manually pushed to maximum permitted power and will return to a speed control setting when released. During climb or descent, use of Vertical Navigation (VNAV) or Flight Level Change (FLCH) may result in excessive pitch changes as the Autopilot Flight Director System (AFDS) attempts to fly at the set speed with the elevators. Therefore, Vertical Speed (V/S) mode (speed on auto-throttles) is recommended for climb and descent in severe turbulence.

## 9 Use of Rudder on Large Transport Aeroplanes

- 9.1 Pilots should be aware that aggressive rudder inputs, particularly full or nearly full opposite rudder commands, when made against an existing sideslip condition, will generate forces on the vertical stabiliser which may exceed the design limit loads and which may lead to structural failure. It should be emphasised that this phenomenon can occur at all flight speeds, even below the maximum design manoeuvring speed (Va). Correct use of the rudder, in conformity with the manufacturer's operating manual, is entirely safe.
- 9.2 Training and awareness programmes should include the following aspects: design criteria and assumptions, certification processes and margins, aerodynamic forces, upset recovery, correct input techniques including the effects of any rudder limiting system and normal and abnormal usage. Such programmes should be based on information and guidance material provided by the aircraft manufacturer and adapted, if necessary, to suit the needs of the operator (e.g. highlighting any important differences between variants/types flown by the same pilots), but without introducing material unapproved by the aircraft manufacturer. In particular, the training should emphasise the differing rudder usage and techniques employed on large transport aeroplanes compared to tactical military and small general aviation aeroplanes. This programme may be considered part of the Accident Prevention and Flight Safety Programme.

## 10 Operation of Twin Propeller Driven Aeroplanes with Limited Battery Power

- 10.1 Airworthiness Requirements for all aeroplanes with an MTWA of 5,700 kg or less, and aeroplanes type certificated before 1980 with an MTWA in excess of 5,700 kg, specify a requirement for the battery of an aeroplane to supply essential equipment for not less than 30 minutes following the total failure of generated electrical power. Aeroplanes with electrical systems which have a limited standby power capacity of only 30 minutes are exposed to unnecessary risk if they are operated on extended over-water sectors or on routes which take them a considerable distance from a diversion aerodrome. This is important for twin piston and turbo-prop aeroplanes in all performance groups who may wish to fly further than 30 minutes from a diversion aerodrome and has particular relevance to those operating over North Sea routes and those who may on occasion dispatch an aeroplane with an allowable deficiency in the electrical system.
- 10.2 The route of a twin-engined Performance Group C and E aeroplane should normally be planned to keep the aeroplane within a reasonable range of the diversion airfield and certainly not beyond the range of VHF equipment from a ground station (approximately 150 nautical miles at 10,000 ft). If the MEL allows dispatch with one generator/alternator unserviceable, in addition to the standard constraints of maintaining VMC and operating only in daylight, aeroplanes should route to be not more than 30 minutes' flying time from a suitable aerodrome. It is the responsibility of the commander to satisfy himself, before the flight departs, that these conditions can be satisfied and if subsequently the flight cannot be continued in daylight VMC, a change of route or diversion to a suitable alternative aerodrome must be initiated.
- 10.3 All pilots of twin-engined aeroplanes should fully acquaint themselves with the drills to be carried out in the event of an alternator/generator failure and the procedures for shedding or reducing the load on the battery. Pilots must have a realistic view of the length of time available with battery-powered equipment following total generator/

alternator failure. After completing the drills to cope with a complete generator failure, the priority for the commander is to gain visual flying conditions, taking due regard to the MFA, and to establish the aeroplane on track to the nearest suitable diversion aerodrome.

## 11 Flight Deck Interphone Aural Alert Suppression System

11.1 Some aircraft types have communication systems that, for a short time during the take-off phase of flight (and for some aircraft during the landing phase of flight), suppress the interphone aural alert on the flight deck. At such times the interphone system is still active and a visual indicator activates on the flight deck. Cabin crew have had difficulty alerting the flight deck crew of a problem in the cabin during the take-off phase of flight. Whilst the cabin crew were aware of the flight deck interphone aural alert suppression system, the actual problems of communication at this phase of flight may not have been adequately addressed in procedures and in associated training. If such systems are installed on aircraft then adequate procedures should be included in the Operations Manual together with associated flight deck and cabin crew training. Procedures and training should be established to ensure that flight crew and cabin crew are aware of how long the flight deck interphone aural alert system is inhibited, together with when and how to communicate once the aural alert is reactivated.

## 12 Loose Articles in the Cockpit and Migrating from Cabin Areas

12.1 Crew members should be aware of the potential hazards of unsecured items carried by hand or in the pockets of crew on the flight deck. This is particularly relevant in aircraft where items can pass from the cockpit floor level into underfloor areas which may house flight control components and in aircraft where a migrating object can foul a flight control and be incapable of recovery by the pilot or a crew member. An incident has been recorded of a pilot's unsecured mobile phone migrating forward to a position where it jammed the rudder pedal controls under the cockpit floor area. The pilot could not retrieve it.

## 13 Redistribution of Passenger or Freight Load Whilst Airborne

13.1 When an incident occurs whilst airborne that requires the redistribution of passengers or an item of freight to ensure the safety and health of an aircraft's crew and passengers (e.g. hazardous fumes, smoke or leakage of dangerous chemicals), it is possible that the redistribution of the mass could affect the position of the aircraft's C of G position to such an extent that it no longer remains within the allowable limits for safe operation of the aircraft.

13.2 When such an event occurs, both flight and cabin crews should consider the effect of any significant redistribution. The cabin crew should ensure that the flight crew are informed of action taken to relocate passengers or items of freight away from a potential hazard. In turn, the flight crew should calculate the likely effect of any redistribution on the C of G and advise the cabin crew accordingly. Dependent on the hazard, a further redistribution may be required to ensure the aircraft's C of G remains within the allowable limits for safe operation.

13.3 Operators should ensure that, if appropriate to the type of operation and aircraft in their fleet, their Operations Manuals contain guidance to flight and cabin crews regarding the effect on the aircraft's C of G position in the event of redistribution of

passenger or freight load whilst airborne. In addition, operators should ensure that the training of flight and cabin crew members includes an awareness of the effect of potential problems on the flight characteristics, due to movement of the aircraft's C of G position, caused by a significant redistribution of passenger or freight loads. Training should include the necessity for cabin crews to ensure that the flight crews are informed of any redistribution and that approval is sought for the final redistribution.

## 14 Child Restraint Devices

- 14.1 The AmSafe Child Restraint System, which the FAA has approved, uses an additional belt and shoulder harness that encircles the seat back and attaches to the passenger lap belt, providing improved upper torso restraint. The FAA have approved the AmSafe Child Restraint System for use in aircraft by children who weigh between 10 and 20 kg (22 and 44 lb) and whose height is 1 m (40 in.) or less, and who are capable of sitting upright unaided (see [www.kidsflysafe.com](http://www.kidsflysafe.com)).
- 14.2 EASA has reviewed this restraint system with the manufacturer and has deemed that this is an acceptable child restraint device in accordance with EU-OPS 1.730 and Temporary Guidance Leaflet (TGL) 44 ACJ 1.730. In addition, the CAA has reviewed the restraint system and has trialled its use on several different aircraft types and seats. The CAA considers that this child restraint device is acceptable for use on aircraft operated by holders of a UK AOC.
- 14.3 Prior to allowing passengers to use this restraint system on board an aircraft, the operator should ensure that consideration is given to the following:
  - a) An assessment of the aircraft seats to establish which are suitable for use with this restraint system; this should include the limitations imposed by the manufacturer.
  - b) Appropriate seating positions particularly with regard to emergency exit rows.
  - c) Training for check-in personnel as to the acceptability of the device with regard to height and mass limitations and seating restrictions within the cabin.
  - d) Training for cabin crew including acceptability, installation and acceptable seating locations.
- 14.4 Operators who wish to permit the AmSafe Child Restraint System to be used on board their aircraft should submit to their assigned FOI an appropriate NPA to their Operations Manual and Training Manual to include information and training for their personnel, procedures for its use and any associated seating restrictions.

## Chapter 12 Flight Procedures

### 1 Checklists

- 1.1 The drills and checks for normal, abnormal and emergency conditions must be listed in the Operations Manual, preferably in a separate volume. Checklists of emergency equipment and instructions on its use must also be provided.
- 1.2 Operators should base their normal, abnormal and emergency checklists on the recommendations of the manufacturer, provided that there is no conflict with the UK AFM. There are variations in philosophy between manufacturers, with some giving detailed checklists and others assuming that 'airmanship' can be relied on to ensure that appropriate actions are taken. Operators should therefore ensure that their Operations Manuals refer to, and their flight crews have been trained in, the philosophy behind the use of the checklists. The design (content, order, layout and format) and publication (physical construction and print characteristics) of abnormal and emergency checklists should reflect the general principles described in *CAP 676 Guidelines for the Design and Presentation of Emergency and Abnormal Checklists* and in *CAP 708 Guidance on the Design, Presentation and Use of Electronic Checklists*.
- 1.3 The CAA is willing to consider checklist changes requested by any operators who feel that a manufacturer's particular drill or procedure is inadequate for their own needs. However, perceived shortcomings in a manufacturer's checklist might indicate in fact that an operator's crews were not being trained and regularly practised in flight deck management, or that lessons to be learnt from previous incidents were not being passed on by the company flight safety officer.
- 1.4 The normal drills must require the aircraft commander to brief other flight crew members on the following:
  - a) Prior to take-off:
    - i) the actions to be taken if an emergency occurs during or immediately after take-off;
    - ii) special techniques for take-off in crosswinds and on wet or otherwise contaminated runways;
    - iii) noise abatement procedures;
    - iv) selection of radio aids;
    - v) selection and checking of reduced thrust for take-off, when permitted; and
    - vi) use of automatics.
  - b) Prior to landing:
    - i) selection of radio aids;
    - ii) missed approach procedures;
    - iii) any special techniques or system configurations for landing; and
    - iv) selected alternate for diversion.

**NOTE:** It is not necessary to include these items in checklists if suitable instructions are provided elsewhere. The word 'briefing' is sufficient at the appropriate points in the lists.

- 1.5 Checklists must include detailed requirements for the setting and cross-checking of altimeters for all phases of flight. An item in the normal drills must require the MFA to be checked before descending from cruising level.
- 1.6 Drills are to be provided in flight crew members' checklists to cover all emergency situations relevant to the aircraft type.
- 1.7 Separate checklists or drill cards must be provided for each flight crew member, including the flight engineer, if appropriate. In 'single pilot' aircraft, checklists can be supplemented by placarding vital actions for final approach and landing. Emergency drills must be readily identifiable, and on larger aircraft presented on a separate set of cards.
- 1.8 Details of cabin crews' ditching, crash landing and emergency evacuation drills should be readily available. This is achieved either by issuing to each cabin crew member a copy of their emergency drills - which they should be required to carry with them - or stowing the drill cards at appropriate positions in the cabin. All checklists or drill cards must be of a quality sufficient to withstand heavy wear and remain usable.
- 1.9 On multi-crew aircraft, instructions must be given that checklists are always to be used. On single pilot aircraft the operator may allow in-flight drills to be carried out from memory, but must ensure that a checklist is readily available to the pilot. Memorised drills must be carried out strictly in accordance with the checklist and memory items of emergency drills must be verified as soon as possible by reference to the checklist.
- 1.10 Operators should ensure that pre-flight inspections reflect accurately what has been published in the approved maintenance schedule and that - to the extent possible - they are completed only when the commander is satisfied that activities on and around the aircraft have ended.

## 2 Radio Procedures

- 2.1 A simple instruction requiring a continuous watch on operational frequencies, if not equipped with SELCAL, will normally suffice. However, concern has been voiced by ATCOs about pilots apparently leaving the en-route frequency unguarded whilst listening to a clearance being received on a different frequency or radio set. When obtaining ATC clearance, at least two flight crew members should listen to what is being received provided this will not interfere with other tasks. When no third flight crew member is present, the pilot who is working the en-route frequency must not stop listening out on that frequency when asked to listen also to the radio on which (e.g. Oceanic) clearance is being received. The only occasion on which the listening watch may be discontinued is by first asking for and receiving permission from the en-route controller, as may be needed in the event that one radio becomes unserviceable.
- 2.2 Operators should instruct flight crew to include the full call-sign when reading back instructions from ATCOs. Failure to do so can mean that the controller will be unable to confirm that the instruction has been heard correctly by the aircraft for which it was intended. If the wrong aircraft responds, at worst there is a risk that confusion will result, jeopardising safety. At best, the controller has to challenge the omission, adding time to the exchange which, in busy airspace, is highly undesirable. The only exception will be when the controller has made clear that an abbreviated form will suffice.
- 2.3 Operators should establish procedures to monitor and improve standards of RTF so that risks of runway incursions, level busts and other operational transgressions are

minimised. The supplement to CAP 413 may be used to increase awareness of correct procedures. Training programmes should include RTF procedures. Type Rating Instructors (TRIs) and TREs may find Appendix E of *CAP 493 Manual of Air Traffic Services, Part 1* useful as a source of standard ATCO phraseology.

2.4 The instruction 'maintain' in some airspace outside the UK can mean 'climb/descend/adjust to a new altitude/flight level and then maintain that new altitude/flight level'. Crews who are more familiar with parlance used in US airspace may misunderstand the meaning of the instruction. Equally, crews based in the UK and unfamiliar with operations in the USA may misunderstand the instruction. Operators have a responsibility to ensure that their flight crews have been trained to understand and to comply with the most commonly-encountered differences in phraseology and procedures used by ATC that are likely to be encountered when operating in airspace contained within all the areas of operation approved for use in their AOC.

2.5 Aircraft wishing to fly within Class D airspace require a clearance from ATC prior to entering the airspace. Traffic operating under IFR or Special Visual Flight Rules (SVFR) that then receives a Radar Control service from ATC whilst within the airspace will be separated from other IFR or SVFR traffic. Traffic information on pertinent VFR flights will also be provided, and traffic avoidance advice given upon request. Traffic information about other flights in the vicinity will also be provided to VFR traffic in order to provide the VFR aircraft with sufficient information to see and avoid all other traffic. It should be noted that aircraft operating under VFR would be receiving an ATC service, but not normally a radar control service.

### 3 Loss of Communication

3.1 Over the last few years, there have been a small but worrying number of reports about a loss of communication between ATC and aircraft. In some cases the cause of the loss of communication was ascribed to something called a 'sleeping receiver'. The problem came to light in 1998 and was thought to be an isolated and rare problem, peculiar to UK airspace and to certain UK fleets. Some cases of loss of communication resulted in additional problems, including Airprox.

3.2 From the summer of 2001, the rate of reported loss of communications began to increase and this rate now appears to be constant, although this is difficult to judge. Additionally, it started to become apparent that the geographical extent of these incidents was not confined to UK airspace and involved other areas. Furthermore, the events of 11 September 2001 have now meant that losses of communication can no longer be assumed to be just equipment failure, and one or two cases of communications failure have resulted in civilian aircraft being intercepted. Technical investigations continue into the problem, and have now been boosted by international concern and activity. The cause or causes have not yet been determined and possible candidates include interference sources from within and without the aircraft in various spectrum bands, e.g. from mobile phones, paging systems, current receiver design, receiver software, and so on. It should be noted that losses of communication have also been ascribed to sleeping receivers and are also known in ATC circles as "PLOC" (prolonged loss of communication).

3.3 All operators should give this loss of communication issue wide publicity within their respective organisations, and should share the information with colleagues in the industry. This publicity should not be confined just to flight crew, but should include engineers (particularly avionics engineers) and cabin crew. It should also include the fact that as no cause, or combination of causes, has yet been confirmed as the reason

for a loss of communication, all information relating to the state of the aircraft at the time of such a loss of communication is very relevant.

3.4 All instances of loss of communication, however caused, should be reported by the flight crew to the operator and thence to Safety Regulation Group (SRG) using the MOR scheme.

## 4 Use and Checking of Altimeters

4.1 Operators must have a clear policy on altimeter setting procedures, particularly their use of QFE and QNH; this policy must be clearly described in Operations Manuals to cover all phases of flight.

4.2 This policy must incorporate:

- a) pre-flight serviceability checks; and
- b) flight crew altimeter procedures, including:
  - i) the setting to be used for each phase of flight;
  - ii) the correct challenge and response for altimeter cross-checks, particularly during climb, descent and approach and when nearing an assigned altitude/level;
  - iii) alternative settings and procedures, if appropriate, for use when QFE (if required) is either not available or cannot be used, e.g. at high altitude aerodromes;
  - iv) the manner of checking and use of any radio altimeter(s);
  - v) special precautions to be taken if an altimeter is suspect or becomes unserviceable in flight;
  - vi) confirmation that, unless special conditions exist, the prescribed setting procedure will be used irrespective of which seat the handling pilot occupies on take-off;
  - vii) the annotation of checklists with the actual setting to be used, e.g. QNH/QFE; phrases such as 'altimeters set' should not be used;
  - viii) the correct report of altitude/level changes to ATC; such reports should not be made before reaching or leaving a particular altitude/level. Reports of reaching a level must not be made until the aircraft's altimeter indicates the cleared level; reports of leaving a level must not be made until the altimeter indicates that the aircraft has actually departed that level and is maintaining a positive rate of climb or descent;
  - ix) provision for one altimeter to be set to the appropriate QNH, when flying at or near to the MFA; this has particular relevance to single-pilot unpressurised aircraft;
  - x) a check of aerodrome elevation during the approach phase; this is to be cross-checked to establish the difference between QFE and QNH, when QFE is used for landing;
  - xi) the procedure for indicating decision heights for landing, e.g. a figure in the navigation log, altimeter 'bugs' and/or landing data cards;
  - xii) the requirement for crews to inform ATC prior to the commencement of a radar approach procedure if it is intended to use QNH settings throughout; and

| xiii) the calls to be made by monitoring pilots during instrument approaches, e.g. at the outer marker, 100 ft above DH / Decision Altitude (DA), etc. The calls and responses required for approaches in Category II or III weather minima conditions will need to be specified in greater detail.

4.3 Ineffective altimeter drills coupled with inattention, misunderstanding and distraction account for many of the altitude violations that have been recorded. In essence, there seem to be three areas where robust procedures are essential to help crews minimise the risk of violating cleared altitudes and flight levels. These are:

- procedures for ensuring that the setting of altimeter subscales is timely and correct;
- procedures for ensuring that ATC clearances are acted upon correctly; and
- procedures for ensuring, when an aircraft is climbing or descending, that it does not pass through the height, altitude or flight level to which it has been cleared.

4.4 Comprehensive guidance on drills associated with altimeters (subscale settings and changes, receipt of ATC clearances and actions to be taken, and monitoring progress in a climb or descent) is given below. In the examples shown, the text is not intended to be prescriptive: rather it is a means of demonstrating a solution to each aspect that deserves attention. All these procedures must be clearly described in the Operations Manual, and instructors and examiners tasked with ensuring that they are applied correctly during recurrent training as well as on every flight.

## 5 Examples of Expanded Altimeter Drills

### 5.1 Altimeter Subscale Settings and Changes

5.1.1 Before departure, the flight crew should obtain the pressure settings they require, and these should be set on the altimeter subscales. One pilot (e.g. PF) should be designated to initiate a comparison of the subscale settings on all altimeters and what height or altitude these instruments indicate. The other flight crew member(s) should be required to monitor all that is said and the indications that are seen, and then to respond appropriately (e.g. "Confirmed").

5.1.2 After take-off, if any altimeter(s) have to be changed from QFE to QNH, a designated pilot (e.g. PF) should command the change saying "Set QNH", prompting a reply from the other pilot (i.e. PM), e.g. "One zero two four set, passing one thousand for altitude four thousand".

5.1.3 When cleared to climb above transition altitude, a designated pilot (e.g. PF) should immediately command a change to the main altimeter subscale settings saying "Set Standard", prompting a reply from the other pilot (i.e. PM) "Standard set, passing flight level three two for flight level eight zero". (This might be repeated by the Flight Engineer/Systems Panel Operator (FE/SPO).) PF should confirm this, e.g. "Three two, cleared eight zero". (Modified procedures may have to be specified for flights that take place in airspace that has a relatively high transition altitude, e.g. in the USA.)

5.1.4 Any change made to a standby or other altimeter subscale setting should be announced by a designated pilot (e.g. PF) when it takes place, e.g. "Standby to Standard". Sometimes, this can be in response to another call or prompt, such as "Passing MFA". In other circumstances, the standby altimeter subscale setting may be set to the lowest forecast QNH for the sector in which the aircraft will be flying, in which case this change should similarly be announced.

- 5.1.5 Before descent, the appropriate QNH should be obtained. Preferably, the standby altimeter should have its subscale set to this QNH before the descent begins or on passing a specified flight level. This change should be announced when it takes place.
- 5.1.6 When cleared to descend below the transition level, a designated pilot (e.g. PF) should command a change to the main altimeter subscale settings saying "Set QNH", prompting a reply from the other pilot (i.e. PM), e.g. "One zero two four set, passing eight thousand for altitude four thousand". (This might be repeated by the FE/SPO.) PF should confirm this, e.g. "Passing eight, cleared four thousand".
- 5.1.7 When required to set QFE, a designated pilot (e.g. PF) should command the change saying "Set QFE". One pilot (e.g. PM) then changes his altimeter subscale setting to QFE and checks that the difference indicated between the altitude his instrument now displays and any other altimeter still set on QNH is close to the elevation published for the airfield to which the approach is being made. He should then announce this, e.g. "One zero one eight set, difference minus two hundred feet". PF, who will have specified in his pre-descent briefing what the airfield elevation is, could reply "Two hundred is correct, setting one zero one eight, passing two thousand three hundred". PM confirms that his altimeter also reads two thousand three hundred at that point, saying "Two thousand three hundred". If the FE/SPO is required to change his altimeter to QFE, he does so when PF (in this example) announces that the QFE value is correct saying "Two thousand three hundred".
- 5.1.8 In the event of a go-around, the procedure above should be used by flight crews who use QFE for the final approach and landing.

**NOTE:** In the paragraphs above, PF has not said what the altimeter subscale setting is when commanding that changes be made. He expects the other flight crew member(s) to know what it is and to set it accordingly: hence when each reads out what they have set, if anyone has set something different, the error should become apparent.

## 5.2 Receipt of ATC Clearances and Actions to be taken

- 5.2.1 Whenever possible, ATC clearances should be requested when at least two flight crew members can listen to what is being transmitted. The person designated to request and to read back the clearance (e.g. PM) should also be tasked with writing it down, and the other flight crew members should do so too if this will not interfere with other tasks. If necessary, PM should ask ATC to "Wait" if by doing so he can involve one other flight crew member, as may be the case when the clearance is being transmitted on a frequency other than that currently being used by the ATC unit controlling the aircraft in flight.
- 5.2.2 Upon receiving the clearance, a designated pilot (e.g. PF when the aircraft is stationary or when the autopilot is engaged, PM on all other occasions) should adjust the altitude shown in the altitude select window on the flight control panel (or equivalent) to the new setting. The pilot (and FE/SPO, if carried) who did not make this adjustment then reads out what he sees. Preferably, where the setting is also displayed elsewhere (on the electronic attitude display indicator, for example), reflecting what the flight management system considers has been set, the pilot making the response will read what is displayed remotely. To this should be added confirmation that any altitude capture facility has been armed.

**NOTE:** Adjusting the altitude setting in the altitude select window on the flight control panel and initiating a climb or descent can be separate actions. It is therefore important to confirm – where an altitude capture facility exists – that it has been armed for the new altitude or flight level when the climb or descent commences.

## 6 Level Bust Prevention – Best Practice

- 6.1 A Level Bust is defined as 'a deviation of 300 ft or more from an assigned level'. A late re-clearance is not a level bust; this occurs when an aircraft is cleared to a new flight level close to the flight level that the aircraft is passing at the time of the new clearance, and which is issued too late for the aircraft to stop its climb or descent without passing through the newly assigned level. In this case, the ATCO issuing the late re-clearance has anticipated the overshoot.
- 6.2 The points of best practice listed are not exhaustive, but are intended as a foundation for operators to address the level bust issue with their pilots through Flight Crew Training and SOPs. Most level busts occur below FL100 in busy terminal airspace and this area needs most attention in terms of RTF discipline and the development of, and adherence to, SOPs. Each operator should make the Head of Training responsible for incorporating these items into refresher training and for raising the profile of level busts within company operations. Flight crew training should include altimeter setting procedures and their importance in relation to Level Bust prevention. SOPs should be clear on altimeter setting procedures, particularly regarding the use of QFE and QNH; these procedures should be clearly described in Operations Manuals and should cover all phases of flight.

### 6.3 Receipt of ATC Clearances and Actions to be Taken

- 6.3.1 Flight crew training should emphasise the necessity, whenever possible, of having both pilots listening on the radio in use when an ATC clearance is being received and writing down the clearance. Training should also cover the procedure for setting and cross-checking the clearance in the altitude select window and an increased awareness of autopilot level-change modes. Training in facilitation techniques can be utilised in the pre-flight brief to confirm a pilot's understanding of the departure clearance.
- 6.3.2 SOPs should require that, whenever possible, ATC clearances should only be requested when at least two flight crew members are available to listen to what is being transmitted. The person designated to request and read back the clearance (preferably the PM) should also be tasked with writing it down. Other flight crew members should also write down the clearance, provided that this does not interfere with other tasks. If necessary, the pilot should ask ATC to delay transmitting the clearance ("Standby") if he can involve another flight crew member who may be off frequency at that particular moment.
- 6.3.3 SOPs should also include the procedure for setting and cross-checking a cleared altitude/level. For example, upon receiving the clearance, a designated pilot (PF when the autopilot is engaged and PM on all other occasions) should adjust the altitude shown in the altitude select window on the flight control panel (or equivalent) to the new setting. Whichever pilot did not make the adjustment reads out what is displayed. When the altitude setting is also displayed elsewhere (on the electronic attitude display indicator, for example), which reflects what the flight management system considers has been set, the pilot making the response should also read what is displayed remotely. Furthermore, a check should be made of the appropriateness of the selected autopilot level change mode.
- 6.3.4 Adjusting the altitude setting in the altitude select window on the flight control panel, and initiating a climb or descent, should be considered as separate actions. This permits an assessment of the amount of altitude change required and highlights the risk of an autopilot and/or an aircraft high-performance induced level bust.

## 6.4 Monitoring Progress in a Climb or Descent

6.4.1 Flight crew training should emphasise that whenever an aircraft is climbing or descending, the PF should carefully monitor its progress. In particular, the PF should monitor the rate of climb or descent within 1,000 ft of the cleared altitude/level to ensure that it is not flown (or that it does not fly - if an autopilot is engaged) through the cleared altitude or flight level. Consideration should be given to reviewing the chosen vertical speed in the last 1,000 ft and limiting performance to a maximum of 1,500 ft per minute and preferably 1,000 ft per minute, with the aim of increasing awareness of the target level and aircraft performance. All unnecessary distractions should be avoided, particularly during the last 1,000 ft prior to capturing the selected altitude/flight level. Adherence to this procedure will also ensure that unnecessary ACAS II Resolution Advisories (RAs) are not generated (see paragraph 24 below).

6.4.2 Operators' SOPs should require that progress be monitored by means of calls initiated by the PF, preferably by means of a challenge, such as "Altimeters". The response to this might be "Passing flight level one hundred for two two zero, Standard set", or "One to go". If the PF does not make the challenge, the PM should be tasked with making it at some specified point thereafter, e.g. 200 ft later - but not earlier than this, otherwise any benefit of the 'challenge/response' system will be lost. In most aircraft, this 'safeguard' should occur before the altitude alert system activates. In aircraft where there is no automatic alert, when approaching a selected altitude or flight level, the discipline described above is particularly important. In aircraft where the altitude alert activates at exactly 1,000 ft before the selected altitude, consideration should be given to inserting a call at another useful time, for example "Five hundred to go". (The aim throughout this exercise is to promote a coherent crew discipline which functions independently of any automatic device.)

6.4.3 SOPs should also include the calling of Flight Mode Annunciator (FMA) changes related to altitude/level changes that are unexpected or incompatible with the phase of flight. The call should be made preferably by the PM, or by the PF in the case of the PM failing to call. In aircraft where visual and tactile cues are sparse (e.g. no feedback movement of side stick and thrust levers) this is of high importance. However, the calling of every change of FMA may lead to distraction at times of high workload and/or busy radio traffic.

## 6.5 RTF Training

Flight crew training should include an assessment of RTF standards during OPC training and annual line checks. The TRE should debrief flight crews on the standard of RTF phraseology with respect to balancing the theoretical requirements of *CAP 413 Radiotelephony Manual* and the practical aspects of the operator's typical RTF environment; for example, operating in a congested RTF environment and RTF techniques which lend themselves to modern commercial operations. SOPs should include standards of radio procedures required by the operator.

## 6.6 RTF Discipline

Flight crew training should include an assessment of RTF discipline during OPC training and annual line checks. SOPs should implement a strict 'no unnecessary calls' procedure. All non-essential calls should not be permitted below FL100. This should ensure that there is maximum effect in the constant monitoring by both pilots in the area of most level busts.

## 6.7 CRM and SOPs

Flight crew training for level bust awareness should be included in the theoretical knowledge instruction component of Multi-Crew Co-operation (MCC) and CRM training. Particular emphasis should be placed on the importance of adherence to SOPs in busy ATC environments when there is pressure to short-cut them. Adherence to robust SOPs is an effective method of preventing level busts.

## 6.8 Understanding and Interpreting Charts Used by Flight Crews

Some level busts have been traced to the misinterpretation of flight profiles - typically SID and STAR procedures - published in charts provided by commercial organisations. Flight crew training should include in-depth familiarisation for crews with the presentation of contents and layout of charts used by the operator. This would ensure that the layout of check altitudes, tracks etc. would become 'second nature' to pilots. Operators should liaise with chart providers to standardise and clarify departure, arrival and approach charts in respect of the display of stop heights and cleared levels. Such charts, although published by external organisations, form part of the operators' Operations Manuals and responsibility lies jointly with both providers and operators. SOPs should include the use of charts in briefing, and in preparing and flying approaches and departures.

## 6.9 Understanding ATC Instructions

Flight crew training should include the most commonly encountered phraseology and procedures (particularly if they are not found in CAP 413) used by ATC within all the areas of operation approved for use in the operator's AOC. This should include reference to any colloquial phraseology encountered on their route network. Flight crew should be trained so that if there is ever any doubt about the meaning of an ATC clearance or instruction they should seek clarification from ATC. However, pilots should be taught that this does not mean responding with a quizzical tone, but explicitly questioning the clearance. SOPs should cover occasions when ambiguity or uncertainty may occur over the precise meaning of an ATC clearance, including conditional clearances or clearances that do not appear to completely supersede a previous clearance or instruction. It is also possible to be confused over similar call signs or simultaneous transmissions. The important thing is that whenever there is any doubt clarification must be sought from ATC. If pilots are aware of similar call signs they should point this out to ATC and remain extra vigilant with their RTF. Similarly, ATC should be informed if a pilot hears a blocked or simultaneous transmission.

# 7 Navigation Procedures

## 7.1 Use of the Global Positioning System (GPS) for North Atlantic Operations (Including Minimum Navigation Performance Specification (MNPS) Operations)

7.1.1 The following sets out the airworthiness criteria and operational requirements associated with the use of GPS by UK registered aircraft engaged in PT operations in the airspace over the North Atlantic Ocean. For North Atlantic operations, systems described as Long Range Navigation Systems (LRNS) are required. An LRNS capability has traditionally been provided by inertial systems. GPS based navigation systems have been accepted as an alternative to these systems subject to the requirements listed below.

### 7.1.2 **Airworthiness Approval**

A GPS based navigation system installation for North Atlantic operations shall comply with the following performance and installation standards:

If any of the required LRNS are to be GPS, they shall be approved in accordance with *FAA Notice 8110.60 GPS as a Primary Means of Navigation for Oceanic/Remote Operations* or equivalent JAA or national documentation.

FAA Notice 8110.60 provides interim guidance for the installation of GPS equipment to be used for oceanic/remote operations. The notice gives requirements for a GPS based navigation installation with the capability to automatically detect and exclude a failed GPS satellite by means of Receiver Autonomous Integrity Monitoring (RAIM) and Fault Detection and Exclusion (FDE) algorithms. The notice provides specific requirements to detect and exclude satellites which exhibit large step changes in pseudorange, and to continuously monitor that portion of the satellite data which contains information on its health. A prediction program is required, to determine whether the GPS satellite coverage is adequate for navigation with RAIM for the route and time of the intended flight. Operational departure restrictions relating to this requirement are also defined.

### 7.1.3 **Operational Approval**

In order to receive operational approval for the use of GPS for these operations, an operator will have to show that the equipment has been approved to the above standards. For MNPS operations, where formal Approvals are required, the operator's Operations Manual will have to include the procedures below. Scrutiny of this Operations Manual is part of the normal State approval process. For North Atlantic Operations, other than MNPS, where formal Approvals are not required, an operator is recommended to include the procedures in his Operations Manual.

## 7.2 **Oceanic Pre-Flight Procedures**

7.2.1 Before departure, the approved navigation availability and integrity prediction program shall be executed. Relevant GPS satellite outages notified by NOTAM shall be accounted for in the program. The specified route should be entered into the program as a series of intended waypoints from departure point to destination including planned alternates. The prediction program should be run a number of times to determine the results for a range of expected groundspeeds and for any potential variances in departure times. The program should be executed as close to the intended departure time as possible, so that the most up-to-date NOTAM information is used. If the prediction shows that a loss of GPS navigation availability will occur (i.e. fewer than four visible satellites for any amount of time) on the planned route, the flight should be cancelled, delayed, or re-routed in such a manner that no such outages can be predicted by the program.

7.2.2 If the program predicts a loss of satellite fault detection and exclusion capability (i.e. fewer than six visible satellites) on the planned route, the flight may only commence if the continuous duration of this loss of capability is less than the time taken to exit any protected airspace (one half the lateral separation minimum). The time taken to exit the protected airspace is derived by assuming a cross-track navigation error growth rate (applicable to all Oceanic airspace) of 35 NM per hour. For MNPS airspace this continuous duration limit is 51 minutes. If the prediction shows that a loss of satellite fault detection and exclusion capability in excess of the allowed continuous duration (see above) will occur on the planned route, the flight should be cancelled, delayed, or re-routed in such a manner that no such outages can be predicted by the program.

### 7.3 Oceanic In-Flight Procedures

7.3.1 A regular independent cross-check of GPS position against a dead reckoning (DR) plot should be maintained. This plot is in addition to any normal cross-check requirements. The absolute maximum time between position checks is half an hour and at this time the current wind velocity should be logged and compared against flight plan values. This continuing plot should be started when the aircraft is within the range of approved terrestrial aids (VOR/DME) in order to calibrate the initial position against an absolute source. Within every half an hour, 10° of longitude or at the next way-point, whichever is sooner, the GPS position needs to be cross-checked against the DR derived position and any other non-GPS navigation information if available. If the GPS position and the DR position are within 10 NM, this verified GPS position can be used to restart the DR plot and navigation by GPS can be maintained until the next cross-check point. If the difference is greater than 10 NM the GPS navigation system shall be regarded as unserviceable and the procedures for its failure must be followed.

7.3.2 If the GPS equipment shows a loss of navigation function alert or any other complete failure alert, reversion should be made to DR procedures and the degraded navigation function reported to the ATC authorities at the earliest possible opportunity and the standard contingency procedures for the airspace executed.

7.3.3 If the GPS equipment shows a loss of RAIM function alert, the GPS position should be checked by extrapolating from the last verified position with true airspeed, heading and wind velocity. Provided the positions agree within 10 NM, no action needs to be taken. If the positions differ by more than 10 NM the action referred to above should be taken.

7.3.4 If the GPS equipment shows a fault detection alert, meaning that a satellite has been declared faulty and eliminated from the solution, the GPS may continue to be used for navigation provided the estimate of position uncertainty displayed on the GPS from the FDE algorithm is 10 NM or less. If this value exceeds 10 NM or is not available, the action referred to above should be taken.

7.3.5 The crew should be vigilant in monitoring the GPS receiver for any other performance deficiencies that might occur such as position jumps, display freezes or unanticipated resets. Such deficiencies may indicate that the position does not comply with the navigation accuracy requirements of the airspace, and therefore the crew must be prepared to declare loss of the means of navigation as above.

### 7.4 Post-Flight Procedures

A full and comprehensive technical debrief will need to be carried out if the GPS equipment appeared to malfunction in any way during the flight, and this should include information as to which other electric or electronic devices were in use at the time of the malfunction, whether they are part of the normal aircraft fit or not.

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#### *Requirement*

### 7.5 Navigation Performance

7.5.1 Aircraft have previously been required to comply with the Required Navigation Performance (RNP) Type for operation in the airspace concerned. During late 2008, terminology was changed and the term Performance Based Navigation (PBN) came into use in place of RNP. Therefore, for operations where a navigation specification for PBN has been prescribed, an aircraft shall be:

- provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specification(s); and
- authorised by the State of the Operator for such operations.

**NOTE:** Information on PBN, and guidance concerning the implementation and operational approval process, are contained in ICAO *Doc 9613 Performance-based Navigation (PBN) Manual*. This document also contains a comprehensive list of references to other documents produced by States and international bodies concerning navigation systems.

Requirement End

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## 8 Reduced Vertical Separation Minimum (RVSM) Airspace Flight Procedures

- 8.1 Ongoing monitoring of the height-keeping performance of aircraft in RVSM airspace had revealed the phenomenon of Altimeter System Error (ASE) drift. ASE was the difference between Actual Pressure Altitude and the Displayed Altitude and could comprise a number of factors. ASE was not unexpected; however, height monitoring by Height Monitoring Units (HMUs) had revealed that, for both individual aircraft and fleets of the same aircraft type, the ASE was drifting with time. In general, the ASE drift was negative; over time, most aircraft were flying gradually lower in relation to their displayed altitude. Intensive analysis of the probable cause of this ASE drift was ongoing. Likely causes included changes with time in the performance of the Air Data Computer and erosion of pitot static probes. The investigation into ASE had also reinforced the fact that poor operational practices by flight crews could lead to greater ASEs or make the interpretation of the height monitoring data difficult. All RVSM approved operators should be aware of the importance of correct operating procedures with respect to both speed limitations and autopilot/transponder operation.
- 8.2 RVSM operating manuals were expected to follow the guidance given in JAA *Administrative and Guidance Material, Section 1, General, Part 3, Temporary Guidance Leaflet No. 6 Appendix 4 Guidance Material on the Approval of Aircraft and Operators for Flight in Airspace above Flight Level 290 where 300 m (1,000 ft) Vertical Separation Minimum is Applied*, with respect to in-flight procedures. Two of the procedures required renewed emphasis as detailed below.
- 8.3 Flight crews were required to comply with any aircraft operating restrictions given in the RVSM airworthiness approval. In particular, if the approval was based on adherence to speed limits, the flight crew must be aware of those limits and ensure that the aircraft was operated within the cleared speed envelope. Details of any speed limits should be readily available to the flight crew. Operators should be aware that different restrictions could apply to different airframes of the same aircraft type, if the RVSM modification was dissimilar. Information regarding any RVSM operating restrictions would be found in the AFM or in a supplement to the AFM. Failure to operate within the cleared RVSM flight envelope would lead to greater ASEs and would invalidate the RVSM approval.
- 8.4 During normal RVSM operations, the altimetry system being used to control the aircraft should be selected for the input to the altitude reporting transponder, which would be transmitting information to ATC. Therefore, both the active autopilot and the operating transponder should be selected to the same altimetry system (unless there is a systems limitation or functionality makes the requirement unnecessary, and is detailed in the AFM). Operators should publish a SOP to ensure that this practice is carried out. Failure to adhere to the required practice would cause a fault in the process of calculating any ASE by an RVSM HMU which would, in turn, prolong the process of identifying the cause of ASE drift.

## 9 Strategic Lateral Offset Procedure In North Atlantic (NAT) Airspace

9.1 The introduction of very accurate aircraft navigation systems, along with sophisticated flight management systems, has drastically reduced the number of risk-bearing lateral navigation errors reported in NAT airspace. Paradoxically, the propensity of aircraft to navigate to such a high level of accuracy has led to a situation where aircraft on the same track but at different levels are increasingly likely to be in horizontal overlap. The effect is to increase the risk of collision in the event that, for whatever reason, an aircraft departs from its cleared level. Following a successful trial in the West Atlantic Route System (WATRS), it has been determined that by allowing aircraft conducting oceanic flights to fly lateral offsets not exceeding 2 NM right of centre-line, an additional safety margin would be provided. In addition, lateral offsets would mitigate the risk of collision when non-normal events such as operational altitude deviation errors and turbulence-induced altitude deviations occur.

### 9.2 The Strategic Lateral Offset Procedure

9.2.1 The procedure provides for the application of lateral offsets within the following guidelines:

- a) strategic lateral offsets and those executed to avoid wake turbulence are to be made to the **right** of a route or track;
- b) in relation to a route or track, there are three positions that an aircraft may fly: centre-line, 1 NM or 2 NM **right**; and
- c) offsets are not to exceed 2 NM **right** of centre-line.

9.2.2 The intent of this procedure is to reduce risk (increase the safety margin) by distributing aircraft laterally and equally across the three available positions. In this connection, pilots must take account of the following:

- a) aircraft without automatic offset programming capability **must** fly the centre-line;
- b) aircraft capable of being programmed with automatic offsets may fly the centre-line or offset 1 NM or 2 NM right of centre-line to obtain lateral spacing from nearby aircraft;
- c) pilots should use whatever means are available (e.g. TCAS, communications, visual acquisition, TAWS) to determine the best path to fly;
- d) any aircraft overtaking another aircraft is to offset within the confines of this procedure, if capable, so as to create the least amount of wake turbulence for the aircraft being overtaken;
- e) if flying offset for wake turbulence purposes, pilots are also to fly one of the three positions at paragraph 9.2.1 but never offset to the left of centre-line nor offset more than 2 NM right of centre-line;

#### NOTES:

- 1 This procedure replaces the wake turbulence avoidance procedure detailed in Edition 9 of the ICAO NAT MNPS (*Minimum Navigation Performance Specification*) *Airspace Operations Manual*.
- 2 It is recognised that the pilot will use his judgement to determine the action most appropriate to any given situation and has the final authority and responsibility for the safe operation of the aircraft. The air-to-air frequency, 123.45 MHz, may be used to co-ordinate the best wake turbulence offset option.

- f) pilots may apply an offset once outbound from the oceanic entry point but must return to centre-line prior to the oceanic exit point;
- g) aircraft transiting radar-controlled airspace, e.g. Bermuda, are to remain on their established offset positions;
- h) there is no ATC clearance required for this procedure and it is not necessary that ATC be advised; and
- i) position reports are to be based on the current ATC clearance and not the exact co-ordinates of the offset position.

## 10 Polar Navigation

- 10.1 The CAA will not require operators to provide training in polar navigation procedures for crews operating aircraft equipped with three independent laser Inertial Reference/ Navigation Systems (IRS), associated FMS and Alternative Navigation Display Units (ANDU), subject to certain conditions being met. In essence, these conditions will require:
  - three IRS and two FMS to be fully serviceable on dispatch;
  - on entering any Compass Unreliable/Useless (CUU) area, the following to be fully serviceable:
    - two IRS and two FMS; or
    - two IRS, one FMS and the Standby Navigation System; and
  - procedures to exist for exiting the CUU area should only one IRS be fully serviceable while in the CUU area.

## 11 Accurate Time Reference – MNPS Navigation

- 11.1 The use of an accurate time reference is of particular importance wherever the safe separation of aircraft is based on procedural methods using estimates of the time of arrival at reporting points. Before MNPS Approvals are granted or reissued by the CAA, operators will have to demonstrate that suitable procedures regarding time setting are specified in their Operations Manuals. The following points should be addressed:
  - a) **Preparation for Service** Before an aircraft is released to service for a flight where use of an accurate time reference is important, the aircraft master clock(s) should have been checked to ensure that UTC is accurately displayed. The chosen methodology for this operation will differ depending on resources; however, operators will need to satisfy themselves that their system is robust, accurate and easy to use. One simple method would be to have an accurate clock in the operations/briefing/flight dispatch area, which is maintained to UTC and checked/reset daily using any of the recommended sources of UTC for this operation. Thereafter, any person needing accurate time could contact that office either in person or by phone to confirm the time. In aircraft, the Aircraft Communications, Addressing and Reporting System (ACARS) could also be a source of accurate time. However, as some doubt presently exists concerning time checks provided by ACARS, operators should check with their ACARS service provider to ascertain the accuracy of such service before using it to set/reset aircraft clocks.

- b) **Pre-Flight** At briefing, crews should have available to them an accurate source of UTC (as above) to enable them to check and/or reset their own timepieces so that they are in a position to confirm that the aircraft presented to them has had its clock(s) accurately set to UTC. Those sections of Operations Manuals dealing with preparations for flight in the MNPS will need to be checked to ensure they contain entries that specify the requirements for accurate time setting and aircraft clock checking before flight and the method(s) that the operator has in place to ensure that this occurs.
- c) **Practical Application** Whilst it is important that crews are supplied with an accurate source of UTC in order to check and/or confirm that navigation systems are synchronised to UTC, it is recognised that some aircraft system clocks are notoriously difficult to set with absolute accuracy. In order to ease the burden of aircraft clock resetting it is suggested that a difference of up to 20 seconds between UTC and the aircraft display is acceptable.

## 12 Operational Considerations when the Accuracy or Reliability of Navigation Equipment is in Doubt during the Approach Phase

- 12.1 Flight crews should carefully monitor the portrayal of navigational information, especially when flying in areas of limited navigational aids. In the event that the accuracy or reliability of navigation information is in doubt, or if conflicting navigational information is evident, then an immediate go-around should be flown when below sector safety altitude. If a TAWS alert is received then crews are reminded to carry out the correct actions immediately with the required vigour. Operators should endeavour to use aircraft with GPS on routes that involve long sectors over both water and terrain that terminate in remote areas served with few navigation aids. This will ensure that both FMS position update computations and TAWS are provided with a choice of information sources from ground-based and satellite navigation systems.

## 13 Controlled Flight into Terrain (CFIT) Prevention

- 13.1 The risk of aeroplanes flying into the ground, water or a man-made obstacle requires determined preventive action by operators. Operators should develop and publish procedures that will help flight crew to avoid getting into situations in which CFIT becomes a possibility. Guidance as to what should be addressed can be found in UK AICs, in the Flight Safety Foundation's 'CFIT Education and Training Aid', and in its 'Approach and Landing Accident Reduction (ALAR) Toolkit'.
- 13.2 CFIT accident statistics reveal that the risk is greatest when an aircraft is being flown on an instrument approach where there is no ILS glide path signal - typically Localiser-Only, Non-Directional Beacon (NDB), and VOR - the common feature being that pilots may not be able to detect immediately when their aeroplane deviates from the intended glide path. It should be remembered that once an aeroplane equipped with a TAWS that conforms with current specifications has been configured for landing, very little protection against inadvertent proximity to terrain or water will be provided. An associated risk is where the aeroplane is manoeuvring to establish on an extended centre-line and there is no means of knowing accurately where the aeroplane is in relation to adjacent terrain.
- 13.3 Non-precision approach vertical profiles depict where, once the aeroplane has been aligned on the extended centre-line, descent may be started and where the 'go-around' must be commenced if insufficient visual cues are observed to allow the pilot to complete a landing. Many such profiles include obstacle clearance 'steps' that

allow the aeroplane to descend progressively as it nears the airfield, and often they allow the aeroplane to be flown level at not below the Minimum Decision Height (MDH) or Minimum Decision Altitude (MDA). Descent profiles such as these enable pilots to fly as close to terrain or other obstacles as is possible.

13.4 Problems associated with flying level at any point on the final approach are that there must be a change of attitude and power, and that the visual scene then becomes more difficult to observe because the aeroplane structure ahead of the instrument panel intrudes upon the view. Furthermore, the pilot's workload is increased, as he must confirm that the increase in power needed to check the descent is adequate. He must then make suitable adjustments to speed, attitude and trim to ensure that the desired altitude is maintained until such time as more adjustments are needed to continue with the descent. One means by which such workload may be alleviated could be by using such automatic systems as are available (autopilot, auto-throttle) in the manner described in the aeroplane or flight crew operating manual. If these work well and are reliable, it makes sense to use them when approaches are flown in IMC.

13.5 Operators are encouraged to consider the use of a technique that can increase the vertical clearance from terrain or obstacles under the approach flight path, by replacing the 'step' descent with a 'continuous descent profile' commencing from a point not lower than will allow the vertical profile to avoid all 'step' constraints, and ending at an MDH/MDA from which an immediate 'go-around' must be made if continued descent to landing is not possible. This process can be considered only where the approach track will allow a straight-in landing - it will not be suitable where a 'break-cloud' or 'circling' manoeuvre is required.

13.6 The use of 'continuous descent' profiles requires the operator to first survey documentation associated with the approach at each runway where they are intended to be flown and assure himself on the following: that a continuous, stabilised descent (ideally following a nominal 3° glide path) will avoid all terrain and notified obstacles; that the point at which the final approach should commence can be clearly identified; that the crew have a means of ensuring as the aeroplane descends that any deviation from the pseudo glide path will be detected at reasonable intervals. Such information should be made available to crews to avoid the need for them to calculate nominal approach slopes in the aeroplane and that if sufficient visual cues are not acquired, the aeroplane does not descend below the MDH/MDA as the go-around is being initiated. It will be necessary for an allowance for 'sink' to be added to the MDH/MDA, and this will need to be reflected in the specified AOM. Operators should establish procedures, publish these in the Operations Manual, and arrange for training to be carried out before any 'continuous descent non-precision approaches' are authorised.

13.7 Details of flight simulator CFIT scenarios for training in the use of TAWS are given in the 'Training in the Use of Equipment' chapter of this publication.

13.8 The activation envelope for the Mode 2A Alert is such that it is possible to receive a warning at relatively low rates of descent (vertical speed) if the terrain closure rate is high, due to rising ground and/or high forward speed. In airspace where speed restrictions apply, the likelihood of a nuisance warning is remote, but where no restrictions apply, nuisance warnings can occur if high speed is maintained in descent over rising terrain. Operating procedures should ensure that the likelihood of a nuisance warning occurring is minimal. Crews should be reminded of the performance of TAWS and of the necessity to always treat a TAWS alert/warning as genuine and react accordingly.

## 14 Unannounced ILS 'On Course'/'On Glideslope' Failure Indications

14.1 Some older aircraft are fitted with analogue ILS/VOR systems that have limited self-monitoring. In the event of a break between the receiver and the indicator, or an earthing fault, it is possible that an 'on course' or an 'on glideslope' indication can be shown with no failure flags, regardless of aircraft position or flight path. Depending on the information source used, such a failure might affect also the TAWS since glideslope information is used to produce a Mode 5 warning when appropriate. Crews should take particular care when given a straight-in ILS approach that might not involve any deviation of the localiser or glide indicators, thus masking any failure. Operators should ensure that flight crews of affected aircraft are aware of this limitation and should specify that, when both pilots' displays are switched to the same receiver ('both on one' or 'both on two'), ILS procedural calls are made to cross-check the position of the aircraft relative to the approach path by reference to other available aids.

## 15 Simulated Instrument Flight

15.1 Simulated instrument flight and the simulation of emergency situations which might affect the flight characteristics of the aircraft or otherwise degrade safety standards, e.g. by affecting performance, are prohibited on passenger carrying flights.

## 16 Practice Auto-Lands in Good Weather

16.1 Operators should ensure that all flight crews are aware of the ILS interference effects that can occur whilst conducting auto-lands when Low Visibility Procedures (LVPs) are not in force. Included within LVPs is the protection of the ILS critical and sensitive areas from intrusion by aircraft and vehicles. In Category I conditions or better, LVPs will not be in force unless specifically requested. Intrusion of the ILS critical and sensitive areas either by taxiing aircraft or by ground vehicles, or by over-flight of the ILS localiser, may cause interference of the ILS signal. This interference may result in deviations from the desired approach path and may or may not be accompanied by a 'LOC' warning flag appearing briefly. The Operations Manual should contain instructions that when carrying out practice auto-lands in conditions not requiring the introduction of LVPs, flight crew should closely monitor the flight path of their aircraft and be prepared to disconnect the autopilot(s) immediately if excessive disturbances occur near to the ground (see *JAA Administrative and Guidance Material, Section 4, Operations, Part 3, Temporary Guidance Leaflet No. 23 'Use of Autoland System on ILS Category I Facilities and Category II/III Facilities when Low Visibility Procedures (LVP) are not in Force'*).

## 17 Runway Capacity Enhancement Measures in the USA

17.1 The FAA introduced runway capacity enhancing measures at aerodromes in the United States comprising ILS Precision Runway Monitor (ILS/PRM) and Localiser-type Direction Aid Precision Runway Monitor (LDA/PRM) also known as Simultaneous Offset Instrument Approaches (SOIA). The FAA required Part 129 operators to complete certain training prior to conducting these. Following the satisfactory FAA presentation of the PRM risk analysis, the CAA accepted that UK operators may conduct ILS/PRM and LDA/PRM (SOIA) approaches in the USA, on completion of the training requirements.

17.2 ILS/PRM procedures enable simultaneous independent approaches in IMC to be made to parallel or near-parallel runways whose centre-lines are spaced less than 1310 m (4,300 ft) apart and more than 915 m (3,000 ft) apart. LDA/PRM (SOIA) procedures enable staggered approaches to runways spaced between 915 m (3,000 ft) and 230 m (750 ft). LDA/PRM (SOIA) procedures have all the protection of ILS/PRM up to the visual segment; it consists of one straight-in ILS/PRM approach and one aircraft on an offset approach that requires a cloud ceiling, based on the aircraft's threshold speed, that gives a nominal 30 seconds to enable the crew to see and identify the landing runway, see the other traffic ahead making an ILS to the parallel runway and inform ATC prior to reaching the Missed Approach Point (MAP). The crew then position the aircraft visually on to the runway centre-line, maintain visual separation from the preceding aircraft and stabilise by 500 ft above the runway threshold. The trailing (offset approach) aircraft would always be the heavy, for wake separation purposes. Therefore, UK aircraft would be most likely to conduct the offset approach.

17.3 ILS/PRM and LDA/PRM (SOIA) operations benefit from enhanced surveillance radar and dedicated monitoring controllers operating on a discrete frequency. Due to the proximity of the runway centre-lines and the unique 'breakout' manoeuvre instruction, pilot training was required.

17.4 When these procedures are fully implemented, operators flying to airports which were not ILS/PRM and LDA/PRM (SOIA) approved were to contact the FAA Air Traffic Control System Command Centre (ATCSCC), prior to departure, to receive a pre-coordinated arrival time. Operators not able to accept a PRM clearance, who had not called for a pre-coordinated arrival time, could expect delays or be requested to divert to their alternate airports.

#### **17.5 ILS/PRM and LDA/PRM (SOIA) Approval**

17.5.1 Operators should inform the CAA when their crews have complied with the required training outlined in FAA Document HBAT 03-03A, Attachment 2. The CAA requires all ground and flight training to be completed prior to PRM operations, notwithstanding Note 3 of Attachment 2 to the FAA document. The CAA informs the FAA that the operator had met the training requirements for their ILS/PRM and LDA/PRM (SOIA) Part 129 approval. The FAA, upon receipt of notification, issues an approval and the Part 129 approval amended accordingly. Operators are permitted to conduct ILS/PRM and LDA/PRM (SOIA) approaches when the Part 129 Operations Specification has been amended. Operators should incorporate ILS/PRM training into their type conversion syllabus for those types operating to the relevant aerodromes in the USA.

### **18 Advice for Pilots making ILS Approaches to United States Airfields**

18.1 There is a difference in working practice between the UK and USA with respect to ILS guidance signal protection. In the UK, ILS Critical Areas are protected at all times while an ILS is in use. Additionally, the larger ILS Sensitive Areas are protected through ATC procedures when aircraft are making an ILS approach. The size of the Sensitive Area increases as the Category (I, II or III) of operation changes in response to decreasing visibility. In the United States, the ILS Critical Area is not protected if the weather conditions are better than 800 ft cloud ceiling and two miles visibility.

### **19 Land and Hold Short Operations (LAHSO) at US Airfields**

19.1 Participation in LAHSO takes two forms, passive and active. Passive participation is when the whole runway is available to the aeroplane, with LAHSO being carried out on an intersecting runway. Active participation is when only the portion up to the Hold

Short point is available for the landing. *FAA Order 8400.10-Vol.2*, Chapter 4, Section 2 requires that non-US air carriers shall conduct LAHSO only when authorised by their NAA. Prior to participation of any kind, there are specific crew training requirements, performance and aeroplane airworthiness requirements and the operator's Part 129 Operations Specification must be annotated with an approval for LAHSO.

19.2 The CAA does not approve UK operators to participate in LAHSO. The CAA is not aware of any non-US operators who have met the FAA requirements for a Part 129 approval to participate in LAHSO. Therefore, if such a clearance is offered the crew should decline unless, in the best judgement of the commander, safety would be jeopardised. Furthermore, crews should be aware that the white strobe lights used to indicate the hold short point would remain on even if a particular aircraft is not required to hold short. The comments section of all ATC Flight Plans should include the comment that the aeroplane is not able to accept a LAHSO clearance and crews should inform the US ATC that they are "unable to accept LAHSO" on first contact with relevant frequencies.

## **20 Collision Avoidance - the See-and-Avoid Principle**

20.1 See-and-avoid is recognised as one important way in which crews seek to minimise the risk of collision when flying in VMC and in particular when operating in Class D, E, F and G airspace. Whilst crews who operate regularly in uncontrolled airspace are aware of the need for good lookout, those crews who do not may need to make a conscious effort to change their normal flight-deck management to include effective see-and-avoid techniques.

20.2 Information on the use of see-and-avoid and its limitations, together with advice on scanning techniques, is provided in Annex 1 to Chapter 12. Details of relevant source/reference material on the topic can also be found in the Annex. Similar information is provided for General Aviation pilots via Safety Sense Leaflet 13 (Collision Avoidance) (available via [www.caa.co.uk/safetysense](http://www.caa.co.uk/safetysense)), and through regular articles in GASIL (available via [www.caa.co.uk/gasil](http://www.caa.co.uk/gasil)).

20.3 When conducting risk assessments for operations outside controlled airspace, operators should take into account the limitations of see-and-avoid as a collision risk mitigation.

20.4 Before relying on see-and-avoid as a collision risk mitigation, operators should ensure that crews are made aware of the limitations described in Annex 1 to Chapter 12, and have received appropriate guidance on how to maximise the effectiveness of their lookout.

## **21 Visual Approaches to UK and USA Airfields**

21.1 The following paragraphs detail the missed approach and separation responsibilities for aeroplanes conducting visual approaches in the USA and the UK. In particular, the status of the IFR flight plan, the responsibility for separation and how it is determined, and the difference between the missed approach procedures resulting from a visual approach and an instrument approach. In the event of a go-around, the respective roles of pilot and ATC must be complementary and clearly understood by both parties; safe in terms of obstacles and separation.

## 21.2 Visual Approach when IFR is not Cancelled

21.2.1 When the pilot accepts a clearance to continue the approach visually in VMC, acceptance does not cancel the IFR flight plan. From the point where the pilot accepts a clearance to continue the approach visually to landing the pilot is responsible for obstacle clearance while ATC is responsible for separation. In the UK, the applicable missed approach should be the one published for the original procedure; however, confirmation should be obtained at the earliest opportunity on acceptance of 'continue visually'. This allows any new ATC instructions to be assimilated prior to the point of go-around initiation. At the point of go-around, both obstacle clearance and separation become the responsibility of ATC.

21.2.2 In the USA, the Aeronautical Manual states that 'If a go around is necessary for any reason, aircraft operating at controlled airports will be issued an appropriate advisory/clearance/instruction by the tower'. Separation is determined as follows: 'If the pilot has the airport in sight but cannot see the aircraft to be followed, ATC may clear the aircraft for a visual approach; however, ATC retains both separation and wake vortex separation responsibility. When visually following a preceding aircraft, acceptance of the visual approach clearance constitutes acceptance of pilot responsibility for maintaining a safe approach interval and adequate wake turbulence separation.'

## 21.3 Visual Approach when IFR is Cancelled

21.3.1 In the UK and the USA, obstacle clearance and separation will be solely the pilot's responsibility to see and avoid other traffic and obstacles. The go-around procedure will be as instructed by ATC and this instruction should be obtained at the earliest opportunity on acceptance of the visual approach. The pilot should clarify with ATC that, in the event of a go-around becoming necessary, he wishes to fly a visual manoeuvre and land, or reinstate IFR and request ATC for an instruction or an instrument departure route. Should the pilot not wish to accept cancellation of IFR, ATC should be informed and a statement of 'continuing IFR' made to avoid any ambiguity. In the event of a go-around from a visual approach, clearance or instructions from ATC must be followed.

## 21.4 Circle to Land

21.4.1 When circling to land on a different runway, the pilot has to carry out the published missed approach for the original runway not the runway he circled towards.

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*Requirement*

## 22 Multi-type Operation

22.1 Where relevant, the policy in use for the crewing of aircraft, where more than one type or variant of aircraft is used, must be stated. Pilots must not operate aircraft with differing flight deck instrumentation, except where those differences are small and an agreement exists between the operator and the CAA. See also Chapter 24, paragraph 4.3.

*Requirement End*

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## 23 Circuit Breakers (CBs) – Operational Use

23.1 In-flight operational use of CBs will usually involve the action of resetting a CB which has tripped because of an electrical overload or fault. Clearly, the re-establishment of electrical power to a circuit which is at fault does involve an element of risk, however

slight. The following instructions should be included in the Operations Manual and included in flight and cabin crew training:

- a) Flight crews should not attempt to reset CBs in flight for other than essential services and, even then, only when this is allowed by the AFM and there is clearly no associated condition of smoke or fumes. 'Essential services' should be regarded as 'essential for safety or for safe flight'. Fuel pump CBs must not be reset. A second reset should not be attempted.
- b) A Technical Log entry should be made whenever any CB trips when the aircraft is in operation and a thorough investigation should subsequently be undertaken including a visual inspection of the appropriate electrical wiring and cable harnesses.

## **24 ACAS/TCAS - Procedures to be Observed in Response to ACAS/TCAS Advisories**

24.1 Procedures and training should be based upon:

- a) ICAO *Doc 8168 Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS), Volume I Flight Procedures* (Part III, Section 3, Chapter 3, Operation of ACAS Equipment, and Attachments A (ACAS Training Guidelines for Pilots) and B (ACAS High Vertical Rate Encounters) to that chapter); and
- b) JAA *Administrative and Guidance Material Section 4, Operations*, Part 3, Temporary Guidance Leaflet No. 11 Guidance for Operators on Training Programmes for the Use of Airborne Collision Avoidance Systems.

### **24.2 High Vertical Rate (HVR) Encounters**

24.2.1 Data collected by ACAS monitoring programmes continues to show that a large percentage of ACAS RAs are a result of climbing or descending aircraft maintaining a high vertical speed while approaching their ATC-assigned altitude. Changes made to ICAO SARPs and guidance material relating to ACAS have been effective in reducing the frequency of occurrence of RAs caused by HVR encounters. It has been determined that no further changes are feasible within ACAS to address this issue without resulting in an unacceptable degradation of the safety provided by ACAS.

### **24.3 Modern Flight Guidance Systems**

24.3.1 Modern aircraft and their flight guidance systems are designed to fly specific flight profiles that provide fuel-efficient and time-efficient flight paths. An integral element of these designs commands the aircraft to quickly climb to more efficient operating altitudes and then remain at these altitudes until fuel-efficient idle thrust descents can be achieved.

24.3.2 The design of these flight guidance systems can result in vertical speeds in excess of 3,000 ft/min until the aircraft is within 500 ft of the ATC-assigned altitude. When an aircraft maintains a vertical speed in excess of 3,000 ft/min until it is within 500 ft of the assigned altitude, it is less than 30 seconds away from being at the adjacent IFR altitude which may be occupied by an ACAS-equipped aircraft flying level at that altitude. If the intruder aircraft is horizontally within the protected area provided by ACAS, there is a high probability that an RA against the climbing or descending aircraft will be generated just as the intruder aircraft begins to reduce its vertical speed to capture the assigned altitude.

## 24.4 Airspace Environment

- 24.4.1 HVR RAs have been observed in both terminal and en-route airspace. The likelihood of this type of RA occurring above FL290 has increased since the introduction of RVSM airspace.
- 24.4.2 Many HVR RAs occur in the proximity of large airports where departing aircraft are kept below arriving aircraft until they are some distance from the airport before they are allowed to climb to higher altitudes. A large percentage of these RAs occur in geographic areas where there is a concentration of climbing and descending aircraft.

## 24.5 ACAS Operation with HVR Encounters

- 24.5.1 ACAS with version 7.0 TCAS II equipment recognises HVR encounters and can, when an HVR encounter is detected, delay the issuance of RAs by up to 10 seconds. This delay allows additional time for the intruder aircraft to initiate a level-off and for ACAS to detect this level-off. However, when the intruder aircraft maintains a vertical speed in excess of 3,000 ft/min until it is within 500 ft of its assigned altitude, even this 10-second delay may be insufficient for ACAS to detect the level-off, and an RA may be issued.
- 24.5.2 When the operational response to the RA requires the pilot of the intruder aircraft to disconnect the autopilot the planned automatic acquisition of the assigned altitude will not occur. Therefore, there is a greatly increased probability that the intruder aircraft will not level off at the assigned altitude resulting in a loss of standard ATC separation. Equally an RA response by the aircraft in level flight, in the direction away from the intruder aircraft, may also result in a loss of separation with another aircraft not involved in the original RA.
- 24.5.3 Consideration has been given to providing ACAS information regarding the intruder aircraft's intent. However, this is not considered a viable approach to reducing these types of RAs while retaining the existing level of safety provided by ACAS. Currently, it has not been possible to identify any additional changes to ACAS that will provide a further reduction in the frequency of these potentially disruptive RAs.

## 24.6 Emergency Descent

- 24.6.1 HVR encounters can be triggered in the event of an emergency descent; the descending aeroplane will inevitably develop a high rate of descent during the manoeuvre. This high rate of descent may generate possible ACAS encounters as the aeroplane descends through occupied levels prior to the descent being co-ordinated by ATC. When these encounters generate an RA the crew should consider manoeuvring in the direction of the ACAS demand, even if the magnitude of the demand is not fully satisfied. This action will reduce the risk of collision without unduly reducing the efficacy of the emergency descent.
- 24.6.2 Crews should be aware that manoeuvring in opposition to an ACAS RA demand during an emergency descent is likely to increase the risk of collision.
- 24.6.3 When initiating an emergency descent crews should make full use of the traffic information provided by ACAS when deciding whether to turn, and in which direction.
- 24.6.4 In UK airspace, when there is no traffic indicated, it is recommended to maintain the heading or track as cleared previously by ATC until ATC are able to give further instructions with regard to heading requirements during an emergency descent.

## 24.7 ACAS Demands that Exceed Aeroplane Performance

- 24.7.1 In the great majority of cases the climb demand during an ACAS encounter requires the pilot to initiate a climb that is well within the aeroplane's normal performance. However, in some circumstances an ACAS climb demand, during an RA, may exceed

the aeroplane's performance capabilities. This situation may occur when the aeroplane is operating at, or close to, its maximum operating altitude, or when the TCAS demand exceeds the aeroplane's best performance.

24.7.2 When an aeroplane's performance limitations do not allow full compliance with an ACAS climb demand, the pilot should still initiate a climb, albeit within the performance limitations of the aeroplane. This action, although not fully achieving the calculated ACAS separation, will still result in a reduction in the risk of collision.

24.7.3 Crews should be aware that manoeuvring in opposition (descent) to an ACAS climb demand is liable to increase the risk of collision.

#### 24.8 **Operational Considerations**

24.8.1 HVR encounters remain a significant cause of 'disruptive' RAs, i.e. those that can cause unexpected loss of standard separation with operational impacts for both pilots and controllers. Operators should therefore consider specifying operational procedures that reduce the likelihood of the issuance of this type of HVR-generated RA.

24.8.2 Amongst the procedures that might be considered, the following should be reviewed:

- Limiting the vertical speed to 1,500 ft/min when within 1,000 ft of the aircraft's assigned altitude, particularly in airspace with a high traffic density.
- Using only moderate values of vertical speed when climbing or descending through small altitude changes.
- Avoiding the use of zoom climbs and high rates of descent within airspace with a high traffic density.

24.8.3 Operators should ensure that crews appreciate both how ACAS can increase situational awareness when initiating an emergency descent, and that manoeuvring in the correct sense when in receipt of an RA will reduce the risk of collision, should an ACAS encounter occur during an emergency descent.

24.8.4 Operators should ensure that crews are made aware of how they should respond to an ACAS climb demand that exceeds the performance capabilities of the aeroplane.

24.8.5 When reviewing the procedures in paragraph 24.7.2, operators should ensure that any change in procedures does not result in an increased risk of altitude busts. These may occur due to the limitations of the autopilot mode being changed when the autopilot is in the altitude-capture mode, such that the assigned altitude capture function is lost.

### 25 **Mode "S" – Aircraft Identification Reporting**

25.1 Mode "S" transponder equipped aircraft incorporate an aircraft identification feature requiring crew input. Some aircraft fully fitted with Mode "S" and Mode "S" controls are transmitting incorrect identifications, e.g. **ABC\_1234** instead of **ABC1234**. Such erroneous settings in operational Mode "S" airspace will prevent automatic flight plan correlation in both Air Traffic Management (ATM) systems and airport operator ground systems. This aircraft identification feature, sometimes known as 'flight identification', should not be confused with the 'aircraft address' which is a unique ICAO code relating directly to the airframe in which the Mode "S" transponder had been installed and over which crews have no control.

25.2 ICAO Document 8168-OPS/611 *Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) Volume 1* requires that flight crew of aircraft equipped with Mode "S" having an aircraft identification feature shall set the aircraft identification into

the transponder. This setting is required to correspond to the aircraft identification that has been specified at Item 7 of the ICAO flight plan and consists of no more than seven characters. If the aircraft identification consists of less than seven characters, **no** zeros, dashes or spaces must be added. If no flight plan has been filed, the setting needs to be the same as the aircraft's registration, again, up to a maximum of seven characters.

- a) For an aircraft filing a flight plan, Item 7 consists of the ICAO three-letter designator for the aircraft operating agency, followed by a flight identification, e.g. KLM511, BAW213, JTR25. In these examples, when in radio contact with an ATC unit, the flight is identified to the unit, by the use of the appropriate ICAO telephony designator for the operating agency, followed by the flight identification, i.e. "KLM 511", "SPEEDBIRD 213", or "HERBIE 25", as appropriate.
- b) If a flight plan is not filed, or the aircraft is not equipped with radio, the Mode "S" aircraft identification to be set consists of the registration marking of the aircraft, e.g. GXXXX, 4XBCD, OOTEK, again with no additional zeros, dashes or spaces. For RTF purposes (for aircraft equipped with radio) the ICAO telephony designator to be used in such cases consists of the registration marking alone (e.g. GXXXX), or the registration marking preceded by the ICAO designator for the operating agency (e.g. "REGULATOR GXXXX"), provided the agency has been issued with a designator.

25.3 The monitoring of the aircraft identification feature is already an essential part of individual States' Mode "S" implementation programmes. In operational Mode "S" airspace the use of an incorrect address will render the task of ATC more difficult and the level of service provided may not be the same as that provided to aircraft transmitting the correct and filed identification.

## 26 The Use and Misuse of Frequency 121.5 MHz

26.1 Reports have been received that chatter on frequency 121.5 MHz, including Practice Pans and Training Fix procedures, sometimes reaches such intensity that crews turn down the volume or deselect the frequency to minimise disruption on the flight deck. As a consequence this potentially creates a problem, particularly from a security perspective in the wake of the terrorist activities of 11 September 2001, as the repeated failure of an aircraft to respond to transmissions on 121.5 MHz could result in air policing action.

26.2 The UK has a long-standing Difference filed with ICAO for the use of 121.5 MHz as a Practice Emergency Training Frequency (PETF), as this unique service is considered a significant enhancement to flight safety. Whilst recognising that it may cause some annoyance, Practice Pans and Training Fixes have a significant and tangible safety benefit, by encouraging inexperienced pilots to seek assistance in an emergency or when uncertain of their position. The VHF Emergency Fixing Service has been an undoubtedly benefit to all users, especially in the south-east of England, where several potentially serious incidents have been avoided and the number of airspace infringements has been reduced. For this reason, NATS consider that the use of 121.5 MHz for position fixing is an integral part of their safety net protecting against the inadvertent penetration of CAS.

26.3 Whilst the current arrangements are not perfect, the well-documented shortage of VHF frequencies means it is highly unlikely that a discrete frequency for practices could be made available in the near future. The problem will be addressed not by restricting the use of frequency 121.5 MHz for Practice Pans and Training Fixes, but by encouraging all pilots to use the frequency only for emergencies, either practice or real.

## 27 The Provision of Routes for En-route Traffic Outside Controlled Airspace

27.1 To provide the most effective ATS to traffic outside CAS the CAA, NATS and the Ministry of Defence (MoD) have agreed on certain principles with the aim of making the most effective use, in overall ATM network terms, of the available NATS/MoD resources.

27.2 In the provision of an ATS for flights outside CAS the following principles will be used:

- the needs of the network as a whole will take priority over the needs of an individual flight;
- NATS and the MoD will co-operate to provide the most appropriate form of ATS at any particular time or place;
- ATS will be provided based on the principle that PT flights will be conducted, wherever possible, within CAS;
- the MoD will provide an ATS subject to capacity and based on established priorities of service;
- the maximum use will be made of Conditional Routes (CDRs) and other existing airspace arrangements; and
- at certain times of the day, in an effort to meet peak civil demand on capacity-critical routes, NATS may request that the MoD provide an ATS to PT flights. Equally the MoD will identify periods when off-route services are not likely to be available (e.g. overnight, weekends or during major military exercises) due to the non-availability of military resources; such periods will be notified (e.g. by a NOTAM).

27.3 During periods when military Air Traffic Control Centre capacity is at a minimum, civil controllers may take advantage of direct routes that are available, but will seek to retain control of the General Air Traffic for the longest period practical in accordance with existing operating procedures in the unit Manual of Air Traffic Services (MATS) Part 2.

27.4 Direct routes leaving and rejoining CAS will only be permitted provided there is no adverse effect downstream. For example, flights that could remain within CAS but elect to leave to take advantage of a direct route and then have to re-enter via a TMA or another portion of en-route CAS will be discouraged. Unless there are obvious network benefits and prior agreement has been reached with the MoD, NATS controllers will not offer routes outside CAS requiring ATS from military controllers. Pilots who cancel IFR or re-file to fly outside CAS to avoid flow control will not be guaranteed an ATS.

27.5 **Conditional Routes**

27.5.1 CDRs are ATS Routes which are usable only under specified conditions. Three types of CDRs are used as described below:

- Category One – a route that is permanently plannable during the times published in NATS AIP ENR 3.
- Category Two – a route that is only plannable in accordance with the conditions stated in the daily Conditional Route Availability Message (CRAM) issued by the Central Flow Management Unit (CFMU).
- Category Three – a route that is not plannable per se but may be used tactically at the discretion of ATC.

A CDR may have more than one Category.

Additional information on ATS routes is available in the NATS AIP ENR 1-1-1-1.

## **28 Policy for the Continuation of a Flight by an Aeroplane Conducting Public Transport Following an In-flight Failure or Shutdown of an Engine**

### **28.1 In-Flight Engine Failure or Shutdown**

28.1.1 Whenever an aeroplane engine fails or is shut down in flight, the appropriate drill must be carried out in accordance with the operator's approved procedures found in the AFM and Quick Reference Handbook or electronic checklists. Good airmanship dictates that the PIC report any engine shutdown to the relevant ground radio station and keep ATC authorities fully informed of ongoing flight progress.

### **28.2 Engine Failure or Shutdown on Aeroplanes with Two Engines**

28.2.1 Following an in-flight engine failure or shutdown on an aeroplane with two engines, the approved procedure is for the PIC to land the aeroplane at the nearest suitable aerodrome. A suitable aerodrome is an aerodrome that is 'adequate' (as defined by EU-OPS 1.192 Terminology), with weather reports or forecasts indicating that the weather conditions are at or above minima, and the field condition reports indicating that a safe landing can be accomplished at the expected time of arrival. Title 14 Code of Federal Regulations (14 CFR) Section 121.565 (FAR 121.565) also uses the term 'suitable' but in a more general sense, although further guidance has been drafted.

28.2.2 Nothing in this policy is intended to prevent a PIC, in the interests of safety, from landing at an aerodrome other than the nearest suitable aerodrome. Additional factors which may be relevant in considering whether an aerodrome is suitable include:

- wind and weather conditions at altitude en route to the aerodrome; and
- the PIC's familiarity with the aerodrome.

The following factors are not considered as justifying a decision to continue beyond the nearest suitable aerodrome:

- sufficient fuel remains to fly to a further destination;
- better maintenance/repair facilities are available elsewhere; and
- more convenient passenger handling is available elsewhere.

### **28.3 Engine Failure or Shutdown on Aeroplanes with Three or More Engines**

28.3.1 Following an in-flight engine failure or shutdown on an aeroplane with three or more engines, the approved procedure is for the PIC to land the aeroplane at the nearest suitable aerodrome. However, if not more than one engine (of an aeroplane that has three or more engines) suffers in-flight engine failure or is shut down, the PIC may elect to proceed to an aerodrome other than the closest suitable if, in his considered assessment, to land at another aerodrome is equally as safe as to land at the nearest suitable aerodrome. In addition to the requirements of EU-OPS 1.192 and the factors at paragraph 28.2.2 above, additional factors to be considered before proceeding beyond the nearest suitable diversion aerodrome include:

- the cause of the engine malfunction and any associated mechanical problems;
- any accompanying systems loss;
- aeroplane weight, fuel remaining and endurance;
- range following further engine loss and/or depressurisation;
- terrain en route;

- aircraft performance in the event of a second engine failure in accordance with EU-OPS 1.505;
- air traffic congestion;
- availability of adequate and suitable diversion aerodromes at regular intervals along the intended route; and
- facilities for passenger handling/accommodation.

#### 28.4 **Continuation Report**

28.4.1 A PIC's decision to continue a flight beyond the nearest suitable aerodrome following an engine shutdown shall be recorded as part of the MOR upon completion of the trip. The MOR shall state the reasons for determining that the selection of an aerodrome, other than the nearest aerodrome, was as safe a course of action as landing at the nearest suitable aerodrome. The MOR shall be submitted to the CAA in accordance with normal procedures.

### 29 **Temperature Error**

29.1 Pressure altimeters are calibrated to indicate true altitude under ISA conditions. Any deviation from ISA will therefore result in an erroneous reading on the altimeter. The altimeter error may be significant under conditions of extremely cold temperature and appropriate corrections should be applied (see Table 7).

**Table 7** Values to be Added to Published Altitudes (ft) for Cold Temperatures

Temp °C	Aerodrome Altitude Above Altimeter Source Elevation (ft) (normally destination elevation)													
	200	300	400	500	600	700	800	900	1,000	1,500	2,000	3,000	4,000	5,000
0	0	20	40	60	80	100	120	140	160	240	320	500	660	820
-10	20	40	40	40	60	80	80	80	120	160	260	340	420	
-20	20	40	60	80	80	100	120	120	180	240	380	500	620	
-30	40	60	80	100	120	140	140	160	240	320	500	660	820	
-40	40	60	80	100	120	140	160	180	200	300	400	620	820	1,020
-50	40	80	100	120	140	180	200	220	240	360	480	740	980	1,220

## 30 Guidelines for the Notification of Suspected Communicable Disease

30.1 The advent of Severe Acute Respiratory Syndrome (SARS) in 2003 and the continuing concern about influenza of global pandemic potential has highlighted the need to ensure reliable notification procedures to Public Health Authorities (PHAs) at the aircraft destination, in the event that a suspected case of communicable disease is identified on board an aircraft in flight. Guidance in relation to communicable disease contained in Amendment 20 to ICAO Annex 9 Facilitation came into effect on 15 July 2007.

30.2 ICAO Annex 9, Chapter 8 specifies that a suspected communicable disease is to be reported promptly to ATS by the PIC of an aircraft in order to facilitate provision for the presence of any special medical personnel and equipment necessary for the management of public health risks on arrival. Reliable advance notice of a suspected case of communicable disease should mitigate the adverse health impact to the population from infections of serious public health concern, and reduce delays. ICAO intends to develop guidelines and incorporate the material in the relevant Annexes and PANS-ATM in due course. In the meantime, ICAO has issued basic guidelines for ATS, which also affect operators, and PHAs when notified of a suspected case of communicable disease on board an aircraft.

30.3 Operators should give appropriate guidance to their staff, based on the procedures specified below, regarding their responsibilities and actions in the event of suspected cases of communicable disease on board an aircraft. Operators should also ensure that any organisations with whom communication will be required in such an event are aware of the relevant procedures.

a) Pilot-in-Command (PIC)

As soon as the PIC becomes aware that he has a person on board who is suffering from a suspected communicable disease, the PIC should report this to the ATS unit with which he is currently communicating, with a request that a message be forwarded to the destination aerodrome control tower. The message should include the aircraft's call sign, aerodrome of departure, destination aerodrome, estimated time of arrival, number of persons affected, number of persons on board and the words "communicable disease". For example:

"(ATS unit), (call sign) REQUEST THE FOLLOWING INFORMATION BE FORWARDED AS SOON AS POSSIBLE TO (destination aerodrome) TOWER. ADVISE READY TO COPY".

"(call sign), ADVISE (destination aerodrome) TOWER THAT (call sign), DEPARTURE AERODROME (departure aerodrome), ESTIMATING (destination aerodrome) AT (time), PERSONS ON BOARD (number), REPORTING (number) CASE(S) OF COMMUNICABLE DISEASE ON BOARD".

b) Local Public Health Authority (PHA)

Procedures for the local PHA or quarantine station to be informed by the destination aerodrome control tower of the arriving aircraft should be agreed locally. It is envisaged that once the PHA is in receipt of the relevant information it will contact the airline agent and establish, through the aircraft-operator (not ATC), communication with the aircraft concerned. Depending on the communication facilities available to the agency, the PHA may not be able to communicate with the aircraft until it is closer to its destination. However, it is through the aircraft-operating agency that details of the event, in addition to those transmitted by the ATS unit to the destination control tower, can be requested by the PHA and communicated to it. Apart from the initial notification to the ATS unit by the PIC whilst en-route, ATC communication channels should not be used.

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# Annex 1 to Chapter 12

## Use of and Limitations Associated with the See-and-Avoid Principle

### 1 Effective Use of See-and-Avoid

- 1.1 See-and-avoid applies to all stages of flight but has added significance whilst manoeuvring and also when operating in busy airspace. It is of particular importance when no radar de-confliction service is available. Whilst effective employment of see-and-avoid techniques undoubtedly prevents many collisions, see-and-avoid cannot necessarily be relied upon and is only one of a number of collision counter measures including the use of a radar service and ACAS.
- 1.2 For see-and-avoid to be of value, pilot lookout must be applied in a disciplined, consistent and effective manner. Success is predicated on the crew being aware of the limitations of the human eye, the effect of physical and environmental conditions and thus the subsequent development of individual and crew techniques that compensate for such factors. The techniques include the application of effective visual scanning, the ability to listen selectively to radio transmissions from ATC and other aircraft to create a mental picture of the traffic situation and the development of wider practices that can be described as good airmanship.
- 1.3 See-and-avoid involves a number of steps. First, and most obviously, the pilot must look outside the aircraft. Second, the pilot must search the available visual field and detect objects of interest, which are most likely to be detected within peripheral vision. The object must then be looked at directly to allow it to be identified as an aircraft and an assessment made as to whether it represents a collision threat. It should be noted that an aircraft which remains on a constant bearing is likely to present a collision threat. Any appropriate evasive action must be decided upon, and then initiated.

### 2 Limitations of See-and-Avoid

- 2.1 Limitations of the human visual system, cockpit workload and numerous other physical and environmental conditions may combine to make see-and-avoid an unreliable method of traffic separation. The following is not intended to be an exhaustive list and will be familiar to most, but seeks to highlight some key factors worth considering:

#### a) Field of Vision

The average person has a field of vision of approximately 190 degrees although it does vary from person to person and reduces with age. The quality of vision also varies across an individual's visual field largely in accord with the distribution on the retina of the two types of light sensitive cells: rods and cones. Cones, which provide sharp vision and colour perception in daylight illumination, are concentrated at the central part of the retina (fovea) whilst rods are situated on the remaining area, referred to as the peripheral retina. Vision can be considered to consist of two distinct systems, peripheral and foveal vision, and there are important differences between the two. Colour perception and the detection of slow movement are best at the fovea, while detection of rapid movement is best in the periphery. In daylight, acuity (sharpness of vision) is greatest at the fovea,

whilst at low light levels acuity is fairly equal across the whole retina. At night, acuity is greatest in the peripheral retina. Peripheral and foveal vision each perform different functions in the search process. An object is generally first detected in peripheral vision, but must be fixated on the fovea before identification can occur.

The eye has a blind spot where the optic nerve exits the eyeball. Under normal conditions of binocular vision the blind spot is not a problem as the area of the visual field falling on the blind spot of one eye will still be visible to the other eye. However, if the view from one eye is obstructed (e.g. by a window post) then objects in the blind spot of the remaining eye will be invisible. Bearing in mind that an aircraft on a collision course appears stationary in the visual field, the blind spot could potentially mask a conflicting aircraft.

**b) Myopia**

In the absence of a visual stimulus the muscles in the eye relax, preventing the lens from focusing properly on distant objects thus creating a problem for the pilot scanning for traffic in a clear, featureless sky. This phenomenon, known as 'empty-field myopia', hinders effective see-and-avoid activity.

**c) Motion**

Motion or contrast is needed to attract the eyes' attention. An aircraft on a collision course may appear motionless in the windscreens for a relatively long period of time so it is important to keep the head and eyes moving during the employment of an effective scan.

**d) Restricted Visual Field**

The available field of view will vary according to aircraft type. Thus the restricted visual field of the cockpit can interfere with a pilot's ability to detect targets (e.g. obstructions such as window posts). Similarly, the presence of a visual boundary can cause a pilot to concentrate the search for traffic directly ahead and at the same level thus limiting the effectiveness of the traffic scan.

Dirty, scratched or fogged windscreens or insect splatter and other debris on the surface can hamper visual detection of aircraft. Optical distortion caused by the curved, laminated transparency of the windscreens itself may, in some circumstances, have an insidious, detrimental effect.

**e) Distractions**

A busy or distracted pilot may devote insufficient time to an effective traffic scan.

**f) Human Factors**

There is no guarantee that, even with two pilots looking out, other aircraft will be sighted or potential conflicts identified. Effectiveness in this regard may vary by crew according to age, ability, experience, stress and fatigue levels, well-being, complacency, distraction and numerous other human factors and physiological reasons. See-and-avoid trials conducted in the United States in the late 1970s and 1980s confirmed that even when pilots were actively looking out they frequently failed to sight conflicting traffic.

**g) Diffusion of Responsibility**

Diffusion of responsibility occurs when responsibility for action is divided between several individuals with the result that each assumes that somebody else is taking the necessary action. Diffusion of responsibility has been a factor in a number of serious aviation accidents. One potential weakness of the see-and-avoid system is that pilots flying in controlled airspace relax their traffic scans in the assumption that ATC will ensure separation.

### **h) Ambient Light/Contrast**

Ambient light also affects visual efficiency. Glare or reflections or indeed flights directly into sun can make objects difficult to see and scanning uncomfortable.

An aircraft that has a low degree of contrast against a cluttered background may be difficult to see.

Whilst operating entirely legally in 5 km visibility on a hazy day, high closing speeds or 'difficult to observe' approach/crossing angles may lead to late visual acquisition of conflicting aircraft.

## **3 Scanning Techniques**

- 3.1 Modern flight decks equipped with an array of complex Flight Management Systems present a temptation for crews to spend significant periods of time concentrating on 'in house' matters as opposed to at least one pilot scanning externally. Thus the starting point to developing an effective scanning technique is to strike an appropriate balance between internal flight deck management activity and external scanning.
- 3.2 It is unlikely that a single scanning technique will suit all pilots. Individual pilots will need to develop a traffic scan that accounts for the issues highlighted above so improving the visual detection rate. A scan should concentrate on the areas most critical at any given time; for example, visually clearing the area of sky that the aircraft is turning into (including the areas above and below the immediate aircraft trajectory).
- 3.3 Effective scanning is accomplished by a series of short, regularly spaced eye movements that bring successive areas of the sky into the central visual field. Each movement should not exceed approximately 10 degrees and each area should be observed for at least one second to enable detection. Each time a scan is stopped and the eyes are refocused, peripheral vision takes on more importance because it is through this area that the presence of other aircraft is often detected. It is important to remember that if another aircraft appears to have no relative motion in the windscreens it is likely to be on a collision course hence the importance of keeping head and eyes moving during an effective scan.
- 3.4 Visual scans often fail because they are unsystematic, with some areas of the visual field receiving close attention whilst other areas are neglected. The 'block' system of scanning has proved to be very effective for pilots. The system is based on the premise that traffic detection can be made only through a series of eye fixations at different points in space. In application, the viewing area (windscreens) is divided into segments and the pilot methodically scans for traffic in each block of airspace in sequential order on either a side-to-side basis or a front-to-side basis. The key point is that unless a series of fixations is made, the likelihood of detecting targets in the scan area is reduced.
- 3.5 An internal scan of instruments is obviously important and the balance between internal and external scanning will depend on the circumstances and flight deck workload at the time. Thus a balance has to be struck according to the circumstances and is, in itself, a key piloting skill. An efficient instrument scan is good practice even when flying VFR. The ability to scan the aircraft instruments efficiently permits more time to be allotted to exterior scanning.

## 4 References

- a) ICAO Circular 213-AN/130 - Pilot skills to make "Look Out" more effective in visual collision avoidance.
- b) Flight Safety Foundation, Flight Safety Digest May 1997 - Collision Avoidance Must Go Beyond "See and Avoid" to "Search and Detect".
- c) Australian Transport Safety Bureau Research Report - Limitations of the See-and-Avoid Principle (ISBN 0 642 16089 9).

## Chapter 13 Fuel Planning and Management

### 1 Basic Principles

- 1.1 The total amounts of fuel and oil carried on board an aircraft must be sufficient for the intended flight and must include a safe margin for contingencies. The manner in which the amounts should be calculated and the records that should be made before, during and after flight must all be specified.
- 1.2 General considerations for calculating and recording fuel and oil requirements and usage are listed below. Instructions, similar to those given for fuel planning, should be specified for calculating the amount of oil needed to lubricate the engine(s) and associated systems and for recording before, during and after flight, as appropriate, the quantities on board.
- 1.3 Operators must ensure that their Fuel Planning Policy allows for the carriage of additional fuel, wherever it is known or suspected that there may be excessive landing delays due to traffic or ATC problems at destination or diversion airfields. Furthermore, operating flight crews should be reminded that vigilance and early decision-making are necessary in fuel management in order to ensure that the contingency, alternate and holding fuel reserves are not eroded to such an extent that operational safety is compromised.

### 2 Aircraft Inbound to the UK with Fuel Reserves Approaching Minimum

- 2.1 Although EU-OPS/JAR-OPS 3 absolute minimum arrival is final reserve, sufficient contingency fuel should be carried to plan to arrive with alternate fuel plus final reserve. In busy terminal areas in the UK 'No delay expected' can mean a delay of up to 20 minutes. Operators should consider using a fuel consumption-monitoring programme to identify sectors where actual fuel consumption is consistently greater than predicted consumption or where holding prior to approach at the destination is consistently longer than anticipated. Where these sectors are identified they should be highlighted to flight crew and the fuel carried should be increased to meet the additional burn requirements. Operators should review their fuel consumption-monitoring programme, or consider establishing one where none already exists, to ensure that the sectors of expected increased fuel burn are identified and the details are included in their Operations Manual. Assistance with the establishment of a fuel consumption-monitoring programme can be obtained from the operators' assigned FOIs.

### 3 Basic Planning Tables

- 3.1 Fuel planning tables should be provided for all aeroplanes, except light single engine types. The tables must take account of aeroplane weight, Outside Air Temperature (OAT) and altitude and, where possible, head or tail wind components. Where tables are not provided, clear statements of the hourly rates of consumption must be made. All circumstances of flight that can reasonably be foreseen should be specified, including climb, cruise, descent, holding and abnormal configuration. Alternatively, where the flight planning system incorporates an electronic software programme, appropriate fuel consumption data must be supplied to the programme to generate realistic fuel burn calculations.

## 4 Planning Factors

4.1 Where procedures require little or no paper documents to be used for flight, alternative procedures, acceptable to the assigned FOI, must be used to permit access to an agreed list of electronic documents for at least the prescribed periods.

## 5 Monitoring Fuel on Board Twin-Engined Light Aircraft

5.1 Operators of twin-engined light aeroplanes should establish an effective back-up procedure, in addition to the aeroplane fuel gauges, by which the fuel remaining in the tanks after flight may be established and recorded. This procedure should be detailed in the Operations Manual.

5.2 On types where physically measuring the fuel quantity is not possible except by fuel gauges an alternative method is necessary. Such a method may require regularly refuelling to a known level and subsequently calculating fuel on board by subtracting known consumption. To be effective, this method requires careful monitoring and the most accurate consumption figures available. Monitoring must include every activity that changes fuel levels, such as maintenance ground runs. Fuel consumption figures should be based on operational experience, historical data or if necessary flight tests. Safeguards against calculation error and careful management together with frequent refuelling to known fuel levels are necessary to ensure the integrity of the method.

5.3 There must be instructions for ascertaining before departure that the amount of fuel on board meets the commander's requirements. There must also be instructions for ensuring that, if in flight the amount of fuel calculated to remain overhead the aerodrome of intended landing is likely to become less than any minimum quantity specified, this fact becomes apparent at an early stage.

5.4 Before signing the technical log record page, the commander must satisfy himself that the correct type and quantity of fuel is on board and that it has been loaded in accordance with any instructions that may have been given. Units of mass or volume shown on the sector record page must be the same as those on fuel gauges visible to the pilot. Exceptionally, where there is a difference between the units on the fuel gauges and those on the sector record page, use of conversion tables may be approved. Loadsheets fuel recorded in kilograms, uplifts in litres and aircraft gauges calibrated in pounds is to be avoided. Operators should provide all flight crews with simple fuel conversion charts/tables to reduce the likelihood of errors.

5.5 Instructions must be given on the frequency of fuel checks, the recording of information and the application of that information. In-flight checks should be carried out at least once on every sector and at intervals not exceeding 60 minutes on flights that exceed 90 minutes. A calculation to determine the amount of fuel remaining and to predict the amount of fuel expected to remain overhead the aerodrome of intended landing should follow every check.

## 6 Fuel Alternates

6.1 An aerodrome suitable in all respects for use as an alternate, if a landing cannot be made at the intended destination, must be identified both on the pilot navigation log (PLOG) and on the ATC flight plan.

6.2 When the planned alternate aerodrome is in the same busy area as the destination, for instance LONDON/Heathrow and LONDON/Gatwick, the track miles on which the fuel requirement for flying to the alternate is calculated should be realistically assessed taking account of the extended route which can reasonably be expected during busy periods.

## 7 Final Reserve Fuel

- 7.1 As a general rule, an emergency exists when the fuel remaining is estimated to have reduced to an amount where an approach to land should be started without delay.
- 7.2 The amount of fuel remaining at this stage (the 'Final Reserve Fuel') is that specified for the aircraft type in EU-OPS 1.255 or JAR-OPS 3.255.
- 7.3 Operators are to specify for each type of aircraft what the Final Reserve Fuel is to be and what action is to be taken by the commander:
  - a) when it appears likely that the Final Reserve Fuel will be reached; and
  - b) when the Final Reserve Fuel is reached.

**NOTE:** The term 'fuel emergency' is not recognised by ATC in the United Kingdom. Emergency calls should be prefixed by 'PAN' or 'MAYDAY', as appropriate.

## 8 Extended Range Operations with Two-Engine Aeroplanes

- 8.1 Operations Manuals should define specific fuel planning procedures which satisfy the EASA Acceptable Means of Compliance AMC 20-6 Extended Range Operation with Two-engine Aeroplanes ETOPS Certification and Operation, but which do not necessarily utilise the fuel planning criteria given in this Chapter.

## 9 Insufficient Fuel Remaining

### 9.1 General Requirements

If it becomes apparent that the fuel remaining is close to the minimum amounts specified, the commander must have clear instructions on the actions he must take. In normal circumstances the aircraft is expected to land with Reserve Fuel, which is the Final Reserve Fuel plus Alternate Fuel.

### 9.2 En Route

Whilst en route, options generally available are:

- a) adjust aircraft speed;
- b) obtain a more direct route;
- c) fly at a different flight level;
- d) land and refuel; and
- e) select an alternate aerodrome which is closer to the destination airfield than that specified in the ATC flight plan and so reduce the Alternate Fuel, thus reducing the required Reserve Fuel.

### 9.3 Top of Descent

At, but not before, the top of descent point, flight may continue to the intended destination, provided that the fuel remaining is not less than Reserve Fuel, and the forecast/actual weather at the destination is not worse than that required by EU-OPS/JAR-OPS 3 subpart D.

#### 9.4 **Overhead the Destination**

When close to overhead the destination, for example in a holding pattern that serves directly the approach to landing procedures, flight may continue to the intended destination provided that the conditions of paragraph 9.3 are satisfied.

#### 9.5 **Delays Exceed Expectation**

Operators must make clear what action is to be taken by commanders if the fuel remaining could reduce or has reduced below the amounts derived from the considerations listed above.

# Chapter 14 Use of the Minimum Equipment and Configuration Deviation List(s)

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Requirement

## 1 Minimum Equipment Lists

- 1.1 Operators may not operate aircraft with unserviceable equipment, except in accordance with an approval under EU-OPS 1.030 or a Permission issued in accordance with Article 41 of the ANO 2009. Such Approval or Permission will be granted by the Flight Operations Inspectorate Department only when the content of the MEL is acceptable.
- 1.2 MELs must be submitted to the Flight Operations Inspectorate Department at the time of an application for an AOC or a variation which covers the introduction of a new aircraft type; so should instructions and guidance to commanders on the operation of aircraft with deferred defects. The content of operators' MELs may not be less restrictive than that of the associated MMEL. When the MMEL becomes more restrictive through amendment, operators must similarly amend their MEL promptly. Guidance can be found in *CAP 549 Master Minimum Equipment Lists (MMEL)/ Minimum Equipment Lists (MEL)* and JAR-MMEL/MEL.
- 1.3 When the carriage of unserviceable equipment results in a deviation from the normal drills, satisfactory alternative drills must be specified. For example, when thrust reversers are listed as minimum equipment, the operator must publish alternative drills.

Requirement End  
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## 2 The Preparation of an MEL

- 2.1 The MEL should be produced in accordance with the requirements in JAR-MMEL/MEL Subpart C. These requirements include definitions of rectification intervals and operational (O) and maintenance (M) procedures. To view JAR-MMEL/MEL, visit the JAA website.
- 2.2 The procedures for preparing an MEL and obtaining CAA approval are contained in CAP 549. These procedures describe the content and format of an MEL, along with a flow chart for the approval process. To view CAP 549, visit [www.caa.co.uk/cap549](http://www.caa.co.uk/cap549).

### 2.3 CAA and JAA Policies

- 2.3.1 Wherever a CAA approved MMEL refers to the regulations, the applicable policy should be applied in the MEL. It should be noted that different authorities use different statements in their MMELs to refer to the regulations. Typical examples of MMEL statements are listed below, although this list is not exhaustive:
  - "As required by Operating Requirements"
  - "As required by Air Navigation Legislation"

- "As required by National Requirements"
- "As required by FARs"
- "As required by Regulations"

2.3.2 Where one of these statements is included, the JAA MEL policy (*JAA Administrative and Guidance Material Section 4, Operations, Part 3, Temporary Guidance Leaflet No. 26 'Guidance Document for MEL Policy'*) can be copied across into the MEL exactly as written, provided a CAA Policy Item does not supersede it. The CAA, with just a few items that are different due to local requirements or service experience, accepts the majority of JAA TGL 26. Additionally, some CAA Policy Items may also be used to overwrite the MMEL entry, particularly in the case where the CAA approved MMEL is produced by the FAA or other foreign authorities. When compiling an MEL, all CAA Policy Items should be checked for their applicability and applied as appropriate. Each CAA Policy Item contains an applicability statement, including any specific requirements that are met.

To view the JAA TGL 26, visit the JAA website. To view CAA Policy Items, visit [www.caa.co.uk/mmelpolicy](http://www.caa.co.uk/mmelpolicy).

AFM Users are advised to read the Guidance Information before applying CAA Policy Items to their MEL.

2.3.3 All CAA-approved MMELs for use by UK operators are listed on the CAA website along with their current revision status. When compiling or updating an MEL, this list should be consulted to obtain the most up-to-date information on the applicable CAA approved MMEL(s). The revision status listing will provide guidance on where to obtain the CAA-approved MMEL if it is not downloadable from the website. All items in the CAA/JAA Supplement supersede and overwrite any applicable entry in the MMEL upon which it is based (e.g. FAA MMEL). To view the revision status list of all CAA approved MMELs, visit [www.caa.co.uk/mmellist](http://www.caa.co.uk/mmellist). For more information on MMEL/MEL issues visit [www.caa.co.uk/mmel](http://www.caa.co.uk/mmel).

## 2.4 Operational (O) and Maintenance (M) Procedures

2.4.1 The applicable (O) and (M) procedures should be obtained from the aircraft manufacturer. These procedures may be included in the MMEL document, or they may be in a separate document produced by the manufacturer, e.g. a Dispatch Deviations Guide, Aircraft Deactivation Procedures Manual. Should the manufacturer be unable to provide the information required the operator is ultimately responsible for proposing procedures.

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*Requirement*

## 3 Authorisation to Utilise Rectification Interval Extensions (RIEs)

3.1 JAR-MMEL/MEL.081 introduced the concept of RIEs which allows operators in exceptional circumstances to permit a one-time extension of the applicable Rectification Interval, B, C or D, for the same duration as that specified in the MEL. In order that an operator can take advantage of RIEs, the MMEL source document (i.e. the manufacturer's MMEL, or the National Authority of the State of manufacturer's MMEL) must contain the appropriate entry allowing the extension of a rectification interval.

3.2 The operator must ensure that rectification is accomplished at the earliest opportunity. The utilisation of RIEs is to be used to allow operators to continue to operate an aircraft after the rectification interval has expired if the rectification has not

been possible. To this end an operator who utilises RIEs will be required to report retrospectively all such uses, together with the reasons for them, to their assigned FOI at the CAA using an RIE Report Form (an example is attached at Annex 1).

3.3 In order for operators to obtain the authorisation to use RIEs, they are to apply to their assigned FOI. The application to the FOI shall contain the name and position of the nominated person responsible for the control of the company RIE procedure and details of the specific duties and responsibilities established by the operator to control the use of these extensions. The assigned FOI shall assess the suitability of these specific duties and responsibilities and decide as to their acceptability.

*Requirement End*  
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#### **4 Clarification of MMEL Definitions**

4.1 The following will be used to overwrite and supersede all existing definitions that are in the MMEL and should be used in the absence of a definition.

- The following statements are intended to cover situations where there is a lack of a replacement part(s), inadequate engineering resources or manpower to enable the defect to be rectified.
  - "It is not reasonably practical to repair or replace before the commencement of flight";

**OR**

- "It is not reasonably practicable for repairs or replacements to be made";

**NOTE:** The intention of either of these statements in an MMEL is that the aircraft may be dispatched if there are inadequate available spares or if there are no qualified and authorised personnel on base to perform the task. The definition is not dependent on whether there is enough time available to complete the task before the next flight. If the aircraft is at a maintenance base or any other airport, but the spare(s) or manpower are not available, then the aircraft may be dispatched. As soon as the aircraft lands at an airport where the spares are available and there are qualified and authorised personnel on base, the defect must be rectified.

- The following statements are intended to allow the aircraft to be flown, using the most direct route, to the nearest maintenance base where arrangements for repairs or replacements can be made:
  - "The aircraft may depart on the flight or series of flights for the purpose of returning directly to a base where repairs or replacements can be made";

**OR**

- "The aircraft may continue the flight or series of flights but shall not depart an airport where repairs or replacements can be made".

**NOTE:** Once the aircraft lands at the maintenance base, the aircraft shall not be dispatched until the defect has been rectified.

#### **5 MEL Items – Compliance Statement – Airbus Operators**

5.1 A particular feature of an MEL produced for Airbus aeroplanes, whereby the only change to a submission is the removal or addition of a manufacturer's serial number,

the use of the following entry in the justification column of the MEL Compliance Statement should be used:

"Addition of or removal of a specific aircraft from the fleet which has resulted only in the addition or deletion of a Manufacturer's Serial Number (MSN) to the footer of the MEL page. No technical content changes have been made."

- 5.2 When an amendment to a document required an amendment to text within the MEL and either the removal or addition of a manufacturer's serial number, the operator should list the text amendments individually in the Compliance Statement and merely state that the remainder are MSN changes to the footer, as above.
- 5.3 Some operators have produced MELs which cover a number of variants of a particular model of aircraft. When this occurs operators should provide an index of pages that apply to each aircraft tail number and include them at the front of the MEL.

## **Annex 1 to Chapter 14**

### **Example Rectification Interval Extension Report Form**

#### **PART 1 - MEL DEFECT**

1. Operator	2. Date of Defect	3. Aircraft Registration	4. Aircraft Type	5. RIE Number
6. Detail of Defect		7. Reason for not rectifying		
8. Rectification Interval Category	9. Expiry date of Rectification Interval		10. MEL Reference Number	

#### **PART 2 - RIE APPLICATION**

11. Name of Applicant	12. Position
13. Why an RIE is Required	

#### **PART 3 - AUTHORISATION**

14. Duration of RIE Authorised	15. Latest date that defect is due for rectification	
16. Comments of Authorising Manager (to include history of previous RIE use for this item where appropriate)		
17. Name of Authorising Manager	18. Position	19. Date

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# Chapter 15 Emergency Procedures and Oxygen Requirements

## 1 Emergency Evacuation Procedures

1.1 Procedures for the evacuation of an aircraft and care of passengers following a forced landing, ditching or other emergency are to be specified. Much of the information will be descriptive, but the basic drills to be followed by the various members of the aircraft crew must be summarised and tabulated. Particular attention should be paid to the following points:

- a) the correct setting for pressurisation system controls prior to ditching;
- b) the ground positioning of the aircraft relative to the wind, wherever possible, to allow for the safest possible evacuation in the event of an aircraft fire;
- c) the use of emergency escape chutes and evacuation slides/rafts;
- d) the fitting of lifejackets to small children and the use of flotation cots;
- e) the briefing of passengers and warning of impact;
- f) flight deck drills should be memory drills and all flight deck crew members should carry them out in a co-ordinated manner, when ordered to do so by the captain;
- g) cabin drills should nominate individual responsibility for initiating evacuation and detail cabin crew duties in and out of the aircraft;
- h) the location and use of each item of emergency and survival equipment. Any variation between such equipment carried in individual aircraft of the same type must be shown;
- i) the carriage of disabled passengers, how they are dealt with should an emergency evacuation of the aircraft be necessary, and any need to carry additional cabin crew. The aircraft commander must be told when severely disabled persons are on board; and
- j) the procedure for warning the cabin crew of any emergency which might require the rapid evacuation of passengers from the aircraft.

### NOTES:

- 1 Operators may be required to arrange a demonstration emergency evacuation, if concern arises as to the effectiveness of procedures that are proposed.
- 2 If electrical power is maintained or reapplied after an accident or incident, the Flight Data Recorder (FDR) or Cockpit Voice Recorder (CVR) may continue to run and hence obliterate accident or incident data. Crews should wherever possible ensure electrical isolation of the FDR/CVR, particularly if reapplying power.

## 2 Actions that Should be Taken in the Event of an Uncontrolled Aeroplane Fire on the Ground

### 2.1 Fire During Take-Off

2.1.1 An uncontrolled aeroplane fire, often involving an engine on one side of the aeroplane, may result in a rejected take-off followed by an evacuation. The flight crew should include in their pre-departure brief the required actions in the event of a fire before  $V_1$ , taking into account all the prevailing circumstances. The main priority must be to stop the aeroplane safely on the runway. An automatic rejected take-off system, where fitted, is usually the best way of achieving this.

2.1.2 Where it is possible, at an appropriate speed before stopping, a turn towards the side with the fire in headwind conditions and away from it in tailwind conditions is recommended, so as to place the fire downwind of the fuselage, unless other risk factors are more significant. Other risks increase with aeroplane size, and crews of larger aircraft should consider, for example, the risks of turning at too high a speed or placing the fire outside the paved surface with possible restriction of access for Rescue and Fire Fighting Services (RFFS).

2.1.3 If turns are recommended, then simulator training and checking in rejected take-offs from close to  $V_1$  due to fire should be required at an appropriate frequency. The conditions simulated should include crosswinds (with a tailwind component on occasions), and occasionally a wet runway.

## 2.2 **Fire During Other Ground Operations**

2.2.1 Many of the factors that apply to fires during take-off will apply to fires during other ground operations. However, turning to take the wind into consideration may be easier during taxiing as speeds are lower and there may be more time. There may be occasions where turning is not possible, for example whilst parked. In this case the main priority will be, as always, the safety of passengers and crew.

## 2.3 **Operational Considerations**

2.3.1 Operators should emphasise the following items in their guidance and training material:

- The need for the flight crew to brief the relevant procedure to be followed in the event of a fire before  $V_1$  prior to take-off, taking account of prevailing conditions.
- That, where possible, the aeroplane should be brought to a stop on the runway.
- That wind direction is important to the spread and effects of a fire; if a turn in an appropriate direction can be made it may help reduce the severity of the effects of the fire. However, turning to reduce this risk is not as important as stopping safely.
- That, once stopped, pilots should assess what has occurred and should only continue to taxi if an evacuation is not required.

2.3.2 Other considerations:

- The risks arising from the fire hazard compared with other risks involved in the rejected take-off and subsequent events.
- The aeroplane manufacturers' guidance.
- The size of the aeroplane.
- The wind conditions and available sources of wind information.
- The likelihood of a turn in the wrong direction if turning is recommended.
- Access to the fire by emergency services.
- The availability of communication with RFFS on 121.6 MHz.
- Flight crew/cabin crew communication.
- Initiation of evacuation and appropriate commands.
- Conditions that require initiation of evacuation by cabin crew.

### 3 Use of Oxygen

#### 3.1 Smoke and Fumes in the Flight Deck

3.1.1 The first action in the event of smoke or fumes in the flight deck should be for the flight crew to don oxygen masks and establish communications. If during flight it appears that both pilots are suffering from some form of incapacitation or that one pilot appears to be in any way incapacitated for no obvious reason, then the flight crew should don oxygen masks without delay.

3.1.2 Operations Manual procedures should contain detailed instructions to crews on the necessity to use oxygen masks at 100% whenever contamination is present or suspected and the need to establish communications by the appropriate switch selections. In addition, cabin crew should monitor the flight deck, but this should not be to the detriment of other emergency procedures such as dealing with cabin smoke or fires, especially where only one cabin crew member is carried. Incapacitation procedures should be practised regularly during recurrent training and case based studies should be discussed at joint flight deck/cabin crews' safety training. The potential for a smoke/fumes event to adversely affect the subsequent operating effectiveness of the flight or cabin crew must be considered. Flight crews should be aware that the first action in the event of smoke or fumes in the flight deck should be to don oxygen masks and establish communications. In addition, flight and cabin crews are advised to take the following post-flight actions following a smoke/fumes incident:

- review the in-flight incident by the aircraft commander which should include consultation with the flight and cabin crew;
- determine whether any crew member felt unwell, or whether their performance was adversely affected; and
- require any crew member who felt unwell, or felt their performance was affected, not to operate as a member of the crew until they have been assessed as fit by a medical practitioner and feels fit to operate.

3.2 If the oxygen masks deploy in the cabin, or if there is any other sign of loss of or insufficient cabin pressure, in addition to the standard procedures (e.g. donning oxygen and securing themselves) the cabin crew should, as soon as is practicable, inform the flight crew of the situation and ensure that the flight crew have donned their oxygen masks. These procedures should be included in manuals reflecting the checklist system referred to in OPS 1.210 of the EU-OPS regulation and in all phases of training and checking.

### 4 Emergency Procedures for Cabin Altitude Warning

4.1 Some AFMs do not have an emergency procedure that requires donning the flight crew oxygen masks as an immediate action when the cabin altitude aural warning is activated. However, some AFMs do contain an abnormal procedure that allows the flight crew to troubleshoot the pressurisation system prior to donning the oxygen masks after the altitude warning sounds. This troubleshooting may delay the donning of the oxygen masks to the point that the flight crew may become incapable of donning their oxygen masks. Operators should ensure that crews are trained in the recognition of the cabin altitude warning aural and visual cues, and that the emergency procedures are followed in the event of a cabin altitude warning sounding including, as the first and immediate action, the donning of the flight crew oxygen masks and the establishment of communications.

## 5 Provision and Use of Oxygen and Associated Equipment

- 5.1 Information and instructions should be given to enable the commander to verify the minimum acceptable oxygen quantity or pressure and that the associated equipment is carried. Guidance should also be given on the use of the equipment. The instructions should include the procedures and routes to be adopted, when necessary, to ensure that a safe operating altitude can be quickly achieved. Due account should be taken of such variables as the amount of oxygen available and the time likely to be spent at an intermediate altitude at which the use of oxygen will be required.
- 5.2 If oxygen is not carried or if an aircraft is not correctly equipped, either temporarily or permanently, instructions on restricting operating altitudes and/or routes should be included.

## 6 Protective Breathing Equipment (PBE) Training

### 6.1 Introduction

- 6.1.1 AAIB Bulletin 4/2007 contained a report of an incident involving a DHC-8-400 aeroplane, which experienced a build-up of smoke in the flight deck and the cabin. Whilst in the cruise, the flight crew noticed an oily smell and asked the cabin crew via interphone if it was evident in the cabin. Shortly afterwards, the cabin crew heard the smoke alarm in the forward toilet compartment activate and found the compartment full of whitish smoke. They informed the flight crew via interphone and donned PBE; they could not see the length of the cabin at this stage. The cabin crew were briefed to prepare the cabin for an emergency landing and a subsequent evacuation on the runway. The evacuation was completed successfully.
- 6.1.2 The cabin crew reported that the use of PBE caused appreciable communication difficulties. They experienced difficulties in communication with passengers, both hearing and being heard, and were unable to hear the landing calls from the flight crew. One of the cabin crew removed the PBE shortly before landing because of concerns about the reduction in speech and hearing volume, and the interference from sounds experienced by the wearer such as rustling of the hood, sound of breathing and the wearer's own voice.

### 6.2 Advice

- 6.2.1 Training that is carried out using dummy training units is unlikely to replicate the problems highlighted in the report.
- 6.2.2 Operators whose crews may need to use PBE should ensure that crews receive briefings about the practical difficulties which may be experienced when using PBE, particularly barriers to effective communication. In addition, operators should ensure that practical training of flight and cabin crew includes the use of communication methods including interphones, passenger announcement systems, and face to face, to demonstrate the potential difficulties in communicating when wearing PBE. The differences between the use of live and dummy units should be emphasised. To ensure a better understanding of both flight and cabin crew actions and procedures, joint practical training should be carried out where possible.

## 7 Smoke Drills

7.1 The CAA's advice in any event involving smoke or fumes is that the first action of the crew should be to don oxygen before establishing communications and completing the appropriate drills.

7.2 This advice to UK operators is, however, not necessarily reflected in checklists provided by all aircraft manufacturers. Revision 39 of the Airbus A320 Flight Crew Operating Manual (FCOM) altered the smoke drill to require crews to action certain items before considering donning oxygen masks. Whilst this paragraph specifically addresses the drill for the A320 family of aircraft, operators should be aware that the advice is applicable to all types.

7.3 Following the publication of Revision 39 of the Airbus A320 FCOM, the CAA communicated with Airbus to highlight the advice being offered to the UK operators which was contained in FODCOMs (see below). Airbus stated that they believed their drill was the most efficient procedure to cover all kinds of situations. However, in the light of CAA guidance, Airbus understood that UK operators would need to alter the FCOM procedures in their own operational documentation and stated that they had no objection to this course of action. Airbus pointed out that a change to the smoke drill would contradict the Electronic Centralised Aircraft Monitor (ECAM) procedures and suggested that operators, instead of modifying the procedure steps, should add a note stating 'In all smoke cases, don oxygen before other checklist'.

7.4 Previous advice published by the CAA on this issue remains valid and includes:

FODCOM 17/2000:

*'The first action in the event of smoke or fumes in the flight deck should be for the flight crew to don oxygen masks and establish communications.'*

FODCOM 14/2001, resulting from AAIB recommendation 2001-47:

*'Operators are further reminded that Operations Manual procedures should contain detailed instructions to crews on such procedures. These should at least include the necessity to use oxygen masks at 100% whenever contamination is present or suspected and the need to establish communications by the appropriate switch selections.'*

FODCOM 21/2002:

*'Operators should ensure that flight crews are aware that the first action in the event of smoke or fumes in the flight deck should be for the flight crew to don oxygen masks and establish communications.'*

7.5 In conclusion, operators should ensure their abnormal and emergency procedures require flight crews to don oxygen masks and establish communications as the first action in the event of smoke or fumes in the flight deck.

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Requirement

## 8 Information on Emergency and Survival Equipment Carried

8.1 An operator shall ensure that there are lists available containing information on the emergency and survival equipment carried on board all of his aircraft, for immediate communication to rescue co-ordination centres in the event of an emergency.

8.2 The information shall include:

- the number, colour and type of life-rafts;
- details of pyrotechnics carried;
- details of emergency medical supplies;
- details of water supplies; and
- the type and frequencies of emergency portable radio equipment.

*Requirement End*

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*Requirement*

## **9      Search Procedure Checklists**

9.1 An operator shall ensure that there is a checklist carried on board the aircraft containing procedures to be followed in the case of sabotage, when searching for a bomb or improvised explosive device. This checklist must also facilitate the inspection of aircraft for concealed weapons, explosives or other dangerous devices. The checklist shall be supported by guidance on the appropriate course of action to be taken should a bomb or suspicious object be found. All crew members should be trained in the use of such checklists (see Chapter 24, paragraph 11).

*Requirement End*

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## Chapter 16 Post-flight Requirements

### 1 Retention of Documents

1.1 Certain documents are required by the ANO and/or *CAP 371 The Avoidance of Fatigue in Aircrews - Guide to Requirements* (and the requirements are mirrored in Appendix 1 to EU-OPS 1.1065 and Appendix 1 to JAR-OPS 3.1065) to be retained by the operator for a specified period. This list is not comprehensive but includes those items about which operators enquire most frequently:

| Document                                  | Period                                                                            | Requirement |
|-------------------------------------------|-----------------------------------------------------------------------------------|-------------|
| Aerodrome Operating Minima (AOM)          | 3 months (not in the aircraft)                                                    | ANO         |
| Aircraft log book                         | 2 years after aircraft destroyed/withdrawn from use                               | ANO         |
| Certificate of Maintenance Review         | 2 years after issue                                                               | ANO         |
| Certificate of Release to Service         | 2 years after aircraft destroyed                                                  | ANO         |
| Commanders' Discretion Reports            | 6 months                                                                          | CAP 371     |
| CVR/FDR                                   | Varies                                                                            | ANO Sch 4   |
| Engine log book                           | 2 years after engine destroyed/withdrawn from use                                 | ANO         |
| Loadsheets                                | 6 months (not in the aircraft)                                                    | ANO         |
| Propeller log book                        | 2 years after propeller destroyed/withdrawn from use                              | ANO         |
| Records of Duty and Rest Periods          | 12 months from the last relevant entry                                            | CAP 371     |
| Records of Flight Times/ Nature of Duties | 12 months from the last flight for which the records were required                | ANO         |
| Technical Log                             | 2 years after aircraft destroyed                                                  | ANO         |
| Training Records                          | 2 years from the last public transport flight for which the records were required | ANO         |
| Weight Schedule                           | 6 months after next weighing                                                      | ANO         |

1.2 Operators should conduct audits of returned flight documentation to provide an insight into the standard of operation being demonstrated by their crews. To facilitate these audits the following additional documents, if appropriate, which FOIs will wish to examine as part of their routine inspection programmes, should be retained for a minimum of three months after the flight to which they pertain:

- take-off/landing data card - the 'bug card';
- navigation flight plan forms/PLOGs;

- c) fuel log;
- d) flight progress chart, where appropriate; and
- e) commander's copy of the loadsheet.

In addition, for ETOPS flights:

- f) dispatch and en-route weather; relevant NOTAMs.

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*Requirement*

1.3 Completed flight preparation forms must be retained for a minimum of three months after the flight to which they pertain.

*Requirement End*

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1.4 Where procedures require little or no paper documents to be used for flight, alternative procedures, acceptable to the assigned FOI, must be used to permit access to an agreed list of electronic documents for at least the prescribed periods.

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# Chapter 17 Dangerous Goods, Weapons and Munitions of War

## 1 Policy on Transport of Dangerous Goods, Weapons and Munitions of War as applicable to all Operators

1.1 The CAA receives regularly a number of questions about the transport by air of dangerous goods, munitions of war, sporting weapons and animals. Many of these questions fall into similar categories and can be answered by reference to *CAP 668 Guidance Material on the Operator's Responsibilities for the Transport by Air of Dangerous Goods, Munitions of War, Sporting Weapons and Animals*, which contains information on areas that include:

**Dangerous Goods:** Legal requirements, aircraft equipment, catering and cabin supplies, medical aid for a patient, passenger provisions, importation of explosives, inspections for leakage or damage, loading and stowage, provision of information, ground handling and storage (including storage of explosives and radioactive materials) and training.

**Munitions of War and Sporting Weapons:** Legal requirements, definitions and calibre of weapons.

**Animals:** Legal requirements (including importation requirements), flight safety and training.

**General:** Comprehensive advice on dangerous goods emergencies (including dealing with emergencies in flight) and emergency response guidance (including the development of checklists for in-flight emergencies).

### 1.2 Carriage of Dangerous Goods

1.2.1 The Air Navigation (Dangerous Goods) Regulations (AN(DG)Rs) set out the applicable requirements, including those relating to operators' responsibilities. They require that a written Permission be issued by the CAA before dangerous goods are carried and that such goods be carried in accordance with the *ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air*. A Permission is granted when the CAA is satisfied as to the adequacy of staff training and procedures.

1.2.2 However, certain items described generally as dangerous goods do not require a Permission for carriage. These include aircraft equipment and stores, certain items carried by passengers or crew and items required for use in flight to provide veterinary aid to an animal or medical aid to a person. Guidance must be given on what items can be carried in all these circumstances.

**NOTE:** Detailed advice on what dangerous goods may be carried without a Permission and what limitations and conditions then apply can be obtained from the CAA's Dangerous Goods Office, Aviation House, Gatwick.

1.2.3 Operations Manuals must state whether or not a Permission for the carriage of dangerous goods is held. Where a Permission is not held, guidance must be given on which items comprise dangerous goods and therefore must not be carried. Where a Permission for the carriage of dangerous goods is held, information must be given to enable operators' staff or the ground handling agent to carry out their responsibilities. The instructions apply from the time dangerous goods are accepted for carriage until they cease to be in the care of the operator or ground handling agent.

- 1.2.4 Operators are required to give training to flight and cabin crew about the transport of dangerous goods by air: this training applies even if only passengers are carried, since they can be the cause of incidents arising from items they unwittingly take on board an aircraft.
- 1.2.5 Accidents and incidents arising from the carriage of dangerous goods are reportable under the Mandatory Occurrence Reporting Scheme (MORS).

### **1.3 Butane Powered Devices**

- 1.3.1 There are a number of devices that are powered by flammable gas, usually butane or a mix of butane and propane, which passengers may attempt to take onto an aircraft. These include camping gas cylinders, soldering irons and workmen's blowtorches. Flammable gas-powered devices all have a reservoir for the gas and a means of ignition; most of them also have a way of preventing accidental ignition but this can become ineffective through misuse. If a device has contained gas it is likely there will be a residue remaining in the reservoir.
- 1.3.2 Operators are reminded that they have an obligation, in accordance with the AN(DG)Rs, to ensure that dangerous goods notices for passengers are displayed prominently at places such as check-in desks, ticket sales desks and aircraft boarding areas. Since passengers may, either in ignorance or deliberately, try to take prohibited items on aircraft in either their checked or carry-on baggage, operators should warn check-in staff of this possibility and put in place procedures so that staff know what action they should take if they are suspicious of an item carried by a passenger. Operators should also regularly check to confirm that notices are in place, that they are prominent and in good condition and that they are brought to the passengers' attention at the time of check-in. There is also a legal requirement for passenger handling staff to receive training in procedures for dealing with passengers and prohibited items.

**NOTE:** The list of items that passengers can carry can be found in Part 8, Chapter 1 of the *ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air*; paragraph 2.3 of the *International Air Transport Association's Dangerous Goods Regulations*; EU-OPS ACJ OPS IEM 1.1160(c)(1) / JAR-OPS IEM OPS 3.1160(b)(5).

### **1.4 Carriage of Weapons and Munitions of War**

- 1.4.1 Munitions of war may only be carried with the written permission of the CAA. Munitions of war are any weapon, ammunition or article containing an explosive, noxious liquid or gas, or any other item which is designed or made for use in warfare or against the person. They include parts, whether components or accessories, for any such weapon, ammunition or article. It must be stated that the carriage of any munitions of war is prohibited without a Permission.
- 1.4.2 Sporting weapons may be carried with the approval of the operator and without a Permission, provided they are unloaded, are carried as passenger baggage or as cargo, and are stowed in a part of the aircraft that is inaccessible to passengers. The passenger or shipper must furnish details about such weapons to the operator before the flight. Ammunition for sporting weapons may also be carried subject to such dangerous goods limitations as are applicable. On a helicopter, if it has been accepted by the CAA that it is impracticable to use an area inaccessible to passengers, sporting weapons and ammunition may still be carried subject to any conditions stipulated by the CAA.
- 1.4.3 Accidents and incidents arising from the carriage of weapons and munitions of war are reportable under the MORS.

## 2 Carriage of Aircraft Equipment and Spares that are Classified as Dangerous Goods

2.1 The CAA is concerned about the manner in which some replacement items of aircraft equipment and spares are being offered for carriage when they are consigned as cargo. The items are those which are classified as dangerous goods. They have an inherent hazard that needs to be recognised as having the ability to cause an accident or incident unless proper procedures are followed in their preparation for and carriage by air. Such equipment and spares may well be quite safe when in their operating location but when carried as cargo on the same aircraft they could present a considerable hazard unless all the requirements applicable to their carriage as items of dangerous goods are complied with. The items that may come under this description include (but are not limited to) fire extinguishers, oxygen cylinders, chemical oxygen generators (which may be contained in passenger service units (PSU) or crew PBE, pyrotechnics for life-rafts, batteries, aerosols (such as insecticide sprays) and dry ice for the preservation of food.

2.2 There is a need to ensure that all items of aircraft equipment and spares which meet the definition of dangerous goods are identified and the correct method established for consigning them as cargo, if the need to ship them is likely to arise. Equipment and spares may need to be shipped as replacements for items which have been used or have reached their expiry date, as AOG spares, or as return items which have been replaced. Sometimes the items are needed urgently; often there is no urgency but they are still sent on that basis.

2.3 It appears that operators, their maintenance organisations and aviation spares suppliers have regarded the operator's own equipment and spares as being exempt from compliance with the requirements that would apply if those items were consigned by others. This is not the case: the transport of dangerous goods by air is governed by the provisions of the AN(DG)Rs. These require that dangerous goods be consigned and carried in accordance with the ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air*. Part 1 of these Instructions state:

*'The provisions of these Instructions do not apply to the following:*

- a) articles and substances which would otherwise be classified as dangerous goods but which are required to be aboard the aircraft in accordance with the pertinent airworthiness requirements and operating regulations or that are authorized by the State of the Operator to meet special requirements;*
- b) aerosols, alcoholic beverages, perfumes, colognes, safety matches and liquefied gas lighters carried aboard an aircraft by the operator for use or sale on the aircraft during the flight or series of flights, but excluding non-refillable gas lighters and those lighters liable to leak when exposed to reduced pressure;*
- c) dry ice intended for use in food and beverage service aboard the aircraft.*

*Unless otherwise authorized by the State of the Operator, articles and substances intended as replacements for those referred to in [(a) above], or articles and substances referred to in [(a) above] which have been removed for replacement, must be transported in accordance with the provisions of these Instructions, except that when consigned by operators, they may be carried in containers specially designed for their transport, provided such containers are capable of meeting at least the requirements for the packagings specified in these Instructions for the items packed in the containers.*

*Unless otherwise authorized by the State of the Operator, articles and substances intended as replacements for those referred to in [(b) and (c) above] must be transported in accordance with the provisions of these Instructions.'*

To help raise awareness amongst staff of maintenance organisations and aviation spares suppliers, the CAA has produced a poster entitled 'Are your spares dangerous?', which is freely available from the CAA Dangerous Goods Office in either A3 or A4 size. Alternatively it can be downloaded from: [www.caa.co.uk/dangerousgoods](http://www.caa.co.uk/dangerousgoods) > Awareness.

2.4 The AN(DG)Rs make it clear that anyone who is involved in consigning items which are dangerous goods for carriage by air has a responsibility to ensure they comply with the Technical Instructions. It is recognised there is a continuing need to ship aircraft equipment and spares and that usually they are consigned by the operator's engineering and maintenance organisation or by a company contracted to provide engineering and maintenance support. It appears that these organisations, whether part of the operator's company or as a company contracted to provide engineering and maintenance support, have not been given the information necessary, or been made aware there are requirements which apply to them, so they can meet their responsibilities or those of their company. Whilst those in the operational side of an operator's company may be aware of the provisions that apply to shipping dangerous goods and what they may constitute, this information is not passed on to those who, in practice, may be required to consign equipment and spares. Some companies or organisations appear not to have taken action to identify all aircraft spares which meet the definition of dangerous goods and be subject to the requirements of the Technical Instructions when consigned for air carriage; there needs to be a formalised method of identifying them and giving warning of their hazard, so that anyone who is called upon to prepare them for shipment knows what has to be done to make them suitable for carriage by air.

2.5 Where an operator holds a general dangerous goods Permission, the CAA asks for the name of the person who has overall responsibility in that company for dangerous goods matters. This is done so that, should the need arise, there is a focal point which the CAA can contact in the knowledge that essential safety-related information will be passed on to everyone who needs to be made aware of it. It does appear this may not have been happening and action should be taken urgently to establish whether or not a means of disseminating such information throughout the company exists and if not to ensure that such a system is put in place as soon as possible. For operators that do not hold a general dangerous goods Permission, a system still needs to exist to ensure that essential information about dangerous goods matters can be disseminated to all of those that need to know, irrespective of whether they are employed by the operator or by a company contracted to provide engineering or maintenance support.

2.6 The CAA takes a very serious view of any occurrence which may jeopardise the safety of an aircraft in flight and dangerous goods which do not comply with the provisions of the Technical Instructions are a potential hazard to an aircraft and those on board. Reported incidents concerning dangerous goods in operators' equipment and spares, which do not comply with all applicable requirements of the Technical Instructions, will continue to be investigated and when the evidence suggests a breach of the AN(DG)Rs has occurred, it is likely that action to prosecute the prime offender will commence.

### **3 Carriage of Dangerous Goods - Miscellaneous Provisions**

#### **3.1 Chemical Oxygen Generators**

3.1.1 In 1997, new requirements for the carriage of chemical oxygen generators were introduced into the ICAO *Technical Instructions for the Safe Transport of Dangerous*

*Goods by Air.* These were intended to ensure that generators when carried as cargo could be specifically identified and packed in such a way that they could not accidentally function during transport. The requirements have remained largely unchanged since that time and include a prohibition on carriage on passenger aircraft. They do not apply to chemical oxygen generators in PSUs installed ready for use or to PBEs carried as required equipment but if these items are sent as cargo for some reason (e.g. maintenance or repair) the full requirements of the Technical Instructions need to be met.

- 3.1.2 PSUs and/or PBEs containing chemical oxygen generators are installed or carried for use on many aircraft; over the past few years there has been so much publicity about them there must be few people in the aviation industry who are now unaware of what they are. Nevertheless, it appears that when they are removed from their normal operating locations, the possibility that the generator is still in place is not recognised and they are sent intact for repair or maintenance, without considering whether it is possible to remove the generator and, if not, ensuring the requirements for the transport of dangerous goods are met.
- 3.1.3 When dangerous goods are to be consigned in air transport, it is the shipper's responsibility to ensure compliance with all applicable requirements of the Technical Instructions. When aircraft equipment is being consigned, the shipper may be the operator or another organisation under contract to the operator. In either case, the operator or the contracted organisation should realise that they must satisfy all the requirements that apply to the shipper, including those of identifying the dangerous goods and ensuring they are correctly packed, marked, labelled and documented.
- 3.1.4 Operators should ensure both their own staff and those of their contractors and agents are reminded of the need to be vigilant when dealing with PSUs and PBEs, so they are not sent as air cargo still containing their chemical oxygen generators unless they are prepared for carriage in compliance with the requirements of the Technical Instructions.

### **3.2 Carriage of PBE - Dangerous Goods Requirement**

- 3.2.1 The rules regarding the carriage of PBEs containing a small chemical oxygen generator changed as a result of an amendment to ICAO *Doc 9284 Technical Instructions for the Safe Transport of Dangerous Goods by Air*. An inoperative PBE (i.e. one that is either unserviceable, has damaged packaging or seal, has passed its expiration date or has been used) is not permitted for carriage on an aircraft and must be removed prior to flight. It should be noted that the Technical Instructions do not apply to PBEs that are required to be on board an aircraft in accordance with airworthiness and operating regulations. Furthermore, operators holding the written approval of the CAA for the carriage of dangerous goods may carry PBEs, in excess of those required, on a passenger aircraft, as declared dangerous goods in cargo. Further details of the requirements additional to those that generally apply to dangerous goods can be found in the above Technical Instructions.

### **3.3 Batteries Carried Loose on Aircraft**

- 3.3.1 Batteries are now commonly carried by some operators for a number of reasons, including to provide the power source for video players, games equipment, computers, etc., used by passengers during flight. Due to the power needed by some of the items, the batteries are often lithium batteries but other types are also carried. By virtue of their size, the lithium batteries are likely to be excluded from the requirements of the Technical Instructions; other types are not likely to be dangerous goods by definition. However, the Instructions recognise that all batteries, irrespective of their type, have the potential to cause a fire through being short-

circuited across the terminals, which can happen if several batteries come into contact with each other. The Technical Instructions require that they must be packed so this cannot occur. A nickel cadmium (nicad) battery, which had been removed from a diving torch and placed loose in a passenger's cabin baggage, was short-circuited by metal objects in the bag causing them to begin to melt and emit smoke.

3.3.2 In addition to small fires on aircraft, there have been several ground incidents where fires were caused by batteries being short-circuited; there is always the potential for this to happen if the terminals of a battery or several batteries are allowed to come into contact with metal. Carrying batteries loose in a bag or in some way that does not provide protection for the terminals could lead to an incident in flight. Where they are part of the supplies placed on an aircraft, operators should ensure their cabin crew are aware of the potential danger of loose batteries, have a recognised method of storing them and do not leave excessive quantities of partly used ones on board. Where they are carried by passengers, operators should ensure their cabin crew, check-in staff and the staff of their handling agents are aware that when advising passengers about batteries there are many circumstances when it is safer to leave them in place in the equipment. If they are removed, it should be stressed that it is important to protect the terminals.

#### **3.4 Christmas Crackers and Party Poppers**

3.4.1 Christmas crackers when complete and in their retail packaging (i.e. in a box of Christmas crackers) do not have sufficient grains of explosive in the "snap" to be regarded as dangerous goods and they can be carried without restriction. However, the snaps when shipped on their own are regarded as having an explosive potential because of the number likely to be contained in a single package and they need to be consigned as dangerous goods under the classification assigned to them by the relevant competent authority and in accordance with the requirements of the Technical Instructions.

3.4.2 Although party poppers appear to contain a minimal quantity of explosive, tests have shown there is sufficient to give rise to a hazard similar to that posed by toy gun caps. Therefore, they are not considered to be suitable for carriage by passengers in their baggage and, even in their retail packaging, need to be consigned as cargo in accordance with the requirements for dangerous goods.

#### **3.5 Fireworks**

3.5.1 The Technical Instructions identify fireworks as items of dangerous goods, no matter what type and what quantity; the list of dangerous goods which passengers are permitted to take on aircraft does not include fireworks in any form, which means they are not permitted in baggage. Some passengers may deliberately hide the fact they have fireworks but most are likely to be in ignorance of the prohibition on fireworks in passengers' baggage and unaware of the potential hazard to which they are exposing an aircraft and its occupants.

#### **3.6 Carriage of Dry Ice**

3.6.1 Dry ice is one of the more frequently carried items of dangerous goods on aircraft and one of the items that passengers are permitted to have; it can be found in cargo, passengers' baggage and catering supplies. It is used as a refrigerant to preserve fresh food, keep food frozen, maintain the purity of chemicals and drugs and preserve medical specimens; therefore, it can be in the cargo compartments, passenger cabin or galley areas. Dry ice is solid carbon dioxide which at ambient temperatures gradually vaporises into carbon dioxide gas: this will be undetectable and have the effect of depleting the amount of oxygen in the atmosphere. In the open air or in a large area, the evolution of carbon dioxide is not at a sufficient rate for there to be a

problem. However, in a confined space or where there is a restricted air flow there is a potential for the percentage of carbon dioxide in the air to rise to the level at which a person will begin to feel the effects, which are a striking headache, a raised breathing rate and a feeling of being flushed, hot and uncomfortable.

3.6.2 The Technical Instructions recognise the potential hazard of dry ice in cargo by requiring shippers to arrange for each consignment so operators can ensure the total quantity of dry ice in any one area does not present a problem and ventilation safety procedures are followed. The Instructions also say that in deciding on the quantity of dry ice that can be carried in a particular cargo compartment or aircraft, operators must have regard to the aircraft type, ventilation rates and method of stowing. They must ensure ground staff are told when dry ice is on board an aircraft so they do not enter a cargo compartment until they are sure the atmosphere in it is the same as that outside.

3.6.3 The Technical Instructions permit passengers to carry up to 2 kg each of dry ice in the passenger cabin of an aircraft without informing the operator; they can have up to 2 kg in their checked baggage providing the operator has agreed. It has been calculated this quantity of dry ice in the cabin is not likely to give rise to a problem since aircraft ventilation rates are capable of dealing with the carbon dioxide that will be produced. Operators need to know if dry ice is in checked baggage so that they can prevent excessive amounts being carried in any particular area.

3.6.4 Dry ice is also put on aircraft to keep fresh the food and drinks to be served to passengers. One report stated that during a particular flight the flight deck crew felt unwell and one of the possible causes was cited as the stowage of dry ice in the galley area immediately behind the flight deck. Whilst there have been no other incidents of this kind reported and dry ice has been carried on aircraft for many years to preserve food and beverages, there may be a potential for it to be stowed so that the carbon dioxide level in the atmosphere in the vicinity of the catering supplies will be higher than normal to the extent that it has an effect on either the flight or cabin crew.

3.6.5 Although the ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air* lists dry ice as an item of dangerous goods, there is a tendency to regard it as having a minimal hazard. This may be so in an open area when the carbon dioxide can dissipate safely, but in a confined space it can have an effect on anyone who spends a prolonged period nearby. Operators need to appreciate the inherent hazard presented by dry ice and ensure that it is loaded and stowed so that it cannot affect anybody on an aircraft or those involved in handling it.

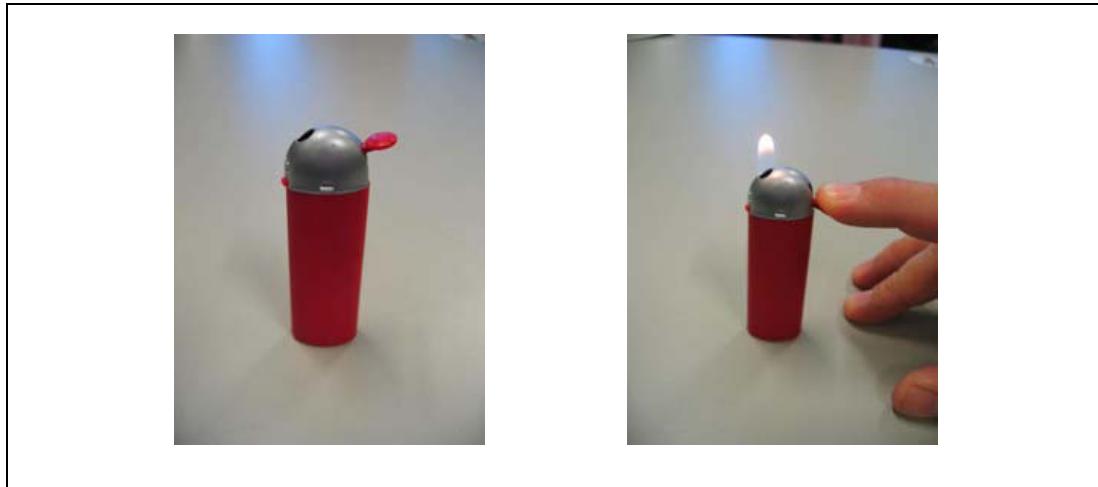
### 3.7 **Display and Use of Dangerous Goods Notices**

3.7.1 Operators have an obligation, in accordance with the AN(DG)Rs, to ensure that dangerous goods notices are displayed prominently at such places. Operators' Quality System audit programmes should include surveys of check-in areas and ticket sales desks under his management in the UK and overseas to ensure compliance with the Regulations.

### 3.8 **Potential for Inadvertent Ignition of Cigarette Lighters in Passengers' Baggage**

3.8.1 The CAA has been advised that at certain locations in Spain cigarette lighters are commonly given as free gifts attached to cartons of cigarettes. The dangers associated with the carriage of cigarette lighters in checked baggage are well known. However, a new type of lighter is being given away which is far more likely to ignite inadvertently. This is because it requires only one action to ignite, the depression of a small lever on the side of the lighter (see Figure 2 below), unlike traditional lighters

which require two actions (the turning of a friction wheel and depression of a button to release the gas).



**Figure 2** New type of lighter

- 3.8.2 With the increase in risk associated with the new type of lighter, operators should implement measures at airports where it is known that lighters are given away or sold (including those attached to cartons of cigarettes), to warn passengers of the potential hazard and remind them of the prohibition of, and the dangers associated with, packing lighters in their baggage. Examples of measures that can be taken include Tour Company Representatives' briefings, leaflets and warning notices.
- 3.8.3 A single cigarette lighter of a type specified in Part 8 of the ICAO Technical Instructions may be carried on the person, i.e. in a pocket.

### 3.9 **Battery-Powered Wheelchairs**

- 3.9.1 There have been occasions when battery-powered wheelchairs have been inadvertently activated during transit, and even caught fire.
- 3.9.2 The ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air provides for the carriage by passengers of battery-powered mobility aids, in checked baggage, subject to the approval of the operator. By far the most common battery used on mobility aids is the non-spillable type, most of which have a gel electrolyte.
- 3.9.3 During air transport, such batteries must be securely attached to the mobility aid and protected from:

- a) inadvertent operation - there are a variety of ways a wheelchair can be protected, and in the first instance the passenger should be asked how this can be achieved; generally this will involve certain actions being taken with the joystick, but may also be as simple as removing a key or turning a deactivation switch. If the latter, care must be taken during loading to ensure that the switch cannot be activated by adjacent baggage.

**NOTE:** Application of the brake is not sufficient; unless the motor is rendered inoperative the motor can still be activated and overheat;

- b) short circuit of the battery - adequate protection may already be afforded by the battery being contained in a battery box fitted to the mobility aid; and
- c) damage - including to associated wiring, by the movement of baggage, mail, stores or other cargo.

3.9.4 The Technical Instructions do not require disconnection of non-spillable batteries, since this is often very difficult to do, and if not done properly can increase the risk of a fire. Consequently, only if deactivation, as in paragraph 3.9.3(a) above, cannot be achieved should disconnection be considered. If this is done it must be ensured that the battery terminals are protected against short circuit, e.g. by the effective insulation of exposed terminals.

3.9.5 Spillable batteries are subject to further restrictions, which are detailed in Part 8, Chapter 1 of the Technical Instructions.

3.9.6 Operators should review their ticket booking process to require any passenger who intends to travel with a mobility aid to declare the fact when making the booking and provide the following information:

- the type and number of batteries fitted to the mobility aid; and
- what measures are required to prevent inadvertent operation. If disconnection is the only way that this can be achieved, details of how this is done should be requested from the passenger.

In turn, the operator should ensure that this information is provided to all relevant staff (e.g. check-in, loading).

#### **4 Recording of Dangerous Goods Occurrences Reported under the Air Navigation (Dangerous Goods) Regulations**

4.1 The CAA's Dangerous Goods Office records occurrences reported under the AN(DG)Rs. These reports are in addition to those made under the MORS and include the following:

- Dangerous goods incidents – occurrences involving the transport of dangerous goods resulting in injury, property damage, fire, breakage, spillage, leakage etc. Occurrences relating to the transport of dangerous goods which seriously jeopardise the aircraft or its occupants are also deemed to constitute a dangerous goods incident.
- Dangerous goods accidents – occurrences involving the transport of dangerous goods resulting in fatal or serious injury or major property damage.
- Dangerous goods in cargo not in accordance with the Regulations – e.g. undeclared, mispacked.
- Forbidden dangerous goods discovered in passenger baggage – i.e. items other than those permitted for carriage by passengers.

#### **5 Dangerous Goods Training Applicable to All AOC Holders**

5.1 The expiry date of dangerous goods training is absolute and an offence against the regulations will be committed if an operator's staff continue to work after their training qualification has expired. It is therefore essential that operators have a structured system that ensures the timely programming and delivery of recurrent dangerous goods training.

5.2 The requirements of the AN(DG)Rs, or EU-OPS/JAR-OPS 3 as applicable, apply to an operator whether or not they hold an approval for the carriage of dangerous goods as cargo. Operators are required to ensure that all relevant staff involved in the processing of passengers or cargo are trained in the subject of dangerous goods in

accordance with the ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air*, including the provision of recurrent training within 24 months of previous training. Examples of staff to be trained include flight crew, cabin crew, passenger handling staff and cargo handlers. Operators involved in the processing of passengers or cargo are also required to ensure that staff of any agent acting on their behalf are similarly trained.

5.3 To ensure that everyone involved is aware of their responsibilities in the transport of dangerous goods, no matter whether such goods are carried as cargo or are in the possession of passengers, training must be given so that an awareness is gained of the hazards associated with dangerous goods and how they should be dealt with in air transport. The areas that should be covered in training syllabi for the transportation of dangerous goods are itemised in the two annexes to this Chapter: Annex 1 Operations Personnel Concerned including Crew Members and Annex 2 Operations Personnel other than Crew Members. The depth of training required for each area is dependent on the responsibilities of the individuals and varies from a general appreciation to in-depth knowledge so that decisions can be taken.

## Annex 1 to Chapter 17

# Training Syllabus for Transportation of Dangerous Goods: Operations Personnel Concerned including Crew Members

### 1 Operators who do not Hold a Permanent Approval to Carry Dangerous Goods

1.1 Training must be given to crew members, passenger handling staff and security staff employed by the operator who deal with the screening of passengers and their baggage, covering the following areas:

- a) general philosophy on the transport of dangerous goods by air;
- b) limitations on dangerous goods in air transport;
- c) marking and labelling of dangerous goods packages;
- d) recognition of undeclared dangerous goods;
- e) dangerous goods in passengers' and crew baggage; and
- f) emergency procedures concerning dangerous goods.

### 2 Operators who do Hold a Permanent Approval to Carry Dangerous Goods

2.1 Training must be given covering the following areas:

- a) Flight crew members:
  - i) general philosophy on the transport of dangerous goods by air;
  - ii) limitations on dangerous goods in air transport;
  - iii) list of dangerous goods;
  - iv) marking and labelling of dangerous goods packages;
  - v) recognition of undeclared dangerous goods;
  - vi) storage and loading procedures pertaining to dangerous goods;
  - vii) provision of information about dangerous goods to the commander of the aircraft;
  - viii) dangerous goods in passengers' and crew baggage; and
  - ix) emergency procedures concerning dangerous goods.
- b) Crew members (other than flight crew members), passenger handling staff and security staff employed by the operator who deal with the screening of passengers and their baggage:
  - i) general philosophy on the transport of dangerous goods by air;
  - ii) limitations on dangerous goods in air transport;
  - iii) marking and labelling of dangerous goods packages;

- iv) recognition of undeclared dangerous goods;
- v) dangerous goods in passengers' and crew baggage; and
- vi) emergency procedures concerning dangerous goods.

Where the crew member is, for instance, a loadmaster, the areas of training appropriate may be those in paragraph 2.1(a) instead of 2.1(b). Further information concerning training can be found in *CAP 483 Safe Transport of Dangerous Goods by Air: Guidelines on Training* and *CAP 668 Transport by Air of Dangerous Goods, Munitions of War, Sporting Weapons and Animals – Guidance Material on the Operator's Responsibilities*.

## Annex 2 to Chapter 17

# Training Syllabus for Transportation of Dangerous Goods: Operations Personnel other than Crew Members

### 1 Operators who do not Hold a Permanent Approval to Carry Dangerous Goods

1.1 Training must be given covering the following areas:

- a) Staff involved in the handling of general cargo, mail or stores and baggage:
  - i) general philosophy on the transport of dangerous goods by air;
  - ii) limitations on dangerous goods in air transport;
  - iii) marking and labelling of dangerous goods packages;
  - iv) recognition of undeclared dangerous goods;
  - v) dangerous goods in passengers' and crew baggage; and
  - vi) emergency procedures concerning dangerous goods.
- b) Staff involved in accepting general cargo, mail or stores:
  - i) general philosophy on the transport of dangerous goods by air;
  - ii) limitations on dangerous goods in air transport;
  - iii) marking and labelling of dangerous goods packages;
  - iv) dangerous goods transport document and other relevant documentation;
  - v) recognition of undeclared dangerous goods;
  - vi) dangerous goods in passengers' and crew baggage; and
  - vii) emergency procedures concerning dangerous goods.

### 2 Operators who do Hold a Permanent Approval to Carry Dangerous Goods

2.1 Training must be given covering the following areas:

- a) Staff involved in the acceptance of dangerous goods for air transport:
  - i) general philosophy on the transport of dangerous goods by air;
  - ii) limitations on dangerous goods in air transport;
  - iii) general requirements for shippers;
  - iv) classification of dangerous goods;
  - v) list of dangerous goods;
  - vi) general packing requirements and packing instructions for dangerous goods;
  - vii) marking and labelling of dangerous goods packages;
  - viii) dangerous goods transport document and other relevant documentation;

- ix) acceptance of dangerous goods and the use of a checklist;
- x) recognition of undeclared dangerous goods;
- xi) storage and loading procedures pertaining to dangerous goods;
- xii) provision of information about dangerous goods to the commander of the aircraft;
- xiii) dangerous goods in passengers' and crew baggage; and
- xiv) emergency procedures concerning dangerous goods.

b) Staff involved in accepting cargo, mail or stores:

- i) general philosophy on the transport of dangerous goods by air;
- ii) limitations on dangerous goods in air transport;
- iii) marking and labelling of dangerous goods packages;
- iv) dangerous goods transport document and other relevant documentation;
- v) recognition of undeclared dangerous goods;
- vi) dangerous goods in passengers' and crew baggage; and
- vii) emergency procedures concerning dangerous goods.

c) Staff involved in the ground handling, storage and loading of cargo, mail or stores and baggage:

- i) general philosophy on the transport of dangerous goods by air;
- ii) limitations on dangerous goods in air transport;
- iii) marking and labelling of dangerous goods packages;
- iv) storage and loading procedures pertaining to dangerous goods;
- v) provision of information about dangerous goods to the commander of the aircraft;
- vi) recognition of undeclared dangerous goods;
- vii) dangerous goods in passengers' and crew baggage; and
- viii) emergency procedures concerning dangerous goods.

### **3 Areas of Training**

3.1 Depending on the responsibilities of individuals, the areas of training covered may vary from those shown above. Only those areas which are appropriate to the individual need to be covered – e.g. if an operator carries only cargo, those areas relating to passengers may be omitted.

### **4 Further Information**

4.1 Further information concerning training can be found in CAP 483 *Safe Transport of Dangerous Goods by Air: Guidelines on Training* and CAP 668 *Transport by Air of Dangerous Goods, Munitions of War, Sporting Weapons and Animals – Guidance Material on the Operator's Responsibilities*.

# Chapter 18 Handling of Accidents and Occurrences

## 1 Accident Reporting

- 1.1 Provision must be made for all operating staff to have ready access to the prescribed requirements for the reporting and investigation of accidents. In particular, operating staff should be familiar with the definitions used in the legislation, the duty to furnish information and the rules governing the removal of damaged aircraft.
- 1.2 Instructions must be issued on the reporting of accidents occurring overseas to the regulating authority of the country concerned and the action necessary to prevent removal or interference with any part of the aircraft without proper permission. This is in addition to operators' existing responsibility to inform the UK Department for Transport. The Operations Manual should contain the address, telephone and fax numbers of the Department's AAIB, and these should be reviewed regularly to ensure that they remain current.
- 1.3 If doubt exists on whether an occurrence is an accident or an incident, it should be reported to the AAIB; the details will then be passed to the CAA's Safety Investigation and Data Department (SIDD), if appropriate.

## 2 Occurrence Reporting

- 2.1 Operators and commanders of UK registered PT aircraft are amongst those required to report to the CAA potentially dangerous occurrences which endanger or, unless corrected, would have endangered an aircraft. Types of occurrence which must be reported within 96 hours of the occurrence coming to the knowledge of the person making the report are prescribed in the AN(G)Rs.
- 2.2 The CAA's SIDD operates a unified and comprehensive system for processing occurrence reports and for the dissemination of information derived from them. Further details are published in *CAP 382 The Mandatory Occurrence Reporting Scheme - Information and Guidance*. A standard occurrence report form (SRG 1601) is in use. Operators who wish to use report forms designed to meet their own requirements must obtain prior clearance from SIDD. Certain incidents, such as bird strikes and AIRPROX, should be reported on special forms.
- 2.3 Operations Manuals must specify the persons responsible for raising occurrence reports and give such guidance as will enable them to comply with the requirements of the Air Navigation Order and Regulations. Any accident notified to the Secretary of State in pursuance of the Civil Aviation (Investigation of Accidents) Regulations shall not constitute a reportable occurrence for the purpose of Mandatory Occurrence Reporting.
- 2.4 Operators must give guidance on the submission of MORs relating to ETOPS aircraft. CAP 382 states that 'any occurrence report on the aircraft type(s), subject to ETOPS approval, be prominently annotated ETOPS'. Operators seeking further information are invited to consult their assigned FOI.

### 3 Illumination of Aircraft by Bright Lights or Lasers

#### 3.1 Introduction

3.1.1 The incidence of aircraft being illuminated by bright lights or laser-generated light appears to be on the increase. It has not been confined to the illumination of aircraft on normal flight paths, but includes the deliberate illumination of aircraft involved in police duties. Laser technology has improved over the years, and it is now possible to purchase high-power lasers that could cause serious problems to aircraft operation through the distraction and possible incapacitation of pilots. Shining a light at an aircraft in flight so as to dazzle or distract the pilot is now an offence under Article 222 of the ANO 2009.

#### 3.2 Crew Mitigation Strategies

3.2.1 The time and place of unauthorised illumination of an aircraft by a bright light or laser light are impossible to predict, although there is evidence that aircraft operating in certain locations, particularly around airports, are increasingly likely to be subject to unauthorised illumination. Whenever practicable, flights within areas of recently reported laser or bright light activity should be avoided.

3.2.2 In the event that unauthorised illumination is encountered the following actions are recommended:

- If exposed to a very bright light or to laser illumination, direct eye contact with the beam should be avoided and eyes should be shielded to the maximum extent possible consistent with aircraft control and safety.
- Crews in contact with ATC should obtain authorisation before deviating from their cleared flight path, having first dealt with any immediate safety concerns. If absolutely necessary an emergency should be declared.
- Crews manually flying aircraft fitted with modern autopilots and Flight Management Systems (FMS) might need to consider autopilot re-engagement, and for subsequent flight away from the illumination to be directed by the FMS.
- As soon as possible following an incident, crews should report the incident by radio to an appropriate ATC unit. The report should include the position of the aircraft at the start of the event, altitude, colour of light or lights, originating direction and position, and any other information possible. This information could be used by ATC, police or other government agency in taking action necessary to protect the safety of UK aviation operations.

#### 3.3 Follow-up Actions

3.3.1 Crews who have been subject to bright light or laser illumination can expect minor and transient visual impairment, e.g. a retinal after-image remaining visible for a short time, or short-lived flash-type blindness of the sort to be expected after a normal 'flash' photograph has been taken. It is recommended that, following an illumination incident believed to be from a laser, affected crew members should seek medical evaluation, preferably by a qualified vision specialist, before returning to flying duties (see ICAO Document 9815, *Manual on Laser Emitters and Flight Safety*, Chapter 4). The incident should be reported to the CAA under the MORS. The MOR should give as much detail of the occurrence as possible and should include brief details of any immediate post-flight medical assistance needed or given to crew members.

3.3.2 AOC Holders should provide appropriate guidance to crews on the hazards of bright light or laser illumination and revise company standard operating procedures accordingly. They should also consider providing crews with appropriate medical guidance covering any cases of bright light or laser illumination.

## Chapter 19 International Leasing

### 1 International Leasing

- 1.1 The subject of leasing of aircraft across international boundaries is complex and often involves a number of different CAA departments as well as Foreign Authorities and the Department for Transport. Companies wishing to become involved in such leases should contact the SRG Flight Operations Strategy Department, Aviation House, Gatwick at the earliest opportunity for further guidance. For current information on leasing regulations, procedures and guidance material, please see the CAA's aircraft leasing webpage at [www.caa.co.uk/leasing](http://www.caa.co.uk/leasing).
- 1.2 Following discussions between the CAA and Transport Canada Civil Aviation, it has been agreed that the carriage and use of supplementary loop belts on UK registered aircraft operating outside the UK on wet leases to Canadian operators is no longer required. Therefore, any UK operator involved in wet leasing to a Canadian operator and not wishing to use supplementary loop belts should apply for an exemption from EU-OPS 1.730(a)(3) through their assigned FOI. Conversely, Canadian operators wet leasing to UK operators are now able to carry and use supplementary loop belts.

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# Chapter 20 Additional Procedures for Helicopters

## 1 Authority, Duties and Responsibilities of the Helicopter Commander

1.1 The operator will nominate one of the pilots to be the helicopter commander for each flight or series of flights.

### 1.2 General Responsibilities

The commander shall:

- a) maintain familiarity with relevant UK and international air legislation and agreed aviation practices and procedures; and
- b) maintain familiarity with such provisions of the Operations Manual as are necessary to fulfil his function.

### 1.3 Specific Responsibilities

The commander shall:

- a) be responsible for the safe operation of the helicopter and for the safety of its occupants and cargo when the rotors are turning;
- b) have the authority to give all commands he deems necessary for the purpose of securing the safety of the helicopter and of persons or property carried therein. All persons carried in the helicopter shall obey such commands;
- c) have the authority to disembark any person or any part of the cargo which, in his opinion, may represent a potential hazard to the safety of the helicopter or its occupants;
- d) not allow a person to be carried in the helicopter who appears to be under the influence of alcohol or drugs to the extent that the safety of the helicopter or its occupants is likely to be endangered;
- e) have the right to refuse transportation of inadmissible passengers, deportees or persons in custody if their carriage poses any risk to the safety of the helicopter or its occupants;
- f) ensure that all passengers are fully briefed on the location of emergency exits and the location and use of relevant safety and emergency equipment;
- g) ensure that all operational procedures and checklists are complied with, in accordance with the Operations Manual;
- h) not permit any crew member to perform any activity during a critical phase of flight except those duties required for the safe operation of the helicopter;
- i) decide whether or not to accept a helicopter with unserviceabilities allowed by the Configuration Deviations List or MEL;
- j) not permit:
  - i) an FDR to be disabled, switched off or erased during flight, nor permit recorded data to be erased after flight in the event of an accident or an incident that is subject to mandatory reporting; or
  - ii) a CVR to be disabled or switched off during flight unless he believes that the recorded data, which otherwise would be erased automatically, should be preserved for incident or accident investigation. Nor should he permit recorded

data to be manually erased during or after flight in the event of an accident or an incident that is subject to mandatory reporting;

- k) ensure that the pre-flight inspection has been carried out;
- l) in an emergency situation that requires immediate decision and action, take any action he considers necessary under the circumstances. In such cases he may deviate from rules, operational procedures and methods in the interest of safety. This requirement shall be the responsibility of the commander or the pilot to whom the conduct of the flight has been delegated;
- m) ensure that the weather forecast and reports for the proposed operating area and flight duration indicate that the flight may be conducted without infringing company operation minima;
- n) before commencing take-off be satisfied that, according to the information available to him, the weather at the heliport and the condition of the Final Approach and Take-Off Area (FATO) intended to be used should not prevent a safe take-off and departure; and before commencing an approach to land be satisfied that, according to the information available to him, the weather at the heliport and the condition of the FATO intended to be used should not prevent a safe approach, landing or missed approach, having regard to the performance information contained in the Operations Manual;
- o) in the absence of a qualified company engineer, ensure that helicopter refuelling is supervised with particular attention being paid to:
  - i) the correct grade and amount of fuel;
  - ii) fuel water checks;
  - iii) fire safety precautions; and
  - iv) checking filler caps for security and correct replacement after refuelling;
- p) take all reasonable steps to ensure that the helicopter mass and balance is within the calculated limits for the operating conditions;
- q) confirm that the helicopter's performance will enable it to complete the proposed flight safely;
- r) not permit any crew member to perform any activity during take-off, initial climb, final approach and landing, except those duties required for the safe operation of the helicopter;
- s) take all responsible steps to ensure that before take-off and before landing the flight and cabin crew are properly secured in their allocated seats;

**NOTE:** Cabin crew should be properly secured in their allocated seats during taxi except for during the performance of essential safety-related duties.

- t) take all reasonable steps to ensure that whenever the helicopter is taxiing, taking off or landing, or whenever he considers it advisable (e.g. in turbulent conditions), all passengers are properly secured in their seats, and all cabin baggage is stowed in the approved stowages;
- u) maintain a high personal standard of discipline, conduct and appearance as a representative of the company;
- v) ensure that, in the event of third-party maintenance being required while away from base, the procedures contained in Section 5 of the helicopter log are followed;

- w) ensure that a continuous listening watch is maintained on the appropriate radio communication frequencies whenever the flight crew is manning the aircraft for the purposes of commencing and/or conducting a flight and taxiing;
- x) ensure that ATS are used for all flights whenever available;
- y) ensure that the documents and manuals referred to in paragraph 5.2(a) are carried and remain valid throughout the flight or series of flights and are produced, when requested, to a person authorised by the CAA;
- z) ensure that abnormal or emergency situations, system malfunctions and IMC are not simulated for any purpose on PT flights;
- aa) ensure that the amount of useable fuel remaining in flight is not less than the fuel required to proceed to a heliport where a safe landing can be made, with final reserve fuel remaining; and
- bb) declare an emergency when the actual usable fuel on board is less than final reserve fuel.

## 2 Fuel Planning and Management

- 2.1 Whilst the requirements for helicopters follow the same general rules as those for aeroplanes, the ability of the helicopter to land safely away from aerodromes has been taken into account.
- 2.2 A minimum in-flight indicated fuel state must be stated for each type of helicopter and operation, with instructions on what actions to take when this fuel state is reached. Particular attention must be given to specialised activities, such as aerial crane work and winching operations. Operators are invited to discuss fuel requirements for these types of operations with their assigned FOI. Where helicopters have the facility for cross-feeding or balancing of fuel in flight, instructions must be used on procedures to be followed.
- 2.3 The following points are to be considered in the preparation of instructions on minimum quantities of usable fuel and oil to be carried:
  - a) Flights under IFR, offshore and over hostile terrain (i.e. where forced landings are not possible or which present a consequential survival problem); the total fuel carried must be at least:
    - i) route fuel from departure point to destination and fuel to carry out a go-around; plus
    - ii) fuel to an alternate; plus
    - iii) contingency reserve of 10% of i) and ii) of this paragraph; plus
    - iv) at least 30 minutes holding fuel (at loiter speed). Additional holding fuel may be required in areas where air traffic delays are likely to occur. Extra fuel may be carried at the discretion of the aircraft commander.

**NOTE:** Provided the sum total of reserve fuel carried is not less than a) iii) and iv), individual operators may define their own fuel formulae to be included in their Operations Manual.

- b) Flights by Day under VFR over non-hostile terrain (i.e. where a forced landing may be carried out with a high degree of confidence and there is not likely to be a consequential survival problem); the total fuel carried must be at least:
  - i) route fuel from departure point to destination; plus

- ii) holding fuel at destination of at least 20 minutes (at loiter speed); plus
- iii) contingency reserve of 5% of route fuel. Extra fuel may be carried at the discretion of the aircraft commander.

**NOTE:** Flights undertaken on a VFR fuel formula above must not carry out flight under IFR unless all the fuel requirements outlined in paragraph a) are met when flight in IFR starts.

2.4 Alternate landing sites must meet the landing requirements of the helicopter with a critical power unit inoperative.

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*Requirement*

2.5 Instructions on IFR alternate fuel requirements must provide for an approach to land at destination, a missed approach from DH/MDA, diversion to a suitable alternate using a realistic altitude (at least the MFA). Departure from this principle will be acceptable only in exceptional circumstances and subject to the provision of special instructions in the Operations Manual on fuel checks, calculations of PNR and weather minima at intended destination. Operations Manual instructions should be based upon JAR-OPS 3.255 and AMC 3.255 (Fuel Policy).

*Requirement End*  
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### 3 Safety Measures to be Adopted During Fuelling

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*Requirement*

#### 3.1 Passengers

3.1.1 In helicopters, pressure and gravity fuel inlets and fuel tanks are generally very close to the cabin area. Passengers should not remain in the helicopter whilst fuelling is in progress except during ambulance and life saving operations, or when prevailing weather conditions would create significant disembarkation and embarkation risks. If, due to the exceptional circumstances, passengers remain on board during fuelling operations, all main exits should be available for immediate use and the external area adjacent to the exits kept clear. In the case of helicopters where the only normal exit is on the same side as the fuelling point filler caps, then 'rotors or engine running' fuelling with passengers on board is not permitted. Clear instructions must be made available to crews in Operations Manuals, and such instructions shall be based upon JAR-OPS 3.305 and Appendix 1 to JAR-OPS 3.305 (Refuelling/defuelling with passengers embarking, on board or disembarking).

*Requirement End*  
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#### 3.2 Onshore Sites

3.2.1 Fuelling at onshore sites whilst engines/rotors are running should be considered only to cover urgent circumstances, these may include:

- a) Ambulance and other emergency missions where time is of the essence.
- b) When severe weather conditions make it inadvisable to stop engine/rotors.
- c) Adverse or unusual operational requirements at the aircraft commander's discretion, but by agreement with the fuelling undertaker.

3.2.2 If, because of the circumstances described above, it is necessary to keep the engines running extreme care should be exercised and the general guidance covering the Fuelling Zone should be followed.

### 3.3 **Offshore Sites**

3.3.1 In the severe weather and wind conditions such as experienced on offshore rigs/platforms it may be necessary to keep helicopter engines running after landing on the helideck to achieve a quick turn-round and operational reasons may also make it necessary to fuel the helicopter. In such circumstances the Commander of the helicopter should be responsible for the overall direction of the fuelling operation and the operator of the rig/platform should be made aware of the possible hazards, so that they may ensure their helicopter landing officer fully observes the necessary safety precautions.

3.3.2 Fuelling offshore must only be carried out from installations of an approved type. Helicopter operators should ensure good fire safety practices at all times fuelling takes place, including the provision of RFF personnel.

3.3.3 Further guidance on helicopter fuelling is included in the following documents:

- a) *CAP 437: Offshore Helicopter Landing Areas – Guidance on Standards*;
- b) Helicopter Operators' 'Operations Manuals' - Offshore sections;
- c) *Helicopter Landing Officer's Handbook* (Offshore Petroleum Industry Training Board);
- d) ICAO Annex 6 Part III, as amended; and
- e) ICAO Heliport Manual - Doc 9261 -AN/903, Chapter 6.

## 4 **Flight-Following for Offshore Helicopters**

4.1 Offshore helicopter flights, including operations in support of oil and gas exploitation over the UK Continental Shelf (UKCS), are largely conducted along defined route structures located in Class G airspace. Flight in Class G airspace does not require aircraft to communicate their presence to agencies or other traffic and therefore there is no mandate on operators to ensure that at all times their aircraft can be contactable through recognised communications. A flight-following system is a means by which a helicopter's location can be readily determined at any time during its offshore flight in order to assist with the provision of an effective search and recovery of survivors in the event of a ditching.

4.2 The operator of any helicopter conducting offshore operations for the purpose of PT must satisfy himself by every reasonable means that:

- a) the helicopter can maintain communications with the appropriate ATC unit or flight information service unit from 1,000 ft above the take-off surface until the commencement of the approach to land;
- b) a monitored flight-following system is available at the intended cruise altitude or level; and
- c) at every place (whether or not an aerodrome) at which it is intended to take off, and any other place (whether or not an aerodrome) at which a landing may be made, there is a responsible person whose duties include:
  - i) immediately after the helicopter's departure, the passing of the time of take-off, intended route and expected time of arrival to the responsible person at the helicopter's intended place of destination; and

ii) if the helicopter is overdue at its destination, the initiation of any necessary action in accordance with the Operations Manual.

**NOTE:** In the case of sub-paragraphs a) and b) above, operations may be conducted in accordance with alternative procedures approved in writing by the CAA.

#### 4.3 Definitions

a) **Flight-following system** means a system of providing the position of an aircraft to a person or organisation at a location remote from the aircraft at frequent and regular intervals by means other than voice communication, thereby ensuring that its position is known throughout the flight.

b) **Offshore flight** means a helicopter flight for the purpose of PT which is conducted over sea areas to or from vessels or structures, including those used in support of, or in connection with, the exploitation or exploration of mineral resources (including gas).

4.4 The overdue action procedure for offshore flights should be included in Part A of the Operations Manual.

### 5 Flight Preparation Instructions

5.1 A Navigation Log (Operational Flight Plan) must be completed for each intended flight **except** as follows:

- for those flights intended to take off and land at the same aerodrome or heliport for such purposes as air tests, training and local area pleasure flights under VFR; or
- on flights operated by small helicopters with a maximum certificated take-off mass of 3,175 kg or less, with a maximum approved seating configuration of nine or less, flying by day, and flying over routes navigated by reference to visual landmarks.

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

- a) the helicopter is airworthy;
- b) the instruments and equipment required for the flight to be conducted, in accordance with JAR-OPS 3 Subparts K and L, are available;
- c) the instruments and equipment are in operable condition except as provided in the MEL;
- d) those parts of the Operations Manual which are required for the conduct of the flight are available;
- e) the documents, additional information and forms detailed in paragraph 5.2 are on board;
- f) current maps, charts and associated documents or equivalent data are available to cover the intended operation of the helicopter, including any diversion which may reasonably be expected;
- g) ground facilities and services required for the planned flight are available and adequate;
- h) the provisions specified in the Operations Manual in respect of fuel, oil and oxygen requirements, MFAs, heliport operating minima and availability of alternate heliports (where required) can be complied with for the planned flight;
- i) the load is properly distributed and safely secured;

- j) the mass of the helicopter, at take-off, will be such that the flight can be conducted in compliance with the appropriate performance requirements of JAR-OPS 3; and
- k) any operational limitation in addition to those covered by (h) and (j) above can be complied with.

## 5.2 List of Documents, Forms and Additional Information to be Carried

- a) The following documents or copies thereof belonging to the respective helicopter are to be carried on each individual flight:
  - i) Certification of Registration;
  - ii) Certificate of Airworthiness;
  - iii) Noise Certificate (if applicable);
  - iv) Air Operator Certificate;
  - v) Aircraft Radio Licence; and
  - vi) Third-Party Liability Insurance Certificate(s).

In the case of loss or theft of these documents, the operation may continue until the flight reaches the base or a place where a replacement document can be provided.

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

**NOTE:** It is accepted that it may not be practicable for flight crew members engaged in over-water operations to carry a licence.

- c) The following manuals are to be carried on each flight:

- i) the current parts of the Operations Manual relevant to the duties of the crew (those parts which are required for the conduct of the flight must be easily accessible to the crew on board the helicopter); and
- ii) the current AFM unless it has been accepted by the CAA that Part B of the Operations Manual contains relevant data for the helicopter type.

- d) In addition to the above the following information and forms, relevant to the type and area of operation, are to be carried on each flight:

- i) operational flight plan;
- ii) helicopter technical log;
- iii) details of the filed ATS flight plan;
- iv) appropriate NOTAM/AIS briefing documentation;
- v) appropriate meteorological information;
- vi) mass and balance documentation;
- vii) notification of special categories of passenger such as security personnel (if not considered as crew), handicapped persons, inadmissible passengers, deportees and persons in custody;
- viii) notification of special loads including dangerous goods, with written information to the commander;
- ix) current maps and charts and associated documents;
- x) essential information pertinent to the intended flight concerning search and rescue services, which shall be easily accessible in the cockpit;

- xii) any other documentation which may be required by the States concerned with the flight, such as cargo manifest, passenger manifest, etc.; and
- xiii) forms to comply with the reporting requirements of the CAA and the operator.

## **6 Standard Masses for Passengers Carried on Flights in Connection with Oil and Gas Exploitation**

- 6.1 The total mass of passengers carried forms a significant proportion of a helicopter's payload. Thus, for helicopters operating at or near their Maximum Authorised Take-Off Mass (MTOM), there is a significant risk that the use of out-of-date standard passenger masses could result in helicopters exceeding their MTOM. With the perceived increase in the mass of the population, a survey was conducted in Spring 2005 to establish whether the standard passenger masses established in 1984 remained valid, or required revision. The resulting information was analysed by statisticians within the CAA Consumer Protection Group. The analysis concentrated on the standard mass applicable to a helicopter with a passenger seating capacity of 10–19, as helicopters of a lesser size in operation on the North Sea tend to use actual rather than standard passenger masses.
- 6.2 As a result of the survey, the figures showed that the average mass of a male passenger (not wearing an immersion suit) had increased from 79.4 kg to 87.6 kg. Based on the survey results and using a 95% level of probability, the standard masses required for use on a helicopter with a seating capacity of 10–19 for oil and gas related flights were 98 kg for adult males and 77 kg for adult females. These figures include a 3 kg allowance for an immersion suit and associated safety equipment.

# Chapter 21 Miscellaneous Provisions Affecting Helicopter Operations

## 1 Loading Instructions

1.1 Helicopter operators must provide loading instructions suited to the capabilities, limitations and operation of a helicopter. In preparing these instructions operators should remember that in many cases they will have to be read and implemented by personnel with little or no aviation experience, such as oil rig crews and contractors' staff. The instructions should be clear, concise and avoid the use of aviation jargon.

## 2 Minimum Weather and Associated Requirements for Public Transport Flights in VMC at Night

2.1 In the UK, an aircraft flying at night shall be flown in accordance with the IFR unless it is within a control zone on a special VFR flight.

2.2 Commercial pilots shall not, unless their licence includes an Instrument Rating (IR) validated by an Operator Proficiency Check (Instrument) OPC(I), fly for the purpose of PT other than in VMC, and shall not fly as PIC at night in VMC unless they have a minimum of 300 hours total flight time on helicopters which includes 100 hours as PIC and 10 hours at night as PF.

2.3 Further requirements are:

- Composition of crew: two pilots, or single pilot for helicopters equipped with an autopilot with at least altitude hold and heading mode which is serviceable on take-off and having an MTWA of 5,700 kg or less.
- Recency: at least three take-offs, three circuits and three landings at night in the preceding 90 days, or for a pilot with a valid IR at least three instrument approaches in the preceding 90 days. Recency may be obtained in a Synthetic Training Device (STD).
- Training and checking requirements for single pilot night VMC operations (which include a night OPC, an instrument qualification, and a night line check) are detailed in Chapter 28.

2.4 Operations Manuals must specify weather minima for VMC night flights. There are two standards of minima which are based on whether the crew/helicopter combination:

- is not** equipped and capable of intentionally entering IMC flight; or
- is** equipped and capable of entering IMC and subsequently making either an instrument approach to an airfield or regaining VMC.

2.5 For a crew/helicopter combination to be considered as IMC capable, the crew must be qualified for flight in IFR (instrument rating with appropriate training and checking), the AOC and Operations Manual must include IFR operations, the aircraft must be equipped for IFR flight, and the weather and fuel state must be suitable for the flight or any required diversion. If any element is not valid, the crew/helicopter combination is not considered to be IMC capable.

2.6 For night flight in VMC with visual ground reference, the aircraft attitude must be capable of being assessed by reference to a clearly distinguishable external horizon that may be provided either by natural lighting or by artificial lights spread deeply and widely across the track.

## 2.7 Night Weather Limits

- a) **Non-IMC Capable:** For a non-IMC capable crew/helicopter combination flying in VMC at night by visual ground reference, the visibility shall be not less than 5 km and the forecast cloud base for the route shall be not less than 1,500 ft above the highest terrain within 5 NM of the route. If the weather deteriorates en-route below the specified visual minima, the helicopter shall divert or return to the place of departure.
- b) **IMC Capable:** For an IMC capable crew/helicopter combination flying in VMC at night by visual ground reference, the visibility shall be not less than 5 km and the forecast cloud base for the route shall be not less than 1,200 ft above the highest terrain within 5 NM of the route. If the weather deteriorates en-route below the specified visual minima, the helicopter shall divert, return to the place of departure or continue the flight in IMC.
- c) Reduced weather limits may be acceptable in some very specific areas of operation, such as flight wholly within the confines of a well-illuminated urban area or well-illuminated line feature and also for some local areas, associated with the company operating base. Therefore, operators demonstrating an equivalent level of safety may be permitted some relaxation in the weather criteria stated, provided the case is acceptable to the CAA and the appropriate instructions are contained in the company Operations Manual.

## 3 Radio Altimeter (Height Bug Setting Procedures)

- 3.1 Radio Altimeters (Radalt) and Audio Voice Alerting Devices (AVADs) for PT over-water operations in helicopters are mandatory and the requirements were introduced in order to provide crews with a warning of the proximity of the helicopter to the surface of the sea, sufficiently early so as to alert the crew and enable them to conduct corrective action.
- 3.2 It is considered essential that, for flights for which there is an equipment requirement for a radio altimeter to be fitted, the Operations Manual contains a procedure for the setting of the height bug or equivalent decision height indicator. This procedure should recognise that the prime function of selecting the height indicator is to give the pilot early warning of possible impact with the sea, and therefore when formulating the procedure operators should ensure that the procedure gives their pilots "adequate" warning/reaction time. There are numerous instances of helicopter flights being conducted over water where the fitment of a radio altimeter is not mandatory but where one is nonetheless installed. Operators of these flights should consider the safety benefits of providing advice to their crews on setting height warning bugs in such circumstances.

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*Requirement*

## 4 Operations over the Sea – Survival Equipment

- 4.1 Survival suits and life jackets shall be worn by crew and passengers when operating beyond autorotational distance from land in accordance with JAR-OPS 3.827 (Crew Survival Suits) and 3.837 (Additional requirements for helicopters operating to or from helidecks located in a hostile sea area).
- 4.2 Survival equipment shall be carried in accordance with JAR-OPS 3.835 (Survival equipment) when operations are carried out over sea areas where search and rescue would be especially difficult.

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*Requirement End*

## **5 Provision of Two-Way Radio Communication during Underslung Load Operations**

5.1 The safety and efficiency of any load carrying operation depends to a large extent on the proficiency and teamwork of the ground personnel and this can be considerably enhanced by the use of portable VHF radios. This is particularly helpful when another crew member is not available on board the helicopter to monitor the behaviour of the external load. Operators should consider the use of two-way radio communications with the Ground Team when appropriate to the circumstances of the task, and should include a section in their Operations Manual detailing the procedures for the use of this two-way communication.

## **6 The Wearing of Protective Helmets by Crew Members Engaged in Underslung Load Operations**

6.1 Operators are recommended to implement procedures requiring all crew members to wear protective flying helmets when conducting underslung load operations.

## **7 Special Protective Equipment: Power Line Inspections**

7.1 A number of AOC holders exercise the privileges of Exemptions against Rules of the Air Regulations 2007 Rule 5(3)(b), on a regular and medium term basis, for the purpose of inspecting, repairing or maintaining overhead transmission lines. The Exemptions are subject to conditions designed to afford protection to vessels and vehicles unconnected with the task in hand and to persons or property on the surface. The standard Exemption does not directly address the risk to the helicopter and its occupants since it is assumed that flight will not take place within the avoid section of the appropriate height/velocity graph.

7.2 It must be stressed that when non-company personnel are carried, these flights are classified as PT, and as such, passengers are to be afforded proper protection. This means that planned flight in the avoid section of the height/velocity graph must be avoided. If prolonged penetrations of the height/velocity avoid area are unavoidable as, for example, in live-line work, a twin-engined helicopter with the appropriate performance should be employed for the task. Where it is considered suitable to use a Group B helicopter it will often be the case that the terrain, onto which a forced landing may have to be carried out, will be unsuitable in terms of slope, for instance, to ensure full PT safety protection standards to the passengers. In recognition of this unusual risk it is necessary for operators to afford the aircraft occupants added compensatory protection by requiring:

- a) aircraft engaged on the task to be equipped with full restraint harnesses for each occupant; and
- b) each occupant to wear a protective helmet; and
- c) each occupant to wear flameproof overalls and clothing (and suitable footwear).

7.3 Additionally AOC holders should brief all personnel engaged on the task of any additional hazards associated with this type of flight, the material for such briefing to be included in Operations Manuals. Initial grant and renewal of Exemptions will be conditional on meeting these requirements.

## 8 Loss of Tail Rotor Effectiveness (LTE)

8.1 A critical low speed aerodynamic flight condition resulting in an uncommanded rapid yaw rate that does not subside and which results in the loss of a helicopter if it remained unchecked was described as Loss of Tail Rotor Effectiveness (LTE). LTE results from a control margin deficiency and not a maintenance malfunction. LTE was an aerodynamic condition that could affect all single rotor helicopters that utilise a conventional tail rotor.

8.2 Whilst the design of main and tail rotor blades and tail boom assembly could affect the characteristics and susceptibility of a helicopter to LTE, it would not nullify the phenomenon entirely. Tail rotor capability was a factor and a helicopter type that is prone to reaching full pedal when, for example, hovering out of wind In Ground Effect (IGE) was more likely to suffer LTE due to high power (high, but in limits, gearbox torque or engine power) than a helicopter with good pedal margins in the same situation. Pilots should be aware of the characteristics of the helicopter they fly and be particularly aware of the amount of tail rotor pedal typically required for different flight conditions. LTE could occur on helicopters with either anti-clockwise or clockwise rotating main blades, but the direction of the relative wind that made them susceptible to LTE would differ. Thus an American design would be susceptible with the relative wind from the front left arcs, whilst French designs would be susceptible with relative winds from the front right arcs.

8.3 LTE was a condition that occurred when the flow of air through a conventional tail rotor was altered in some way, by altering either the angle or the speed at which the air passed through the rotating blades of the tail rotor system. An effective tail rotor relied on a stable and relatively undisturbed airflow in order to provide a steady and constant anti-torque reaction. The pitch, and inevitably the angle of attack of the individual blades, would determine the thrust output of the tail rotor. A change to any of these criteria would inevitably alter the amount of thrust generated. When a pilot made a yaw pedal input he would effect a thrust reaction from the tail rotor. Altering the amount of thrust delivered for the same yaw input would create an imbalance. Taking this imbalance to the extreme would result in the loss of effective control in the yawing plane and LTE would occur. This alteration of tail rotor thrust could be effected by numerous external influences. The main influences and hence the main contributing factors to LTE were:

- airflow and downdraft generated by the main rotor blades interfering with the airflow entering the tail rotor assembly;
- main blade vortices developed at the main blade tips entering the tail rotor; and
- turbulence and other natural phenomena affecting the airflow surrounding the tail rotor.

8.4 Wind tunnel tests had shown that the aerodynamic turbulence induced with all three of the above phenomena are both complex and interrelated; however, three conditions appear to be contributory factors to LTE:

- a high power setting, hence large main rotor pitch angle, induced considerable main rotor blade downwash and hence more turbulence than when the helicopter was in a low power condition;
- a slow forward airspeed, typically at speeds where translational lift was in the process of change, where airflow around the tail rotor would vary in direction and speed; and

- c) the airflow relative to the helicopter, the worst case being when the relative wind was within  $\pm 15^\circ$  of the 10 or 2 o'clock position (American/French types respectively) when the generated vortices could be blown directly into the tail rotor.
- 8.5 Certain flight activities were more at high risk to LTE than others and could find themselves in low and slow situations over geographical areas where the exact windspeed and direction are hard to determine: powerline and pipeline patrol sectors, low speed aerial filming, and in the Police and Helicopter Emergency Medical Services (HEMS) environments.
- 8.6 The exact parameters described above would vary from type to type depending on rotor orientation (clockwise or anti-clockwise), the size of the machine and the geometric and aerodynamic relationship between the main and tail rotors. However, there were certain flight phases where LTE was more likely to occur regardless of the type. The following is a general 'how to avoid LTE' list and whenever possible, avoid combinations of:
  - a) low and slow flight outside of ground effect;
  - b) winds from  $\pm 15^\circ$  of the 10 o'clock (American) or 2 o'clock (French) position;
  - c) tailwinds that may alter the onset of translational lift hence induce high power demands;
  - d) low speed downwind turns;
  - e) large changes of power at low airspeeds; and
  - f) low speed flight in the proximity of physical obstructions that may alter a smooth airflow.
- 8.7 Pilots should be aware that if they entered a flight regime where combinations of the above occurred, then they were entering a potential LTE situation. In this case they should realise the possibility of experiencing LTE, recognise its onset and be prepared to react quickly before it builds up.
- 8.8 The exact actions to be taken, having encountered the phenomenon, will vary according to the circumstances, but gaining forward airspeed will remove the problem. Awareness of LTE to assist in early detection of it, followed by firm corrective action to counter the effect, would always pay dividends. Early identification followed by the immediate application of corrective action by getting the nose forward to regain airspeed was the key to a safe recovery - hence the need for the pilot to ensure that he had the height and space available to recover.

## **9 S76 Helicopters - Rejected Take-off Manoeuvre Practice**

- 9.1 An accident involving a Sikorsky S76C Spirit resulted from the helicopter landing heavily from a practice rejected take-off, following a simulated engine failure during a short field or semi-oblique take-off profile. The practice was conducted in very light wind conditions with no reported tailwind. Two similar accidents, in similar weather conditions, have also involved S76 type helicopters.
- 9.2 From the detailed investigations carried out into all these accidents it is believed that slight and unexpected tailwinds were encountered during these practices that led in turn to significant reductions in helicopter performance due to an absence of the required translational lift. The Rotorcraft Flight Manual (RFM) for the aircraft describes this particular manoeuvre as "demanding, requiring some precision and practice in order to be flown well". The accident reports also noted "the short field and vertical

operations are demanding manoeuvres to fly. In training they are made more so by the fact that the relatively high basic weight of the helicopter requires that they are flown at a power-to-weight ratio very close to the certified limit. Ideally, training for the manoeuvre might be confined to a simulator, but there are practical difficulties associated with simulator availability and fidelity. The RFM highlights the training risks involved and suggests strategies for reducing these risks." In order to mitigate the risks associated with flying vertical and short field rejected take-off manoeuvres it is recommended that all operators of S76 helicopters carry out a risk analysis of such pilot training activities.

## 10 Helicopter Offshore Operations – Crosswind Considerations

- 10.1 During offshore operations there have been several occurrences of helicopters rolling over or becoming unstable whilst their rotors are running on helidecks.
- 10.2 An analysis of the forces acting on a helicopter on deck indicates that aerodynamic forces, arising from the lateral wind components to which a helicopter might be subjected, could cause the most significant toppling moments. Research indicates that with Minimum Pitch On Ground (MPOG) applied, the main rotor can still develop a significant amount of lift. Indeed, the lift developed by the Sikorsky S76 when on the ground is known to be approximately 30% of its weight in a 20 kt wind. Whilst crosswind limits are published for hovering flight and rotor engagement, no such limits are available to flight crews conducting parked, rotors running, operations.
- 10.3 Simply applying a crosswind limit would be unsound without taking into consideration the effects of deck motion, aircraft mass and loading, total relative wind and when inclement weather conditions are forecast or observed. A change in wind direction after touchdown could lead to an increase in crosswind component and therefore due account of the probability of a significant change in wind direction should be considered. The effects of crosswind are not symmetric and depend, to a large degree, on the direction of rotation of the helicopter's main rotor.
- 10.4 The attitude of the helicopter on deck may also be considered a factor. On landing, the helicopter can adopt a roll attitude, relative to the surface of the helideck, due to the effects of the landing gear geometry and the normal procedure of landing with the parking brake applied. After landing, it is recommended that the helicopter attitude is levelled as near as possible in relation to the deck. Releasing and reapplying the brakes to let the helicopter settle may help to achieve this.
- 10.5 Information for classifying helidecks, via the Helideck Limitations List (HLL), and imposing pitch, roll and heave operating limits has been in use for many years, and was derived empirically rather than by scientific analysis. Ongoing research into the measurement of helideck motion and the associated forces on helicopters on deck is being conducted by the CAA. Operating limitations in future are likely to be set using a helideck acceleration-based Motion Severity Index (MSI), a Wind Severity Index (WSI), individual helicopter operating limits and a helideck status scheme to control deck-handling procedures. As a result of experience, it may be that a modified system, omitting the deck motion element, would be appropriate for fixed helidecks.
- 10.6 Operators conducting operations to offshore helidecks, whether fixed or moving, should produce guidance for crews covering at least the following topics:
  - procedures for operating on decks during adverse weather conditions, including squalls;
  - aircraft attitude levelling on deck;

- crew remaining at the controls;
- procedures for passenger changeover; and
- refuelling.

## 11 Use of Vacant Flight Crew Seats

11.1 In a helicopter requiring two pilots, the use of a flight crew seat by other than a fully-qualified pilot as specified in Part D of the JAR-OPS 3 Operations Manual is not permissible.

11.2 For single-pilot operations in helicopters fitted with two pilot seats and dual controls, the second pilot's seat may be occupied by a person who is not a member of the operating crew provided that:

- a) under no circumstances should the passenger be embarked or disembarked in the co-pilot's position with rotors and/or engines running;
- b) the commander is satisfied that the person is briefed prior to embarkation on the use of the full harness, the requirement to keep it fastened, safety procedures and equipment, and the necessity for avoiding contact with any of the controls and switches;
- c) the passenger remains strapped in with the safety harness locked at all times when the rotor is turning. This is to avoid any fouling of the controls should the passenger be incapacitated for any reason;
- d) the person's stature is such that he is able to remain clear of all the flying controls while seated in a normal position; and
- e) when appropriate, the passenger wears a life-jacket at all times during flight.

**NOTE:** The commander has nevertheless an absolute right to refuse provision of a second pilot's seat for passenger use if a set or part of a set of dual controls is installed.

### 11.3 Use of Jump Seat

Passengers are not to be carried on the jump seat unless especially authorised by the relevant Company Manager. When passengers are carried on the jump seat they are to be briefed on their duties and actions in the event of an emergency. The final decision as to whether passengers may occupy the jump seat rests with the commander.

## 12 Helicopter Onshore Operating Sites

### 12.1 Onshore Operating Site Selection and Survey Procedure

The requirements for the selection of operating sites are given in Annex 1 to this Chapter.

### 12.2 Pleasure-Flying Onshore Site Requirements for H1 Helicopters

Details of the requirements affecting operating sites for pleasure flights are given in Annex 2 to this Chapter.

### 12.3 Provision of Rescue and Fire-Fighting Services (RFFS) for Helicopters at Unlicensed Onshore Operating Sites

Details of the requirements for the provision of RFFS at unlicensed operating sites are given in Annex 3 to this Chapter.

## 12.4 **Provision of Fire-Fighting Services (FFS) for Helicopters Operating at Unlicensed HEMS or Air Ambulance Operating Bases**

Details of the requirements for the provision of FFS at unlicensed HEMS or ambulance operating bases are given in Annex 4 to this Chapter.

~~~~~  
*Requirement*

## 13 **Noise and the Environment**

13.1 Helicopter operations are by their very nature generators of considerable noise. Operators shall consider the effect of such noise when planning and conducting operations, particularly repetitive operations such as Pleasure Flying. The take-off and landing phases of flight generate the greatest noise, so operations shall be planned to minimise the effect of such noise during these phases of flight wherever possible.

*Requirement End*  
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~~~~~

*Requirement*

## 14 **Carriage of Weather Radar Equipment**

14.1 Whenever helicopters carry passengers at night or under IFR in areas where potentially hazardous weather conditions such as thunderstorms exist, such helicopters shall be equipped with weather radar equipment.

*Requirement End*  
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*Requirement*

## 15 **Communications on the Aeronautical Emergency Frequency**

15.1 It is required that helicopters be equipped with radio equipment required for the type of operation being conducted. This radio equipment shall be able to provide for communications on the aeronautical emergency frequency 121.5 MHz. (See JAR-OPS 3.850 – Radio Equipment.)

*Requirement End*  
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## 16 **Sporting Weapons and Ammunition**

16.1 Sporting weapons and ammunition for such weapons may be carried without an approval from the CAA provided they are stowed in a place on the helicopter which is inaccessible to passengers during flight and, in the case of firearms, unloaded. All reasonable measures must be taken to ensure the operator is made aware of the intended carriage of sporting weapons and ammunition.

16.2 With the agreement of the CAA, sporting weapons and ammunition may be carried other than in an inaccessible location on a helicopter if it has been accepted that it is impracticable so to do, subject to any conditions stipulated by the CAA.

16.3 Ammunition for sporting weapons may be carried in passengers' checked baggage, subject to certain limitations, in accordance with the ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air*.

## 17 Operation of Helicopters Certified for Flight in Limited Icing Conditions

- 17.1 In addition to the guidance provided by ACJ OPS 3.346 on flight in expected or actual icing conditions, the following additional information was developed within the Helicopter Sub-Sectorial Team by offshore experts and is considered useful material for offshore operators to consider.
- 17.2 The limited icing approval may be granted following the achievement of limited icing certification. Extensive flight-testing in natural icing conditions is required to achieve this certification, with no extrapolation to the conditions encountered during test being permitted for certification. The CAA has certified limited icing under the aegis of *British Civil Airworthiness Requirements (BCAR) Paper G610* and the advisory material contained in CAA Paper 96009 for the past 30 years. EASA has proposed a Special Condition, based on *BCAR G610* and the advisory material, to allow limited icing certification of helicopters under JAR-29/CS-29. This Special Condition states that a helicopter limited icing approval is only envisaged for a large rotorcraft certified in accordance with JAR-29/CS-29, including Category A and IFR Approval.
- 17.3 The following information has been developed to provide guidance material for flight planning, operations and minimum equipment levels for flight in accordance with a limited icing approval. It is also intended for a specific operational case, namely over-water (sea areas) operations departing and arriving from an offshore heliport, or heliports at the coast.
- 17.4 If the helicopter has been certified for flight in limited icing conditions and it is intended to operate over water (sea areas), departing and arriving from an offshore heliport, or heliports at the coast, then the operator should ensure that procedures in the Operations Manual take additional account of the following:
  - a) The need for the flight crew to use the best available information, such as an area forecast and liquid water content and temperature profiles, to ensure that there is no unavoidable icing of a severity worse than the AFM continuous limit along the planned route at the planned altitudes or flight levels.
  - b) The aircraft's flight path should ensure that the time to vacate icing conditions by reaching a positive temperature band of air, or landing at the arrival heliport, is not greater than the time stipulated in the AFM. The band of positive temperature air should not be less than 500 ft in depth. Offshore, the positive temperature band of air should exist at or above 500 ft Above Mean Sea Level (AMSL) and onshore between MFA and MFA +500 ft. However, an onshore approach in IFR may be conducted with the 0°C isotherm below MFA providing that c) and d) below can be complied with.
  - c) If the approach is made in IMC and the 0°C isotherm is at or below the MFA with no band of positive air above MFA, then in order to ensure that a missed approach back into icing conditions will not be necessary, the minimum cloud ceiling in the landing forecast should not be less than DH/MDH + 400 ft.
  - d) Any descent into the band of positive air should take place over the sea or as part of an instrument procedure.
  - e) The aircraft MEL for flight in icing conditions should include the requirement for serviceable radio altimeter and weather/mapping radar.

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# Annex 1 to Chapter 21

## Onshore Operating Site Selection and Survey Procedure

### 1 Introduction

- 1.1 Following changes to the Rules of the Air Regulations 2007 (Rule 5) and the acceptance of JAR-OPS 3 as an operational code, heliport selection procedures have been amended to include the categorisation and survey procedures for all heliports, including those within or outside congested areas and in a hostile or non-hostile environment, as well as procedures that will permit, after approval, AOC holders operating twin-engine helicopters to self-authorise landings and take-offs within congested areas.
- 1.2 JAR-OPS 3.220 formalised the need for operators to authorise the use of heliports and to ensure that all heliports are adequate for the type of helicopter and operation concerned. Heliports are to be categorised as Estimated, Measured or Surveyed. Measured and Surveyed sites may be considered pre-surveyed as defined by AMC No. 1 to OPS 3.220. Heliport information shall be contained in a Company Landing Site Directory (CLSD).
- 1.3 A long-term Permission to allow operators to self-authorise operations to or from congested-area unlicensed heliports will only be granted for helicopters operated in Performance Class 1. Operators wishing to conduct Performance Class 2 or 3 operations to or from heliports within a congested area will be required to obtain one-off Permissions from the CAA for the specific flights.
- 1.4 Operators of twin-engine helicopters who wish to apply for the initial issue of a self-authorising long-term Permission to take off and land within a congested area, and those operators who currently hold a Permission, should include and maintain information in their Operations Manuals to reflect the procedures contained in this Annex.
- 1.5 To be granted a long-term self-authorising congested area Permission, an operator will have to satisfy the CAA as to its competence to survey sites with the appropriate equipment. Initial applicants shall establish within their CLSD a minimum of three surveyed sites, including at least one in a congested area, prior to applying for the Permission. All applicants will need to specify in the company Operations Manual detailed procedures to establish the suitability of a site.
- 1.6 The requirements are intended to ensure that all operations, including those into congested areas, can be conducted in a safe and practical manner. Operators wishing to propose variations to these procedures may do so, but before a Permission is issued they will need to satisfy the CAA that a level of safety at least equivalent to that achieved by these provisions can be ensured.

### 2 Helicopter Selection, Categorisation and Survey Procedure

#### 2.1 Operations into Congested Areas

- 2.1.1 Three types of site may be nominated by an operator as follows:
  - a) **Estimated.** A site where no reliable information has been obtained, but a reasonable estimate of site size and obstacle heights is available. For example, "it

is an open field with a length equivalent to three full-size football pitches with trees about 25 feet high at the end". The company may dispatch the aircraft in accordance with the requirements of paragraph 6.1 below provided that it is satisfied the information is reasonably accurate, that the dimensions are appropriate to the Performance Class 1 clear area Landing Distance Required (LDR) or clear area Take-Off Distance Required (TODR) (whichever is the greater), and that fuel to a suitable alternate landing site or airfield is carried. Companies should specify in their Operations Manual the minimum acceptable dimensions for using estimated sites which must be not less than the Performance Class 1 clear area LDR or TODR. In addition, they should specify the minimum acceptable size of site for helipad profiles (if applicable) to be flown on departure, following measurement of the site on arrival. The minimum acceptable size should include an allowance for the horizontal distance flown, forward of the initial hover point, during drop down following an engine failure at Take-off Decision Point (TDP).

The use of Estimated Sites is limited to day only.

b) **Measured.** A site which has been measured to an accuracy less than that required for a surveyed site, e.g. paced out or taken from GPS readings or an accurate and current large-scale map. Obstacle heights may be determined by comparison with known objects such as a standard two storey house or similar 'known' items, or may be provided from other acceptable sources such as spot heights from a large-scale chart. The dimensions should be factored by a minimum of 10% to account for any inaccuracies. Where a site is clearly an open area, e.g. a park, then it need not be measured, provided its length clearly exceeds the TODR in still air at the Weight, Altitude, Temperature (WAT) limit and there are no obstacles greater than 15 ft located at that distance. (For an AS355 this is 301 m at 2,400 kg, 15°C, 0 ft Pressure Altitude (PA) and nil wind.)

The use of Measured Sites is limited to day only.

c) **Surveyed.** A site which has been accurately measured for calculating performance which may be used by day and by night providing adequate lighting is provided. The survey need not be done by the AOC holder but must be done to the standard specified by them. The operator should record the date of the survey and ensure no changes that might affect the commander's helicopter performance calculations have occurred at the site since the last survey. Sites should be resurveyed at intervals of not less than 12 months in order to remain valid as surveyed sites.

## 2.2 Heliport Operating Requirements into Non-congested Areas

2.2.1 The procedures detailed in paragraph 2.1 should be followed, but LDR and TODR may be amended to allow Performance Class 2 or 3 operations where applicable.

## 2.3 Heliport Operating Requirements – Pleasure-Flying or Feeder Sites

2.3.1 Further requirements for pleasure-flying or feeder sites are contained in Annex 2.

## 3 Performance Requirements

3.1 Single-engine helicopter operations can only be conducted within Performance Class 3. Twin-engine helicopter operations should be conducted to the highest level of performance possible. Commanders of helicopters being conducted within Performance Classes 2 or 3 must ensure that the take-off and landing are conducted over a surface which permits a safe forced landing to be executed in the event of an

engine failure. Helicopters operating to sites where a safe forced landing is not possible must operate to Performance Class 1.

3.2 Unless specifically granted a written Permission from the CAA under Rule 5(3)(c) of the Rules of the Air Regulations 2007 to operate to Performance Class 2 or 3 standard, operations to unlicensed heliports within a congested area shall be conducted to Performance Class 1 standard.

## 4 Equipment

4.1 The Operations Manual should specify equipment required to conduct accurate surveys at surveyed heliports, and that required to be carried in the aircraft to measure distances and obstacle heights to a reasonable degree of accuracy at Measured and Estimated Heliports should be listed. Instructions of the use of all equipment should be provided. (See Appendix A.)

## 5 Personnel

5.1 The Operations Manual should specify who may authorise the use of a site, and these should be limited to named persons within the company. Initial training of 'surveyors' and their recurrent checking should be detailed, along with a method of recording it. (See Appendix A.)

## 6 Procedures to be Followed

### 6.1 Prior to Aircraft Departure

- a) Following a request to operate to a non-surveyed or congested area site, an authorised person is to assess the type of site and its suitability.
- b) If satisfied that the site is appropriate for use, the authorised person will authorise use of the site. They are responsible for ensuring that the pilot has full details of the site including the type of site and any restrictions upon its use.
- c) For flights to Estimated or Measured sites in a congested or hostile area, aircraft must be equipped with the equipment specified in paragraph 4, examples of which are at Appendix A.
- d) Following completion of steps (a) to (c), the aircraft may be dispatched on the flight. Sites in congested areas can only be authorised during the planning stage of a flight and under no circumstances can they be authorised in-flight.
- e) Normal passenger handling considerations must apply.

### 6.2 On Arrival at Estimated Sites

- a) On arrival above the site and before commencing an approach to a landing, the commander must be satisfied that it is obstacle free. He should also consider the following:
  - i) *Size*: The FATO is adequate; there should be sufficient distance to accommodate the published landing distance from 100 ft.
  - ii) *Shape*: The site accommodates the approach, go-around, touchdown and lift-off area and departure route with due regard to the appropriate Performance Class.
  - iii) *Surrounds*: Any obstacles and wires etc. have been identified and do not infringe the approach or departure flight path.

- iv) *Surface*: The surface appears satisfactory and is free from debris that may damage the helicopter and the ground is able to support a safe forced landing.
- v) *Slope*: Any slope is within the helicopter's limits.
- b) No performance credit may be taken for wind and approaches should be conducted with a headwind component.
- c) Sites are limited to use by day only.
- d) If the site lies within a congested area, prior to departure from the site it must be measured or surveyed in accordance with paragraph 2.1.1(b) or (c). For single-pilot operations, to achieve this it will be necessary for the helicopter to be shut down.

### 6.3 On Arrival at Measured Sites

- a) On arrival above the site, and before commencing an approach to a landing, the commander must be satisfied that it is obstacle free (in accordance with paragraph 6.2(a) above). He must also be satisfied that the landing distance available is not less than that required for the aircraft to land from 100 ft.
- b) No performance credit may be taken for wind and approaches should be conducted with a headwind component.
- c) If the site lies within a congested area, and if dimensions appear to be less than originally advised, then prior to departure from the site it must be re-measured or surveyed in accordance with paragraph 2.1.1(b) or (c). For single-pilot operations, to achieve this it will be necessary for the helicopter to be shut down.
- d) Sites within a congested area are limited to use by day only.

### 6.4 On Arrival at Surveyed Sites

- a) On arrival above the site, and before commencing an approach to a landing, the commander must be satisfied that it is obstacle free (in accordance with paragraph 6.2(a) above). He must also be satisfied that the site has not changed in respect of its size and obstacle domain since its most recent survey.
- b) Prior to commencing an approach to land at night, the commander shall ensure that the nominated person in charge of the site has provided sufficient lighting to enable the commander to identify the landing area from the air, to determine the landing direction and to make a safe approach and landing.
- c) Approaches should be made with a headwind component.

### 6.5 Prior to Departure from a Site

- a) If Performance Class 1 is required:
  - i) The commander is to calculate the maximum WAT limit for the conditions.
  - ii) The commander is to calculate the maximum weight at which, in the ambient conditions, the helicopter is able to clear all obstacles by a vertical interval of not less than 35 ft, assuming an engine fails at the TDP. (If a helipad profile is to be flown, allowance must be made for the horizontal distance during the drop down from TDP to 35 ft, when calculating the take-off weight.)
  - iii) The commander is to calculate the rejected take-off distance required for the lowest maximum weight calculated in paragraph 6.5(a)(i) or (ii); or the maximum weight calculated for the rejected take-off distance available.
  - iv) The maximum permissible take-off weight shall be the least of 6.5(a)(i), (ii) and (iii) above.

- v) No departure is permitted with a tailwind component.
- vi) At Measured and Estimated sites, no performance credit may be assumed for wind.
- vii) At Measured and Estimated sites, the actual horizontal and vertical dimensions used for calculating take-off performance shall be factored by 10%.
- viii) At Surveyed sites, 50% of the headwind component of the actual wind may be used where the wind velocity and direction are obtained from within the site.
- ix) Prior to a night departure, the commander shall ensure that the nominated person in charge of the site has provided sufficient lighting to enable a safe take-off.
- b) If the helicopter is to be operated in Performance Class 2 or 3, items 6.5(a)(i), (ii), (iii) and (iv) need not apply. However, the commander must satisfy himself that the aircraft can, in the event of an engine failure, either conduct a safe forced landing or continue the take-off avoiding all obstacles.

## 7 Record of Use of Self-Authorising Permission

7.1 Operators granted the Permission to self-authorise into congested area heliports will be required to record details of all flights utilising the Permission. (See Appendix B.) All sections of the pro forma must be completed and retained by the operator for a minimum of 12 months. For an initial period of six months, newly authorised operators are to inform CAA Flight Operations Inspectorate (Helicopters) (FOI(H)), in advance of the flight, of the details of the congested area heliport of intended use.

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# Appendix A to Annex 1

## Surveying Procedures and Surveyor Training

### 1 Surveying Procedures

1.1 Items of equipment that the company holds should be included in the Operations Manual. Where the company does not hold the appropriate equipment certain surveys may not be possible and the text should specify that the company is not equipped or trained to conduct full surveys for "Surveyed" sites. The following lists should be included in the Operations Manual or amended as appropriate:

1.1.1 Equipment Required

a) Full Site Surveys:

- i) Accurate distance measuring equipment, e.g. Range Finder or Measuring Wheel.
- ii) Equipment capable of calculating obstacle height, e.g. Abney Level or Inclinometer.
- iii) Magnetic compass.
- iv) Calculator.

b) Estimated or Measured Sites Surveys:

Where possible the equipment provided should be as for Full Site surveys; however, where the conditions are obviously not limiting it is acceptable to estimate the height of obstacles and pace out the distances. In these circumstances, no special equipment is required.

1.1.2 Full Survey Procedures

a) Include company forms and their use.

b) Include instructions for using the equipment for the purpose of:

- i) determining distances and the obstacle heights using the supplied equipment; and
- ii) determining bearings using a sighting compass.

c) Measurements to be plotted on the appropriate form or diagram.

d) Completing the entry in the CLSD.

e) Include the need for sites to be re-surveyed at intervals of not less than 12 months in order to remain valid as Surveyed sites.

### 2 Surveyor Training and Checking

#### 2.1 Training, Recurrent Training and Checking for Surveyors

- a) Personnel must be trained to survey 'Surveyed' sites. All line commanders should be trained to survey Estimated and Measured sites.
- b) Personnel will be retrained and rechecked annually in their ability to carry out a full site survey with the equipment.
- c) Training records will be annotated accordingly.

2.2 Surveyor training and checking is detailed in Part D of the Operations Manual.

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## Appendix B to Annex 1

### Pro Forma for Recording Use of Self-Authorising Permission

| Aircraft Type and Registration | Site Name and Grid Reference | Site Length (metres) | Site Width (metres) | Obstacle Type and Height | Pressure Altitude and OAT | RTOW/ ATOW | Take-Off Heading |
|--------------------------------|------------------------------|----------------------|---------------------|--------------------------|---------------------------|------------|------------------|
|                                |                              |                      |                     |                          |                           |            |                  |
|                                |                              |                      |                     |                          |                           |            |                  |
|                                |                              |                      |                     |                          |                           |            |                  |
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## Annex 2 to Chapter 21

# Pleasure-Flying Onshore Site Requirements for H1 Helicopters

### 1 Introduction

- 1.1 Helicopter pleasure flights normally take place in conjunction with events attended by members of the public, often in large numbers. A pleasure-flying event is defined as an operation from which it is anticipated that ten or more PT movements will be undertaken in any one day (a movement is defined as one take-off *or* one landing).
- 1.2 The helicopter operator must be satisfied that the site chosen is suitable on the day for the helicopter type to be operated there and that the site is organised and staffed in such a way as to ensure the safety of the helicopter, its passengers and persons and property on the ground. Responsibility for assessing the suitability of the site on the day(s) when the pleasure-flying event is taking place rests entirely with the helicopter operator who will base his assessment on the minimum requirements set out in his Operations Manual. If, however, the event constitutes 'an open-air assembly of more than 1,000 persons', the Rules of the Air Regulations 2007, Rule 5(3)(e) requirement for conformance with notified procedures applies. NATS UK AIP GEN 1-6, paragraph 1 is the means of notifying these procedures and it places certain responsibilities on the person in charge of the event. Therefore the operator needs to liaise closely with the event organiser to confirm that all requirements have been met.

### 2 Notification

- 2.1 Prior notification of an operator's intention to open a pleasure-flying site should be forwarded to the CAA's FOI(H) at least seven days in advance of a pleasure-flying event using the pro forma contained at Appendix A.
- 2.2 There may be occasions when operators will be asked to attend events at short notice. In these instances operators must inform FOI(H) immediately by telephone and follow up with the Appendix A pro forma stating the reason(s) for late notification. In all circumstances the required notification must be forwarded to FOI(H) by 1300 hrs on the weekday preceding the event. The same procedure should be followed in the event of one operator being substituted by another at a site that has already been pre-notified to FOI(H). If an event is cancelled for any reason, the operator should notify FOI(H) by telephone, e-mail or fax.
- 2.3 Where a site is deemed to be in a congested area, the operator should forward the pleasure-flying notification to FOI(H) in the normal way. Additionally, a request for a Rules of the Air Regulations 2007 Rule 5(3)(c) (the 1,000 feet rule) Permission should be made to the company's Assigned Inspector (AI).

### 3 Assessing the Suitability of the Site

- 3.1 Prior to an event taking place, the Operations Manager (or other nominated competent company person) should visit the proposed site to assess its suitability using the requirements contained in the company Operations Manual relating to pleasure-flying site requirements. Whilst there are generally three methods available for site assessment - Survey, Measurement and Estimation - the Estimation method

is not considered acceptable for pleasure-flying activities. It is therefore essential that the person inspecting the site is fully competent and sufficiently experienced in the role in order to exercise sound judgement.

- 3.2 On the day of the event, the pilot in charge will ensure that he has received a thorough briefing from the Operations Manager or competent person. On arriving at the site and prior to commencing operations, he will ensure that his selected approach and take-off paths remain unobstructed. He must satisfy himself that in the event of a failure of a power unit the helicopter can be landed safely in a clear area, without endangering persons or property on the ground and without causing injury to occupants in the helicopter. It is possible on the day of the event that the previously agreed site layout may, in some way, have been compromised. Should operational changes be necessary, the pilot in charge is responsible for ensuring that Operations Manual criteria are upheld. He may consider alternative means of complying with the Operations Manual and if necessary postpone the start of operations. In the event that criteria cannot be met he should inform the organisers that the operation will have to be cancelled.
- 3.3 Due consideration must always be given to environmental sensitivities and routes should be varied to minimise noise and nuisance to local residents. Complaints from members of the public regarding noise and nuisance made to the CAA will be forwarded to the helicopter operator for reply and follow-up action.

#### **4 Photographs at the Site**

- 4.1 The Operations Manager should ensure that a photographic record of the event is made whilst pleasure-flying is in progress. As a minimum, photographs should indicate the location and general layout of the site and shall include aerial views. Arrows indicating approach and departure routes and wind direction should be marked on the photographs and the site of the actual Touchdown and Lift-Off area (TLOF) marked with an 'H'. These photographs are to be kept on file for a minimum period of 18 months and will be inspected by an authorised person in the course of routine inspection activities.

#### **5 Rules of the Air Regulations**

- 5.1 By the nature of these operations, flights close to persons, vessels, vehicles and structures are often unavoidable. Pilots and site managers must be fully aware of all facets of Rule 5 of the Rules of the Air Regulations 2007 and must be scrupulous and exact in their observation of any conditions attached to any relevant Permissions granted. It is essential that no part of the flight takes place within the avoid part of the Height/Velocity curve and that in the event of failure of a power unit the pilot is able to land the helicopter safely without endangering either the aircraft and its occupants or persons and property on the ground.

#### **6 Air Traffic Control Consideration**

- 6.1 Helicopters engaged in pleasure-flying activities from temporary sites should not interfere with other air traffic. Flights within aerodrome traffic zones, both Air Traffic Zones and Control Zones, will clearly require co-ordination with local ATC. For sites outside of CAS, consideration should be given to requesting issue of a NOTAM, in accordance with NATS UK AIP ENR 1-1-4, paragraph 3. Additionally and when appropriate, the Civil Aviation Notification Procedure should be followed to advise military pilots of the activity. NATS AIC Y075/2010 refers.

## 7 Ground Personnel

7.1 A minimum of three ground personnel are required at a pleasure-flying site of whom not less than two persons shall be available for RFF duties. One of the ground crew is to be nominated as 'Site Manager' and given a written brief of duties and responsibilities. It is accepted that personnel assigned to RFF duties may conduct other duties such as marshalling and briefing, providing this does not prevent them from responding immediately in the event of an incident or accident.

## 8 Site Operations and Crowd Control

8.1 Having determined the extent of the heliport area, there will be a requirement to protect this area of operation from unauthorised or inadvertent entry by members of the public. To achieve this, it may be necessary to rope or fence off certain parts of the heliport area. A control point should be established adjacent to the TLOF; from here ground staff will be able to give passengers a final briefing and marshal them to and from the helicopter. The RFF vehicle and the registration desk will normally be located adjacent to the control point.

## 9 Passenger Briefing

9.1 Each passenger will receive a thorough verbal briefing prior to emplaning. This briefing will include 'no go' areas (the dangers of rotors), the emplaning procedure including operation of seatbelts and doors, prohibition of the use of electronic devices such as mobile telephones, exiting the helicopter in an emergency, smoking restrictions and deplaning procedures. Briefings should be conducted in a quiet area away from aircraft noise. In addition to a verbal briefing, the company should make available appropriate briefing cards and/or a briefing board showing all the above. Whenever possible, pilots should position the helicopter facing towards the passenger departure gate so that they can observe the entire deplaning and emplaning process. Where this is not practical, a marshaller should be positioned in full view of pilot and passengers in order to co-ordinate passenger movement with the pilot.

## 10 Passenger Handling and Marshalling

10.1 A record of the names of passengers on each flight should be kept. This is probably best achieved by issuing tickets or by the use of a passenger manifest.

10.2 Passenger masses must be calculated according to Operations Manual requirements. Passenger handlers/marshallers are not to undertake pleasure-flying duties unless they have received training on their duties according to the appropriate section(s) of the company Operations Manual and have received a briefing from the pilot in charge at the specific event. They should be aware of the dangers associated with rotors-running helicopters on the ground and are to be particularly vigilant for potentially hazardous movements within the area of the main and tail rotor disc sweep areas. Marshallers are to be familiar with the seatbelt and door mechanisms for the particular helicopter operating at the pleasure-flying site.

10.3 Passengers should be positively marshalled and must never be allowed to approach the helicopter unless accompanied by authorised marshallers. Dogs must be kept well clear of the helicopter at all times. Children undertaking pleasure flights must be accompanied by an adult to ensure that inadvertent or deliberate tampering with door mechanisms is avoided.

10.4 Procedures should be in place to ensure that passengers are deplaned and escorted away from the helicopter before emplaning passengers are permitted to enter the rotor disc area accompanied by authorised marshallers. Marshallers should ensure that any loose items such as hats and umbrellas are secure about the person or removed and that portable electronic items are switched off prior to emplaning. (Portable telephones and other electronic items should remain switched off throughout the flight as they may interfere with the aircraft systems.) Detailed guidance on the dangers associated with loose mobile equipment and the potential for interference with controls is contained in *JAA Administrative & Guidance Material Section 4 Temporary Guidance Leaflet No. 29 Guidance Concerning the Use of Portable Electronic Devices (PEDs) on board Aircraft*.

## 11 Minimum Site Criteria

11.1 The suitability of the site must be assessed with due regard to the specific helicopter performance. The pilot in charge at the site must assure himself that the operation can be conducted, and continue to be conducted, so that in the event of a failure of a power unit the helicopter can be landed safely in a clear area without endangering persons or property on the ground and without causing injury to occupants of the helicopter.

## 12 Final Approach and Take-Off Areas and Safety Area – Performance Class 3

(See Appendices B, C and D)

12.1 Whilst pleasure-flying may be conducted under Performance Classes 1 and 2 using multi-engine, Category A helicopters, the majority will be carried out using single-engine Category B helicopters in Performance Class 3. The primary concern in such operations is that the helicopter must, at all times, be able to carry out a safe forced landing in the event of an engine failure. This means in practice that there must be a continuous (significant) obstacle free corridor available from the commencement of take-off to the completion of the landing. The suitability of the obstacle environment surrounding the operating site to meet this requirement must be considered. This should be done during the site survey and may vary from day to day, being dependent on wind strength and direction and pilot experience.

12.2 As a minimum requirement therefore, a FATO should be established which will allow for initial acceleration and climb. Such data is no longer required to be included in the Helicopter Flight Manual and so the distance required to take off and climb to a height of 100 ft (as previously required under BCAR Section G Group B requirements) is provided in Appendix B. Also included is the (BCAR Section G) landing distance required from a height of 100 ft. Whilst it can be seen that the take-off distance is generally more demanding, the FATO should also be long enough to accommodate both, i.e. based on the longer distance of the two. The first third of the FATO length, in the direction of take-off, is to be obstacle free, whereas the remaining two thirds may contain insignificant and frangible objects. Beyond this point it is necessary to ensure that there is sufficient open space such that a safe forced landing can be made. As an example, the B206B will require a 'worst case' FATO length of 263 m.

12.3 The width of the FATO is to be a minimum of 1.5D or 24 m, whichever is the greater. The FATO is to be surrounded by a Safety Area (SA) extending from the FATO periphery out to 3 m or 0.25D, whichever is the greater. For example, the B206 will require a FATO minimum width of 24 m surrounded by an SA of 3 m width, requiring a total width of 30 m. FATO and SA slope requirements should be limited to a mean slope in any direction of 3% ( $1.72^\circ$  or 1:33.3); an SA can be an upward maximum of 4% ( $2.29^\circ$  or 1:25) from the edge of the FATO. No portion of the FATO shall have a local slope exceeding 7% ( $4.00^\circ$  or 1:14.3) where it is intended to be used by helicopters operated in Performance Class 2 or 3. No portion of the FATO shall have a local slope exceeding 5% ( $2.86^\circ$  or 1:20) for Performance Class 1 operations.

12.4 Side slope protection is required. This slope rises upwards and outwards from the sides of the SA to a height of 100 ft agl at a gradient of 1:1. The slope should not be penetrated by any fixed or temporary obstacle.

## 13 Touchdown and Lift-Off Areas

13.1 A TLOF should be established. This may or may not be contained within the FATO. The TLOF should be of sufficient size to contain a circle of diameter of at least 0.83D and be large enough to provide for safe access and exit of passengers and adequate space for marshallers. The TLOF should be essentially flat but under no circumstances should the slope on the TLOF exceed 2% ( $1.15^\circ$  or 1:50) in any direction.

## 14 Taxi-Route

14.1 The TLOF, if separated from the FATO, should be joined to the FATO by an appropriate taxi-route. This should be twice the rotor diameter (2RD) minimum width and must be suitable for emergency landings. For example, a B206 requires a minimum width of 20.3 m. The maximum slopes on the surface of the air taxiway should not exceed 10% ( $5.71^\circ$  or 1:10) transversely and 7% ( $4.00^\circ$  or 1:14.3) longitudinally. In any event the slope should not exceed the slope landing limitations of the helicopter it serves.

## 15 Take-Off and Approach Over Water

15.1 Where take-off and/or approach with the possibility of forced landing on water is planned, special operational provisions should be incorporated. These must include the use of floats, the carriage and wearing of life jackets, the provision of a radio-equipped safety boat and enhanced briefing of passengers.

## 16 Operating Adjacent to Major Roads

16.1 Low flying helicopters have the potential to cause distraction to motorists travelling along busy roads adjacent to pleasure-flying sites. Operators should avoid approach and departure routes that involve over-flying busy roads at low altitude. Where a site has potential to create a problem of this nature, the local police should be asked for advice regarding, for example, provision of warning signs and their opinion of the suitability of the site in terms of all traffic issues.

## **17 Refuelling**

- 17.1 At a pleasure-flying event, refuelling is to be conducted in accordance with procedures laid down in the Operations Manual. Rotors-running refuelling operations with Jet A1 fuel are permitted but no passengers are allowed to remain on board during the refuelling operation. Rotors-running refuelling operations with Avgas are prohibited.
- 17.2 Personnel allocated to RFF duties may conduct refuelling duties provided they are suitably protected from fuel contamination as regards the contamination of Personal Protective Equipment (PPE) for fire and rescue.

## **18 Provision of Rescue and Fire-Fighting Services (RFFS) and Medical Standards**

- 18.1 Guidance on the appropriate levels of RFFS are contained in Annex 3 to Chapter 21. This provides guidance on all types of PT operations including pleasure-flying. Operators should note the guidance pertaining to selection of primary and complementary media; personnel levels and PPE; RFF equipment; medical and first aid equipment; personnel training; selection of an appropriate vehicle; response time and response area and record-keeping.

## **Appendix A to Annex 2**

### **Pleasure/Feeder Site Notification Form**

### **Pleasure/Feeder Site\* Notification**

(\*Delete as applicable)

Notifications should be submitted:

- a) For all intended pleasure-flying - to arrive at FOI(H) at least seven days prior to the event.
- b) For 'feeder sites' - to arrive at FOI(H) at least 28 days prior to the special event.
- c) In the event of cancellation, FOI(H) should be advised as soon as practicable and, where possible, no later than 1300 hrs on the weekday preceding the event.

**OPERATOR:** .....

I confirm the above sites have been inspected and conform in all respects to the Operations Manual Criteria.

**Signed:**.....

**Date:** .....

When completed this form should be forwarded to:

FOI(H)  
Civil Aviation Authority  
Aviation House  
South Area  
Gatwick Airport  
West Sussex RH6 0YR

General telephone enquiries may be made on +44(0)1293 573443.

**NOTE:** The receipt of this notification form by the CAA does not imply approval of the site. It is the helicopter operator's responsibility to ensure that the site is suitable for the purpose and conforms in every way with their operations manual requirements.

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## Appendix B to Annex 2

### Take-Off and Landing Distances Required by Helicopters Operating to Performance Class 3

Sea Level – Nil Wind – Maximum Mass – International Standard Atmosphere (ISA) Temperature

| Type                   | Mass (kg) | Take-Off Distance to 100 ft (TD) | Emergency Landing Distance from 100 ft (LD) | Rotor Diameter (RD) | Overall Length of Helicopter Including Rotors (D Value) |
|------------------------|-----------|----------------------------------|---------------------------------------------|---------------------|---------------------------------------------------------|
| AS350 Squirrel B2      | 2,250     | *388 m                           | 460 m                                       | 10.69 m             | 12.94 m                                                 |
| Bell 206 Longranger II | 1,882     | 285 m                            | 232 m                                       | 11.28 m             | 12.96 m                                                 |
| Bell 206 Jetranger     | 1,452     | 263 m                            | 229 m                                       | 10.15 m             | 11.92 m                                                 |
| EC120B                 | 1,680     | 500 m                            | 460 m                                       | 10.20 m             | 11.52 m                                                 |
| Enstrom 480T           | 1,296     | 149 m                            | 136 m                                       | 9.75 m              | 11.23 m                                                 |
| Enstrom 280F           | 1,066     | 168 m                            | 151 m                                       | 9.75 m              | 11.16 m                                                 |
| Hughes 369             | 1,361     | 230 m                            | 189 m                                       | 8.05 m              | 9.39 m                                                  |
| SA341 Gazelle          | 1,800     | 305 m                            | 140 m                                       | 10.50 m             | 11.97 m                                                 |
| Robinson R22           | 622       | 366 m                            | 110 m                                       | 7.67 m              | 8.76 m                                                  |
| Robinson R44           | 1,089     | 427 m                            | 305 m                                       | 10.06 m             | 11.76 m                                                 |
| Hiller 12              | 1,405     | 168 m                            | 117 m                                       | 10.80 m             | 12.41 m                                                 |

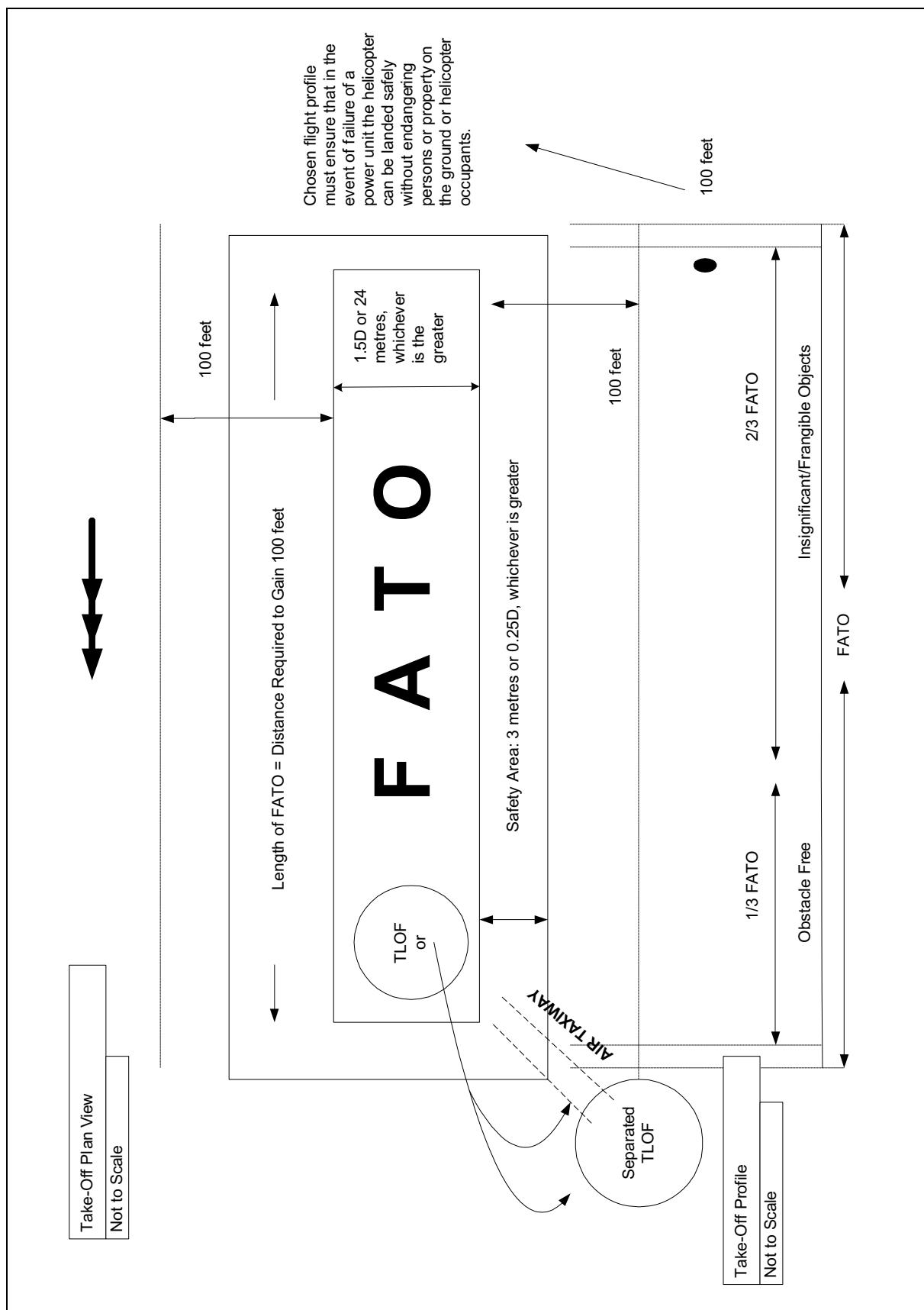
**NOTE:** Dimensions/Masses are representative figures for the types listed. Operators must use the precise dimensions contained in the specific aircraft manufacturer's Type Data or Flight Manual.

\*500 m required by AS350B

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## Appendix C to Annex 2

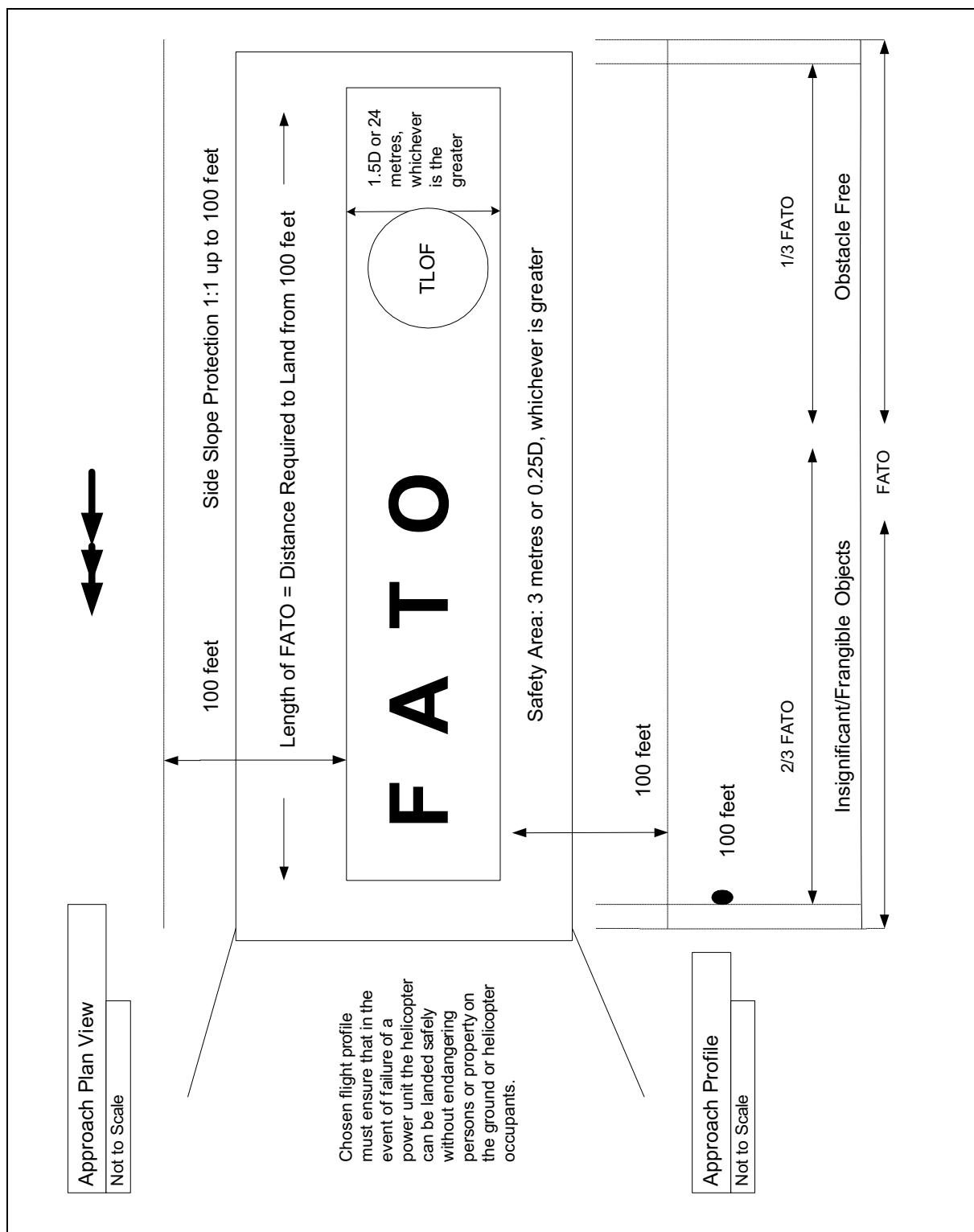
### Take-Off Plan View and Profile Schematic



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## Appendix D to Annex 2

### Approach Plan View and Profile Schematic



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## Annex 3 to Chapter 21

# Provision of Rescue and Fire-Fighting Services (RFFS) for Helicopters at Unlicensed Onshore Operating Sites

### 1 Introduction

- 1.1 This Annex details the requirements for the provision of RFFS at onshore unlicensed operating sites used for the purpose of public transport of passengers. The scales of RFFS media required for Police (PAOC) and HEMS operating bases have been aligned to correspond to the levels applicable for Low Intensity H1 operations.
- 1.2 Helicopter operators, in considering the level of risk for specific operations, should examine carefully the precise nature of each operational activity. The operator should determine the specific level of risk according to the planned level of activity and the nature of the operation as suggested in sub-paragraphs (a) to (h). The following criteria should be accounted for in the risk analysis for the determination of the appropriate level of RFFS in any safety case so that the risk remains as low as is reasonably practicable. Having determined appropriate response levels, operators are required to include in their Operations Manuals the chosen levels of response appropriate to the various types of operation carried out at unlicensed sites.
  - a) The number of planned movements and the frequency of movements.
  - b) The total number of helicopters in use at the site during any peak periods (including other operators' participation).
  - c) The number of passengers.
  - d) The type of helicopter(s) and specific hazards, e.g. construction materials used for airframes.
  - e) The nature of the terrain.
  - f) Whether 'elevated' or surface level.
  - g) Availability of local Fire and Ambulance services.
  - h) The establishment of an emergency plan.
- 1.3 The guidance given in this Annex is split into STANDARD, LOW INTENSITY and ELEVATED levels of extinguishing agent coverage. This is to make use of the levels currently in use and understood by industry. Operators can select alternative levels as appropriate to specific risk assessment and in accordance with safety case principles. Operators should not feel constrained by the quoted levels if they wish to modify them, provided this decision is supported by an appropriate risk assessment. The quoted levels can be regarded as minimal baseline requirements for the various categories.

### 2 Definitions

- 2.1 The definitions are taken from ICAO (Annex 14 Volume 2, Chapter 6) and refer to 'helicopter overall length' being the helicopter length, including the tail boom and the rotors. At surface level sites, the corresponding levels of RFFS should be used for the H2 RFFS Standard (see paragraph 3 below) or H1 RFFS Standard (see paragraph 4 below) as appropriate and these correspond to the standards which meet the CAA's

requirements for the levels of RFFS at permanent and temporary licensed surface level sites. Operators are encouraged to adopt these H1 or H2 standard levels whenever a safety case cannot be made for employing the lower levels described in paragraphs 5 and 6 below. At elevated heliports the level of extinguishing agents described in paragraph 7 is to be regarded as the absolute minimum.

- a) Helicopter Category H1: A helicopter with an overall length up to but not including 15 m.
- b) Helicopter Category H2: A helicopter with an overall length from 15 m up to but not including 24 m.
- c) There are currently no Category H3 helicopters on the UK register.
- d) Elevated Heliport: A heliport located on a raised structure on land that is at least 3 m higher than the surrounding terrain. (For guidance on applicability, see Note above paragraph 7.1.)

### 3 H2 RFFS Standard

#### 3.1 Extinguishing Agent Requirements

**Table 8** Quantities of Extinguishing Agent Required for H2 Helicopter Operations

| Foam Meeting Performance Level B |                                         | Complementary Agent      |                      |                           |
|----------------------------------|-----------------------------------------|--------------------------|----------------------|---------------------------|
| Water (litres)                   | Discharge Rate of foam solution (l/min) | Dry Chemical Powder (kg) | CO <sub>2</sub> (kg) | Other Gaseous Agents (kg) |
| 1,000                            | 500                                     | 45                       | 90                   | 45                        |

#### NOTES:

- 1) The discharge rate of complementary agents should be selected for optimum effectiveness of the agent used. Halon extinguishing agents are no longer specified for new installations. Gaseous agents, including CO<sub>2</sub>, have replaced them.
- 2) Dry chemical powder must be of the foam compatible type which is capable of dealing with Class B fire (or liquid hydrocarbons). If a high performance dry powder is used, the amount required may be reduced by 50%. High performance dry powders should be produced in accordance with the EN 615 standard. In tests, 1.5 kg of dry powder should extinguish a 144B tray with a surface area of 4.52 m<sup>2</sup>.
- 3) Where the main complementary agent is dry powder, an additional quantity of gaseous agent CO<sub>2</sub> (18 kg) is required for effective intervention in cases of aircraft engine fire.
- 4) Where the main complementary agent is gaseous, an additional quantity of dry powder (9 kg) is required to assist in dealing with a running fuel fire.
- 5) For foam meeting performance level B, it is permitted to substitute up to 50% of the gaseous complementary media requirement specified in the table for water for foam production, assuming the following media substitution rates:
  - 1 kg of gaseous agent = 0.66 litres of water; or
  - 1 kg of CO<sub>2</sub> = 0.33 litres of water.

## 4 H1 RFFS Standard

### 4.1 Extinguishing Agent Requirements

**Table 9** Quantities of Extinguishing Agent Required for H1 Helicopter Operations

| Foam Meeting Performance Level B |                                         | Complementary Agent      |                      |                           |
|----------------------------------|-----------------------------------------|--------------------------|----------------------|---------------------------|
| Water (litres)                   | Discharge Rate of foam solution (l/min) | Dry Chemical Powder (kg) | CO <sub>2</sub> (kg) | Other Gaseous Agents (kg) |
| 500                              | 250                                     | 23                       | 45                   | 23                        |

**NOTES:**

- 1) The discharge rate of complementary agents should be selected for optimum effectiveness of the agent used. Halon extinguishing agents are no longer specified for new installations. Gaseous agents, including CO<sub>2</sub>, have replaced them.
- 2) Dry chemical powder must be of the foam compatible type which is capable of dealing with Class B fire (or liquid hydrocarbons). If a high performance dry powder is used, the amount required may be reduced by 50%. High performance dry powders should be produced in accordance with the EN 615 standard. In tests, 1.5 kg of dry powder should extinguish a 144B tray with a surface area of 4.52 m<sup>2</sup>.
- 3) Where the main complementary agent is dry powder, an additional quantity of gaseous agent CO<sub>2</sub> (18 kg) is required for effective intervention in cases of aircraft engine fire.
- 4) Where the main complementary agent is gaseous, an additional quantity of dry powder (9 kg) is required to assist in dealing with a running fuel fire.
- 5) For foam meeting performance level B, it is permitted to substitute up to 50% of the gaseous complementary media requirement specified in the table for water for foam production, assuming the following media substitution rates:
  - 1 kg of gaseous agent = 0.66 litres of water; or
  - 1 kg of CO<sub>2</sub> = 0.33 litres of water.

## 5 Minimum Recommended RFFS Standard for Low-Intensity H2 Operations

5.1 In considering a risk assessment for large helicopter operations into unlicensed sites, operators should pay particular attention to the total number of occupants involved in the operation (see paragraph 1.2 above). Where the number of passengers handled at a site exceeds 38 (e.g. 19 in and 20 out) an RFFS is required. If a risk analysis indicates that some, but not the full H2 RFFS Standard (see paragraph 3 above), RFF facility is required, operators may propose suitable levels or make use of the lower level for low-intensity operations as stated below:

**Table 10** Quantities of Extinguishing Agent Required for Low-Intensity H2 Helicopter Operations

| Foam Meeting Performance Level B |                                         | Complementary Agent      |                      |                           |
|----------------------------------|-----------------------------------------|--------------------------|----------------------|---------------------------|
| Water (litres)                   | Discharge Rate of foam solution (l/min) | Dry Chemical Powder (kg) | CO <sub>2</sub> (kg) | Other Gaseous Agents (kg) |
| 230                              | 230                                     | 45                       | 90                   | 45                        |

**NOTES:**

- 1) The discharge rate of complementary agents should be selected for optimum effectiveness of the agent used. Halon extinguishing agents are no longer specified for new installations. Gaseous agents, including CO<sub>2</sub>, have replaced them.
- 2) Dry chemical powder must be of the foam compatible type which is capable of dealing with Class B fire (or liquid hydrocarbons). If a high performance dry powder is used, the amount required may be reduced by 50%. High performance dry powders should be produced in accordance with the EN 615 standard. In tests, 1.5 kg of dry powder should extinguish a 144B tray with a surface area of 4.52 m<sup>2</sup>.
- 3) Where the main complementary agent is dry powder, an additional quantity of gaseous agent CO<sub>2</sub> (18 kg) is required for effective intervention in cases of aircraft engine fire.
- 4) Where the main complementary agent is gaseous, an additional quantity of dry powder (9 kg) is required to assist in dealing with a running fuel fire.
- 5) For foam meeting performance level B, it is permitted to substitute up to 50% of the gaseous complementary media requirement specified in the table for water for foam production, assuming the following media substitution rates:
  - 1 kg of gaseous agent = 0.66 litres of water; or
  - 1 kg of CO<sub>2</sub> = 0.33 litres of water.

## **6 Minimum Recommended RFFS Standard for Low-Intensity H1 Operations**

- 6.1 Provided that a risk analysis does not show otherwise, the CAA continues to have no objection to operators' current Operations Manual requirements that do not predicate for an RFF facility. This acceptance on the part of the CAA is regarded as being appropriate for limited PT helicopter movements up to ten movements per day.
- 6.2 Pleasure-flying operations may continue to be operated at the current Operations Manual requirements in accordance with the guidance published in Annex 2: Pleasure-Flying Onshore Site Requirements for H1 Helicopters. Operators can continue to use this minimal level of RFFS provided that it is applied only where single aircraft/single spot pleasure-flying operations take place. Any changes to these parameters should show resultant and appropriate increases in the level of RFF provided. The minimum extinguishing agent levels are listed in paragraph 6.3 below and may be adopted for use in other low-intensity H1 operations as described in paragraph 6.1 above.

### **Extinguishing Agent Requirements**

**Table 11** Quantities of Extinguishing Agent Required for Low-Intensity H1 Helicopter Operations

| <b>Pre-mixed Foam Solution Meeting Performance Level B</b> |                                                 | <b>Complementary Agent</b> |            |                      |                           |
|------------------------------------------------------------|-------------------------------------------------|----------------------------|------------|----------------------|---------------------------|
| Pre-mix (litres)                                           | Minimum Discharge Rate of foam solution (l/min) | Dry Chemical Powder (kg)   | and either | CO <sub>2</sub> (kg) | Other Gaseous Agents (kg) |
| 90                                                         | 60                                              | 18                         |            | 18                   | 9                         |

**NOTES:**

- 1) Complementary agents should be capable of discharge at an effective rate, delivered from one or two extinguishers. Halon extinguishing agents are no longer specified for new installations. Gaseous agents, including CO<sub>2</sub>, have replaced them.

2) Dry chemical powder must be of a foam compatible type which is capable of dealing with class B fire (or liquid hydrocarbons).

6.4 Where a risk analysis predicates for an increase in the above levels, but does not indicate a need for the full ICAO H1 RFF Standard (see paragraph 4 above), operators may select suitable levels or make use of the levels described in paragraph 5 above.

## 7 Minimum RFFS Standard for Elevated Heliports (H1 and H2)

**NOTE:** In paragraph 2.1 d) an elevated heliport is defined as a heliport located on a raised structure on land that is at least 3 m higher than the surrounding terrain. For heliports located on raised structures that are less than 3 m above the surrounding terrain the application of the following criteria is not considered mandatory, provided that it can be determined through a risk analysis that any additional risks that arise due to the location and elevation of the heliport above the surrounding terrain are fully mitigated (see also paragraph 1.2). An essential element of the risk analysis is the requirement to ensure an effective fire-fighting intervention (e.g. by Local Authority Fire and Rescue Appliances) that guarantees rapid, unimpeded access to any location on the raised heliport structure to address all foreseeable helicopter fire scenarios that may occur on the heliport regardless of wind strength/direction or accident location and with due regard to the response time objectives stated in paragraphs 12.1, 12.2 and 12.4. Similar additional considerations will need to be assessed where a heliport is located on a mounded site that rises above the surrounding local terrain. It is common practice to provide raised structures that allow for other activities to occur beneath the heliport, such as car parking. In these instances there may be additional issues to consider in a risk analysis, which may impinge on health and safety legislation.

7.1 The CAA has assessed the level of risk from fire following an accident on an elevated heliport as being potentially catastrophic. All flights for which Rules of the Air Regulations 2007 Rule 5 Permissions are necessary will attract a condition that the recommended levels of protection and response for operations to elevated heliports are in accordance with ICAO *Annex 14, Volume II*, Chapter 6 (Table 6.3) and the ICAO *Heliport Manual* Chapter 6. This condition will be applied to all Permissions whether issued for PT operations by FOI(H) or for private operations by FOI(GA). The minimum levels for extinguishing agents are listed in paragraph 7.6 below.

7.2 Particular problems arise from the operation of helicopters at elevated heliports that require special attention to the RFFS provisions. One important aspect is the confined and restricted space available on an elevated heliport. Where a Fixed Monitor System (FMS) is provided, the confined nature of the heliport may limit locations for siting foam monitors and the location of hand-controlled foam branch pipes, and may have an impact on general fire-fighting tactics. It is foreseeable that an accident could result in a fuel spill with a fire situation which could quickly cut off or reduce the already limited routes of escape to a place of safety for the helicopter occupants. The purpose of providing RFFS at an elevated heliport is to rapidly suppress any fire that occurs within the confines of the heliport or its appendages, and to rescue personnel from the heliport and evacuate them to safety. It is necessary to assume that no assistance will be available from external sources during the initial suppression, control and evacuation phases. Local fire and rescue authorities should be informed immediately of any accident or incident on the heliport to allow post-initial fire and specialist salvage assistance to be provided by them. To this end, local fire and rescue authorities should be familiarised with access routes to the heliport and the integral capabilities of on-site RFFS. Consequently, the requirement for the amount of extinguishing agent at elevated heliports is based on a fire-fighting action which may be required to last longer than at surface level heliports. In addition, at an elevated

heliport, RFFS should be immediately available on or in the vicinity of the landing area whilst helicopter operations are being conducted in order to achieve a rapid 'knock-down' response and so meet the more demanding response-time objectives of paragraph 12.3.

7.3 It is considered essential at an elevated heliport to be able to apply the fire-fighting agents, both principal and complementary, to the entire landing area irrespective of the wind strength/direction. Foam monitors should be positioned at different locations around the heliport so as to ensure the application of foam to all parts of the landing area, taking account of likely wind conditions (i.e. direction and speed) and taking account of the capabilities of helicopters operating to the heliport. Foam monitors should preferably be operable from a remote control position located clear of the landing area and easily accessible. At an elevated heliport operating H1 helicopters only, an FMS comprising at least two fixed monitors should be provided. It should be assumed that one monitor could be rendered ineffective either by being downwind of an incident or being damaged or destroyed as a result of an accident or incident occurring. This requires that each monitor in a two-monitor system is capable of delivering foam in a jet spray/aspirated pattern at 100% of the required discharge rate. Therefore, for an H1 elevated heliport, the minimum discharge rate of foam solution will be at 250 l/min from each monitor. To cope with small localised fires and clean-up operations and to access areas of the heliport or appendages which may otherwise be inaccessible to an FMS, e.g. due to the prevailing weather conditions, it is necessary to provide at least one additional hand-controlled foam branch pipe for the delivery of aspirated foam with a minimum discharge rate of 225 l/min.

7.4 At an elevated heliport operating Category H2 helicopters at least two fixed monitors should be provided. It should be assumed that one monitor could be rendered ineffective either by being downwind of an incident or being damaged or destroyed as a result of an accident or incident occurring. This assumption requires that each monitor in a two-monitor system is capable of delivering foam in a jet spray/aspirated pattern at 100% of the required discharge rate. Therefore, at an H2 elevated heliport, the minimum discharge rate of foam solution will be at 500 l/min from each monitor. Foam monitors should be positioned at different locations around the heliport so as to ensure the application of foam to all parts of the landing area, taking account of likely wind conditions (i.e. direction and speed) and taking account of the capabilities of helicopters operating to the heliport. Foam monitors should preferably be operable from a remote control position located clear of the landing area and easily accessible. To cope with small localised fires and clean-up operations and to access areas of the heliport or appendages which may otherwise be inaccessible to an FMS, e.g. due to the prevailing weather conditions, it is necessary to provide at least one additional hand-controlled foam branch pipe for the delivery of aspirated foam with a minimum discharge rate of 225 l/min.

7.5 As an effective alternative to an FMS and supplementary hand-controlled branch pipes, consideration may be given to the provision of a Deck-Integrated Fire-Fighting System (DIFFS). These systems typically consist of a series of pop-up nozzles, which rise through the surface of a heliport to provide an effective spray distribution of aspirated foam, having both a horizontal and a vertical component, delivered to the whole of the landing area. These systems are being utilised effectively for offshore helidecks and further technical guidance is available in CAP 437 *Offshore Helicopter Landing Areas – Guidance on Standards*, Chapter 5.

## 7.6 Extinguishing Agent Requirements

**Table 12** Quantities of Extinguishing Agent Required for Elevated Heliports

| Helicopter RFF Category | Foam Meeting Performance Level B |                                         | Complementary Agent         |                      |                           |
|-------------------------|----------------------------------|-----------------------------------------|-----------------------------|----------------------|---------------------------|
|                         | Water (litres)                   | Discharge Rate of foam solution (l/min) | Dry Chemical or Powder (kg) | CO <sub>2</sub> (kg) | Other Gaseous Agents (kg) |
| H1                      | 2,500                            | 250                                     | 45                          | 90                   | 45                        |
| H2                      | 5,000                            | 500                                     | 45                          | 90                   | 45                        |

### NOTES:

- 1) The discharge rate of complementary agents should be selected for optimum effectiveness of the agent used. Halon extinguishing agents are no longer specified for new installations. Gaseous agents, including CO<sub>2</sub>, have replaced them.
- 2) Dry chemical powder must be of the foam compatible type which is capable of dealing with Class B fire (or liquid hydrocarbons). If a high performance dry powder is used, the amount required may be reduced by 50%. High performance dry powders should be produced in accordance with the EN 615 standard. In tests, 1.5 kg of dry powder should extinguish a 144B tray with a surface area of 4.52 m<sup>2</sup>.
- 3) Where the main complementary agent is dry powder, an additional quantity of gaseous agent CO<sub>2</sub> (18 kg) is required for effective intervention in cases of aircraft engine fire.
- 4) Where the main complementary agent is gaseous, an additional quantity of dry powder (9 kg) is required to assist in dealing with a running fuel fire.
- 5) For foam meeting performance level B, it is permitted to substitute up to 50% of the gaseous complementary media requirement specified in the table for water for foam production, assuming the following media substitution rates:
  - 1 kg of gaseous agent = 0.66 litres of water; or
  - 1 kg of CO<sub>2</sub> = 0.33 litres of water.

## 8 Rescue Equipment

8.1 The table of equipment below is the generic minimum requirement for all categories described regardless of the level of extinguishing agent selected.

**Table 13** Quantities of Rescue Equipment Required

| Heliport RFF Category:                            | H1 or H2 | Elevated H1 or H2 |
|---------------------------------------------------|----------|-------------------|
| Adjustable Wrench                                 | 1        | 1                 |
| Axe, rescue, large (non wedging or aircraft type) | 1        | 1                 |
| Cutters, bolt 600 mm                              | 1        | 1                 |
| Crowbar, 1.05 m                                   | 1        | 1                 |
| Hook, grab or salving                             | 1        | 1                 |
| Hacksaw, heavy duty and spare blades              | 1        | 1                 |
| Blanket, fire resistant (nominally 1.2 m x 1.2 m) | 1        | 1                 |

**Table 13** Quantities of Rescue Equipment Required (Continued)

| Heliport RFF Category:                          | H1 or H2 | Elevated H1 or H2 |
|-------------------------------------------------|----------|-------------------|
| Ladder, length appropriate to helicopter in use | 1        | 1                 |
| Life line (50 mm circumference x 15 m length)   | 1        | 1                 |
| Pliers, side cutting                            | 1        | 1                 |
| Set of assorted screwdrivers (as appropriate)   | 1        | 1                 |
| Harness knife and sheath (per crew member)      | 1        | 1                 |
| Gloves, fire resistant (pairs per crew member)  | 1        | 1                 |
| General purpose saw (eclipse type)              | 1        | 1                 |

**NOTES:**

- 1) The rescue equipment lists are helicopter RFF category dependent and not related to the type of operation.
- 2) Operators of H1 and H2 elevated heliports should give consideration to the provision of a powered rescue saw.

**9 Medical and First Aid Standards**

9.1 The table of equipment below is the generic minimum requirement for the categories described regardless of the level of extinguishing agent selected.

**Table 14** Quantities of Medical and First-Aid Equipment Required

|                                          | Heliport RFF Category |       |             |             |
|------------------------------------------|-----------------------|-------|-------------|-------------|
|                                          | H1                    | H2    | Elevated H1 | Elevated H2 |
| Medical Packs                            | 1                     | 2     | 1           | 2           |
| Foil blankets                            | 6                     | 12    | 6           | 12          |
| Stretchers                               | 1-2                   | 1-2   | 2           | 4           |
| Resuscitation Pocket Mask                | 1 *                   | 1 *   | 1 *         | 1 *         |
| Disposable latex gloves                  | 1 box                 | 1 box | 1 box       | 1 box       |
| <b>Contents of the Medical Pack</b>      |                       |       |             |             |
| Large Emergency Wound Dressings          | 6                     | 6     | 6           | 6           |
| Extra-Large Emergency Wound Dressings    | 6                     | 6     | 6           | 6           |
| Triangular bandages                      | 6                     | 6     | 6           | 6           |
| Scissors - suitable for cutting clothing | 1                     | 1     | 1           | 1           |
| Eye Dressings                            | 2                     | 2     | 2           | 2           |
| Sterile Eyewash (bottle 500 ml)          | 2                     | 2     | 2           | 2           |

\*The pocket mask is the only device offering protection against the unpleasantness of mouth-to-mouth resuscitation (especially where blood is involved) and all fire and rescue personnel should be trained in its use.

9.2 The above table should be modified appropriately to cater for the anticipated maximum number of occupants of the largest type of helicopter in use.

## 10 Training

10.1 All personnel shall receive training prior to initial participation and periodically thereafter. Personnel should be trained to perform their duties and assessed as competent in role and task. Refer to Appendix A for detailed guidance on a typical syllabus.

10.2 Assessment of the competency of the person(s) determining, evaluating and conducting the training shall be the responsibility of the operator. The CAA may ask for details of that assessment.

10.3 All personnel must receive appropriate regular training in the use of the specific RFF equipment provided. This should include a full operational exercise.

10.4 All personnel must receive appropriate regular training in first aid to enable them to provide immediate assistance in the event of an accident. In some instances, training may need to be specific and more advanced than basic first aid.

10.5 Aircraft familiarisation on the aircraft types normally planned to use the site must form an integral part of local training. Methods of door operation, emergency exit and seat harness release are important aspects of such training. Records, on a personal basis, of all practical and technical instruction are to be maintained and retained for a minimum of two years.

## 11 Personnel Levels

11.1 Not less than two trained persons for Category H1, and three for Category H2, shall be available for RFF duties. Regard must be given to the arduous nature of RFF activities. Helicopter operators are advised to determine an appropriate medical standard to be met by personnel employed as heliport fire-fighters and should ensure that appointed medical practitioners are adequately qualified to conduct such medical examinations and are conversant with medical standards to be applied. Operators should refer to Fire and Rescue Service *Circulars 41/2004 Medical and Occupational Evidence for Recruitment and Retention in the Fire and Rescue Service* and *36/2005 Consultation on Draft Regulations to Outlaw Age Discrimination*, published by the Office of the Deputy Prime Minister. This guidance accords with the Employer Equality (Age) Regulations 2006 published by the Department for Trade and Industry.

11.2 The actual number of trained personnel may need to be increased following a risk assessment of the requirement for the specific operation.

11.3 At surface level sites the minimum number of trained personnel as quoted in paragraph 11.1 above must be supplemented by at least one person with the responsibility for passenger/crowd control in normal operational and emergency situations. This person will also be responsible for alerting, and liaison with, local emergency services.

11.4 At elevated sites determination of the total number of personnel for the safe management of RFFS and passenger handling is to be the subject of a safety case. The total number of personnel will be very much dependent upon the specific type of RFF equipment in use.

## 12 Response Time and Response Area

- 12.1 Response time is considered as the time between the receipt of the initial call to the RFFS and the first effective intervention at the accident by the RFF personnel.
- 12.2 At surface level heliports the operational objective of the RFFS should be to achieve a response time not exceeding two minutes in optimum conditions of visibility and surface conditions. This response must be achievable by personnel appropriately dressed (see paragraph 14 below).
- 12.3 At elevated heliports the response time should be considerably less than two minutes. The CAA recommends that a delay of less than 15 seconds should be the objective, measured from the time the system is activated to actual production of foam at the required application rate. The operational objective should ensure that the system is able to bring a fire associated with a crashed helicopter under control within a further 30 seconds. 'Under control' is assumed to be the point when it becomes possible for occupants of the helicopter to be effectively rescued.
- 12.4 The response area is considered as all areas used for the manoeuvring, landing, take-off, rejected take-off, taxiing, air taxiing and parking of helicopters.

## 13 Vehicle

- 13.1 Unless special circumstances dictate (see paragraphs 13.2 and 16.2 below), a fit for purpose vehicle shall be provided and be readily available for immediate use to carry personnel and RFF equipment to the scene of an incident. Non self-propelled appliances (trailers) are permissible but they must be connected to a suitable towing vehicle whilst aircraft movements are taking place. A vehicle carrying bulk flammable material is not suitable for either purpose.
- 13.2 Where soft or other difficult terrain is immediately adjacent or comprises part of the response area a suitable all-wheel drive vehicle will be required in order to ensure an effective response. In other situations the vehicle must be suitable for the terrain at the specific site. At confined area heliports alternatives to the provision of a vehicle may be required. These may be on the lines of fixed systems such as those used for elevated heliports.
- 13.3 For night operations sufficient lighting equipment for adequate illumination of an incident must be provided. This equipment may be carried on the vehicle or by any other suitable means.
- 13.4 The capability of the available vehicle must be taken into account when surveying any site. If the vehicle in use cannot meet the requirements contained here and in paragraph 12 the site is unacceptable.
- 13.5 Where a considerable proportion of helicopter movements take place over water areas the provision of a rescue craft should be considered. The objective should be to recover the maximum anticipated number of occupants of the largest helicopter in use in the most expeditious manner.

## 14 Personal Protective Equipment

- 14.1 All RFF personnel must be provided with PPE, i.e. helmet (complete with full-face visor), fire-resistant tunic, trousers, gloves and boots or stout shoes. The PPE must be suitable for the hazards likely to be encountered. Guidance on the selection of appropriate PPE is available from the Health and Safety Executive.

14.2 Respiratory Protective Equipment (RPE) must be provided on a scale commensurate with the nature of the hazard. For example the provision of appropriate RPE should be considered where helicopters are partially or substantially constructed of composite material (MMMF). Guidance on the selection of appropriate equipment is available from the Health and Safety Executive.

## **15 Records**

15.1 Records of personnel competency and training in rescue, fire-fighting and first aid as well as for equipment and vehicle checks and maintenance logs shall be made and preserved for two years.

15.2 The person in charge at the site should have available, on site, documentation of the records of training and the maintenance status of all equipment in use at the site to indicate the appropriateness of the RFF cover.

## **16 General**

16.1 For a helicopter take-off and landing area located on an aerodrome licensed for use by fixed wing aircraft, the RFFS at the aerodrome will be acceptable for helicopter operations provided that the amounts are at least equal to those required for H1 or H2 operations, as appropriate and as shown in paragraphs 3 and 4 above, and that the response time in paragraph 12.2 can be achieved.

16.2 In certain circumstances alternative fire-fighting equipment, such as fixed monitors, may be appropriate.

16.3 Further general information is available from the CAA Aerodrome Standards Department (Fire Policy section).

## **17 Further Advice and Guidance for Hospital Heliports**

17.1 Annex 3 to Chapter 21 is intended only to address the provisions for RFFS for helicopters operating at unlicensed onshore operating sites. However, there are many other design and operational considerations that need to be addressed when designing a heliport operation at a hospital. The Department of Health has produced Health Building Note (HBN) 15-03: Hospital Helipads, which seeks to describe options for new hospital helipads compliant with new regulatory requirements, and provides guidance on their operation and management. For heliports intended for use at hospitals, it is recommended that trusts and operators consult a copy of HBN 15-03, available through [www.spaceforhealth.nhs.uk](http://www.spaceforhealth.nhs.uk). Hard copies may be obtained from The Stationery Office Ltd (TSO): tel. +44 (0) 870 600 5522, online bookstore [www.tsoshop.co.uk](http://www.tsoshop.co.uk).

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## Appendix A to Annex 3

# Fire-Fighting and Rescue Syllabus for Heliport RFF Personnel

A typical syllabus would comprise:

- chemistry of combustion;
- extinguishing agents - methods of application and use;
- first aid fire extinguishers;
- fire hose;
- fire appliances and equipment - selection, storage, handling, use, inspection and test, maintenance, record keeping;
- personal protective equipment;
- helicopter construction;
- helicopter familiarisation;
- response area topography;
- tactics and techniques - appliance positioning, external/internal fires, access, forcible entry, assistance with evacuation;
- first aid;
- casualty handling;
- emergency planning; and
- theoretical and practical, written and oral assessment.

### NOTES:

- 1) Instructors will need to vary the syllabus to suit local requirements and specific equipment provided.
- 2) The end result must be an organised trained unit to provide the necessary cover, with emphasis on practical use of equipment available at the particular aerodrome. The training sessions must include actual fuel fire situations.
- 3) It is recommended that the above programme is modified for recurrent training. The first bullet point can be omitted and personnel should participate as a team comprising the individual members forming the crew.

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## Annex 4 to Chapter 21

# Provision of Fire-Fighting Services (FFS) for Helicopters Operating at Unlicensed Helicopter Emergency Medical Service (HEMS) or Air Ambulance Operating Bases

### 1 Introduction

- 1.1 For a number of years FOI(H) has published guidance for all Helicopter AOC operators, which has laid down RFFS provisions for helicopter operations at onshore unlicensed operating sites used for the public transport of passengers. In addition, helicopters operating in accordance with the privileges of a Police Air Operator Certificate (PAOC) have been required to provide FFS equipment at locations used as a main operating base. These provisions are laid down in *CAP 612 Police Air Operations Manual (PAOM), Part 1*.
- 1.2 Following consultation with representatives from the CAA's Aerodrome Standards Department Fire Branch and the HEMS and Air Ambulance communities, it has been agreed that a provision for FFS at HEMS and Air Ambulance operating bases is both desirable and appropriate. Furthermore, it was agreed that minimum primary and secondary extinguishing agent requirements for H1 helicopters should be based on the levels specified in the amended *PAOM Part 1*.

**NOTE:** H1 helicopter: A helicopter with an overall length up to, but not including, 15 m.

H2 helicopter: A helicopter with an overall length from 15 m up to, but not including, 24 m.

### 2 Application

- 2.1 Although a HEMS or Air Ambulance helicopter may operate from an unlicensed aerodrome or site, the operator should ensure that the FFS equipment listed below is provided at any such location used as a HEMS or Air Ambulance operating base, or any site where the frequency of passenger movements (take-offs or landings) is expected to exceed ten per day on a regular basis. Operators should provide at least:
  - a) a 90-litre pre-mixed foam unit with hose having a minimum discharge rate of 60 litres of foam solution per minute. The foam selected should meet ICAO Performance Level B, e.g. Aqueous Film Forming Foam (AFFF) or Film Forming Fluoroprotein (FFFP) Foam;
  - b) an 18 kg mobile dry chemical powder unit. Dry chemical powder should be of the foam-compatible type; and
  - c) an 18 kg mobile CO<sub>2</sub> trolley unit equipped with an extending applicator for use on engine fires. The CO<sub>2</sub> trolley unit may be substituted with no less than 18 kg of other gaseous agent provided with a suitable applicator for use on helicopter engine fires.

#### NOTES:

- 1 The discharge rate of complementary agents should be selected for optimum effectiveness of the agent used.
- 2 Where H2 helicopters are routinely operated, the operator may need to consider additional quantities of fire-fighting media.

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## Chapter 22 Minimum Weather Conditions for Helicopter Over-Water Operations

### 1 General

- 1.1 The general weather minima for flight under VFR or IFR shall apply to any helicopter flight over water. JAR-OPS 3 requires that low level over-water flights out of sight of land are only to be conducted under VFR when the cloud ceiling is greater than 600 ft by day and 1,200 ft by night. Other than the weather minima for flying between helidecks located in class G airspace at Appendix 2 to JAR-OPS 3.465, there are no other regulations or rules that specifically identify minimum weather conditions for flights over water.
- 1.2 A flight in IMC over water must be conducted in accordance with IFR, and procedures for letting down to offshore platforms are well established and published elsewhere; this chapter provides guidance for Visual Contact Flights (VCF) over water only, as defined below.
- 1.3 The general Rules of the Air Regulations apply depending upon the airspace in which the flight is being conducted; there are subtle differences between legislation and JAR-OPS 3. For flight under VFR, outside CAS (i.e. class G airspace) JAR-OPS 3.465 requires that the aircraft must remain clear of cloud and in sight of the surface and in a flight visibility of at least 5 km whereas Rule 28 of the Rules of the Air Regulations 2007 requires that the helicopter remains clear of cloud *with the surface in sight*; maintains a flight visibility of at least 1,500 m and flies *at a speed which, having regard to the visibility, is reasonable*.
- 1.4 Appendix 1 to JAR-OPS 3.465 (Note 2) states that helicopters may be operated in a flight visibility down to 1,500 m by day, provided the appropriate ATS authority permits use of a flight visibility less than 5 km, and the circumstances are such that the probability of encounters with other traffic is low, and the Indicated Air Speed (IAS) is 140 kt or less. When so prescribed by the appropriate ATS authority, helicopters may be permitted to operate down to a flight visibility of 800 m by day and it is implicit in JAR-OPS 3.465 that the aircraft must remain in sight of land. Furthermore, the Rules of the Air Regulations 2007 allow flight in a visibility of 800 m, but under IFR (Rule 33).
- 1.5 JAR-OPS 3.240(a)(6) introduced the concept of over-water flights in the coastal corridor; the Interpretative and Explanatory Material (IEM) to this rule provides an approach to risk assessing any over-water activities, and should be considered.
- 1.6 When determining weather minima for over-water operations, operators should consider providing crews with guidance that considers both the pre-flight planning minima and the conditions that might subsequently exist en route during the flight. Unless exemptions or permissions from the regulations have been obtained, flights must also be made in accordance with the Rules of the Air Regulations and the Low Flying Rule 5 in particular.
- 1.7 Operators are therefore encouraged to assess the risk of their intended activity and propose suitable guidelines for their crews. The CAA recognises that some specialised helicopter tasks including Lighthouse/Ship Support, MoD support and Search and Rescue may be conducted in more extreme conditions than would usually be expected of commercial operations. Measures relating to crew training and experience, aircraft type and equipment fit should be taken into account in consideration of such activities.

## 2 Visual Contact Flight

2.1 A VCF is defined as a flight conducted under VFR or IFR such that the helicopter remains below and clear of cloud and during which the flight crew must be in continuous visual contact with the surface and be able:

- by day, to assess the helicopter attitude and separation from the surface by external reference; and
- by night, to assess the helicopter attitude by reference to a clearly distinguishable external horizon.

## 3 Planning Minima

3.1 The following planning minima are applied to a VCF:

- Visibility:** Although the regulations allow flight in certain circumstances in visibilities as low as 800 m (provided the flight remains within sight of land), operators may wish to impose much higher limits for their operations. For VCFs a forecast visibility of 3 km by day is recommended and an absolute minimum visibility of 5 km by night must be forecast for the duration of the flight at the planning stage.
- Cloud base:** The rules state that the helicopter should remain clear of cloud. The forecasting of an accurate cloud base over water is not an exact science and at night the hazard of encountering un-forecast fog should not be underestimated. For VCFs an absolute minimum cloud base of 600 ft by day, and 1,200 ft by night, must be forecast for the duration of the flight at the planning stage.
- Transit Altitude:** Operators will be expected to consider minimum transit heights: by day a minimum altitude of 500 ft AMSL and at night 1,000 ft AMSL should be required. Long over-water sectors at low altitudes are not recommended.

## 4 En-route Conditions

4.1 Flights which have been dispatched as VCF under the provisions of the planning minima above may be continued in the event of worsening conditions en route, subject to the limiting weather conditions that have been established in accordance with the following:

- Visibility:** A minimum in-flight visibility of not less than 1,500 m during daylight and not less than 5 km by night should be maintained. Flight visibility may be reduced to 800 m for short periods during daylight, when in sight of land, if the helicopter is manoeuvred at a speed that will give adequate opportunity to observe other traffic and any obstacles in time to avoid a collision
- Cloud base:** For short periods during the flight it may be acceptable for a cloud base below that anticipated during the pre-flight planning stage to be tolerated. Operators are to provide suitable guidance as to an acceptable reduction in minima.
- Transit Altitude:** For very short flights a lower altitude of 250 ft by day only may be considered appropriate in certain circumstances. Due consideration of the use of a fully coupled autopilot should be made and mandated where appropriate.

- d) **Aircraft Equipment:** If the flight is being conducted in visibilities of less than 1,500 m and under IFR an autopilot is mandatory for single pilot operations. Guidance may be established for two pilot operations where appropriate.
- e) **Speed:** The rules require that the helicopter's speed be adjusted for the conditions. When flight with a visibility of less than 5 km is permitted, the forward visibility should not be less than the distance travelled by the helicopter in 30 seconds to allow adequate opportunity to see and avoid obstacles (see Table 15 below).

**Table 15** Maximum Advisory Speed for Flight in Various Visibilities

| Visibility (m) | Advisory speed (kt) |
|----------------|---------------------|
| 800            | 50                  |
| 1,500          | 100                 |
| 2,000          | 120                 |

4.2 Helicopters should not be flown in these conditions below the minimum IFR speed quoted in the Flight Manual or below the minimum speed at which an engine failure can be suffered and the flight continued without loss of altitude, whichever is the greater.

#### 4.3 Additional Equipment

4.3.1 Operators must also consider the following equipment requirements:

- a) Radio Altimeters with AVADs, Artificial Horizons and Gyroscopic Direction Indicators are mandated, as are Automatically Deployed Emergency Locator Transmitters (ADELTS), ELTs, flotation equipment and emergency flotation devices.
- b) Lifejackets, crew survival suits, life rafts and survival ELTs on extended over-water flights are also required depending on the circumstances.

### 5 Transition to and from Instrument Flight

5.1 If at any point in the course of a flight dispatched as a VCF over water, actual weather conditions are less than the minima determined in accordance with paragraph 4, the flight must, from that point, either be conducted in accordance with IFR and appropriate Operations Manual instructions, with particular reference to MFAs for flights in IFR, or, if the helicopter is unable to comply with IFR, the route of the flight must be changed so as to enable VCF to be maintained within the limits above.

5.2 If the commander does elect to continue the flight in accordance with IFR, descent below the MFA in order to resume VCF should only be made in accordance with:

- a) a notified instrument approach procedure; or
- b) a 'non-precision approach procedure at an offshore installation' specified in the Operations Manual; or
- c) a specified procedure for 'en-route descent through cloud'.

## 6 Offshore Operations in Support of Oil and Gas

6.1 Such activities are predominantly multi-pilot operations and planned as IFR flights. En-route let down procedures and rig radar approaches are well established in company Operations Manuals and in JAR-OPS 3. Guidance on flights between helidecks is published in JAR-OPS 3 and reproduced below:

**Table 16** Minima for flying between helidecks located in Class G airspace  
(Appendix 2 to JAR-OPS 3.465)

|              | <b>Day</b>         |                  | <b>Night</b>       |                  |
|--------------|--------------------|------------------|--------------------|------------------|
|              | Height<br>(Note 1) | Visibility       | Height<br>(Note 1) | Visibility       |
| Single Pilot | 300 ft             | 3 km             | 500 ft             | 5 km             |
| Two Pilots   | 300 ft             | 2 km<br>(Note 2) | 500 ft             | 5 km<br>(Note 3) |

**NOTE 1:** The cloud base shall be such as to allow flight at the specified height below and clear of cloud.

**NOTE 2:** Helicopters may be operated in flight visibility down to 800 m provided the destination or an intermediate structure is continuously visible.

**NOTE 3:** Helicopters may be operated in flight visibility down to 1,500 m provided the destination or an intermediate structure is continuously visible.

6.2 An en-route descent through cloud for the purpose of regaining visual contact with the surface should not be attempted, unless the latest information available to the commander in respect of the en-route weather indicates that the conditions of cloud base and visibility likely to be encountered on completion of the descent are not less than those established in accordance with paragraph 5.

## Chapter 23 Selection of Offshore Alternates

### 1 General

- 1.1 An operator shall establish procedures for the selection of destination and/or alternate heliports when planning a flight. An operator shall only authorise use of heliports that are adequate for the type(s) of helicopter and operation(s) concerned. Offshore alternates may be specified subject to the following conditions:
  - a) An offshore alternate shall be used only after a PNR. Prior to PNR, onshore alternates shall be used.
  - b) OEI landing capability shall be attainable at the alternate.
  - c) Deck availability shall be guaranteed. The dimensions, configuration and obstacle clearance of individual helidecks or other sites shall be assessed in order to establish operational suitability for use as an alternate by each helicopter type proposed to be used. The operator must establish procedures for guaranteeing the availability of a helideck. Where there is the possibility of the deck being out of use due to another aircraft being scheduled to land on the helideck or for any other circumstance, another suitable alternate must be sought.
  - d) Weather minima shall be established taking accuracy and reliability of meteorological information into account.
  - e) The MEL shall reflect essential requirements for this type of operation.
  - f) An offshore alternate shall not be selected unless the operator has published a procedure in the Operations Manual, which has been approved by the CAA.
- 1.2 When operating offshore, any spare payload capacity should be used to carry additional fuel if it would facilitate the use of an onshore alternate.

### 2 Offshore Alternate Deck Landing Environment, Performance and Weather Considerations

- 2.1 The landing environment of a helideck that is proposed for use as an offshore alternate should be pre-surveyed and, in addition to the physical characteristics, the effect of the wind direction and strength and turbulence established. This information (including the orientation of the helideck), which should be available to the commander both at the planning stage of the flight and in flight, should be published in an appropriate form in the Operations Manual Part C such that the suitability of the helideck for use as an offshore alternate can be assessed. The alternate helideck should meet the criteria for size and obstacle clearance appropriate to the performance requirements of the type of helicopter concerned.
- 2.2 The use of an offshore alternate is restricted to helicopters which can achieve OEI IGE hover at an appropriate power rating at the offshore alternate. Where the surface of the offshore alternate helideck, or prevailing conditions (especially wind velocity), precludes an OEI IGE hover, OEI Out of Ground Effect (OGE) hover performance at an appropriate power rating should be used to compute the landing mass. The landing mass should be calculated from graphs provided in the relevant Part B of the Operations Manual. When arriving at this landing mass, due account should be taken of helicopter configuration, environmental conditions and the operation of systems which have an adverse effect on performance. The planned landing mass of the

helicopter, including crew, passengers, baggage, cargo plus 30 minutes of Final Reserve fuel, should not exceed the OEI (whether IGE or OGE as appropriate) landing mass at the time of approach to the offshore alternate.

2.3 When the use of an offshore alternate is planned, an operator should not select a helideck as a destination or offshore alternate unless the aerodrome forecast indicates that during a period commencing one hour before and ending one hour after the expected time of arrival at the destination and offshore alternate, the weather conditions will be at or above the following planning minima: cloud base 600 ft day/ 800 ft night and visibility 4 km day/5 km night. Where fog is forecast, or has been observed within the last two hours within 60 NM of the destination or alternate, offshore alternates should not be used.

### **3 Actions at PNR**

3.1 Before passing the PNR – which should not be more than 30 minutes from the destination – the following actions should have been completed:

- confirmation that navigation to the destination and offshore alternate can be assured;
- radio contact with the destination and offshore alternate (or master station) has been established;
- the landing forecast at the destination and offshore alternate has been obtained and confirmed to be above the required minima;
- the requirements for OEI landing have been checked to ensure that they can be met;
- the availability of the offshore alternate should be guaranteed by the duty holder (the rig operator in the case of fixed installations and the owner in the case of mobiles) to the extent possible, having regard to information on current and forecast use of the offshore alternate and on conditions prevailing, until landing at the destination, or the offshore alternate, has been achieved (or until offshore shuttling has been completed).

# Chapter 24 Training, Testing and Qualification Requirements

## 1 Problems of Small Operators

1.1 A very small organisation, operating one or two aircraft and employing a small number of aircraft flight crews, may agree special arrangements with the CAA. A problem may arise in connection with the periodical testing of the examiner. In the larger firms employing several pilot examiners, one can test the other and there is no real difficulty; however, where the total complement of pilots warrants only one examiner, arrangements should be made for periodical tests to be conducted by an independent examiner outside the operator's organisation; in such cases the CAA should be notified. Procedures for testing the examiner are to be agreed with the CAA. Written agreement between operator and training provider must be obtained. In the event of serious difficulty in this connection, the assigned FOI may be able to arrange for assistance.

## 2 Part-Time and 'Freelance' Pilots

| 2.1 Schedule 8 (ANO 2009) tests have to be conducted 'within the relevant period by, or on behalf of the operator', and tests conducted by Operator A cannot be claimed to have been on behalf of Operator B unless at the time of the test there was an arrangement to that effect and the test was carried out in accordance with Operator B's requirements. Competence certificates should be annotated to that effect as soon as they are raised. Operator B must, in addition, satisfy himself of the other matters required by ANO 2009 Article 95(2)(b), including satisfactory operation of all instruments and equipment fitted in the aircraft operated by Operator A. If Operator A and B wish to utilise each other's training personnel and facilities and accept each other's training documents they must enter into an appropriate written agreement.

| 2.2 Operators should ensure the competence of any part-time or 'freelance' pilots they employ. ANO 2009 Schedule 8 tests carried out to establish the competence of an operator's pilots must be conducted either by the operator himself or by another operator, under arrangements detailed above and placed in the company's Operations Manual, Part D (Training), which ensure that the pilot is competent to perform all the duties and responsibilities laid upon him by the operator.

## 3 Circling Approaches

3.1 Crews should receive instruction in the procedures involved in circling approaches and training captains should be thoroughly briefed so that consistent and correct procedures are taught. Each circling situation is different due to the variations of runway layout, weather conditions, aircraft configuration etc., so that it is not possible to cater for every situation. However, operators should ensure that at least the following information is available in the Operations Manual:

- The visibility limits for commencement/continuation of a circling approach.
- The aircraft configuration at various stages of the circling approach.
- The use of flight control systems. It is recommended that maximum use be made of aircraft automatics where appropriate.

- d) Method of positioning the aircraft to various parts of the procedure.
- e) The prohibition of descent below circling minima until the landing runway threshold has been identified, and the aircraft is in position to continue with a normal rate of descent and land within the touchdown zone.
- f) Missed approach procedures.

3.2 Unless otherwise prescribed, the missed approach procedure will be that applicable to the instrument approach runway. Whilst a missed approach during the instrument procedure or at MDA/MDH may be relatively straightforward this may not be the case once the aircraft has started the circling procedure. Crews should therefore discuss beforehand the procedure to be adopted should visual contact be lost or a missed approach initiated at any stage during the procedure. Particular consideration should be given to segments of the missed approach that are terrain critical.

3.3 This procedure will normally be carried out in a simulator and the operator should ensure that training manuals contain sufficient information and guidance to training captains in order to run the simulator and instruct crews on the procedures to be used. It may be necessary to set the visibility and cloud base in the simulator higher than published circling minima due to the limitations of the device.

3.4 It is recognised that circling a large modern jet transport at low altitude or in poor visibility is a situation which is best avoided when possible. Operators should therefore consider restricting circling approaches to higher minima in terms of altitude and visibility than those laid down in PANS-OPS and EU-OPS and JAR-OPS 3.

## 4 Flight Crew Training

### 4.1 Go-around Training

4.1.1 Most go-arounds are flown from positions not normally practised during simulator training and checking. These include go-arounds from below decision height and from well above decision height close to the acceleration altitude. They may also take place when not in the final landing configuration and when not asymmetric as required by Licence Proficiency Checks (LPC) or OPC. There have been a number of incidents during which a go-around was carried out in a serviceable aircraft that resulted in the loss, or near-loss, of that aircraft. Two events that were frequently linked with go-around were:

- a) altitude busts; and
- b) flap and/or landing gear limit speed exceedance.

4.1.2 Go-arounds with all engines operating are part of the initial type rating training course for Multi-Pilot Aeroplanes (MPAs) but not a mandatory part of annual or six-monthly recurrent training. The practice of go-arounds with all engines operating from other than at DA should be carried out regularly. As a minimum, this should be included in the operator's three-year training programme but should not be too prescriptive in detail. Unplanned go-arounds should be included to verify pilot understanding of SOPs. This would enable operators to vary the training in order that it encompass a variety of circumstances including:

- a) above DA and above the platform altitude in the Missed Approach Procedure;
- b) between DA and touchdown; and
- c) after touchdown.

Briefing material should be produced to provide crews with guidance on appropriate autoflight modes relevant to the differing circumstances. Operators should ensure

that sufficient training is provided to enable crews to execute go-arounds satisfactorily from various altitudes.

## 4.2 Manual Flying Skills

4.2.1 The advent of the JAR LPC and OPC enabled a checking regime to be more realistic and cater for aircraft that were flown primarily using automatic flight guidance. The ability to fly an aircraft manually was a degradable skill and therefore required practice to maintain. Manual flying during routine line operations was acceptable in controlled circumstances, provided it was adequately briefed and the option to revert to automatics was discussed by the crew beforehand. The simulator was a sensible place to give crews added practice to maintain manual flying skills. Operators of highly automated aircraft should provide guidance to crews on when it is appropriate to practice manual flying during routine operations. In addition, they should ensure crews have sufficient opportunity during simulator programmes to practice their manual flying skills.

~~~~~  
*Requirement*

## 4.3 Operation on More than One Type or Variant

4.3.1 An operator shall ensure that a flight crew member does not operate more than one type or a variant unless the flight crew member is competent to do so. When considering operations of more than one type or variant, the operator shall ensure that the differences and/or similarities of the aircraft concerned justify such operations, taking account of the following:

- the level of technology;
- operational procedures; and
- handling characteristics.

4.3.2 The operator shall specify in the Operations Manual appropriate procedures and/or operational restrictions, approved by the CAA, for any operation on more than one type or variant covering:

- the flight crew members' minimum experience level;
- the minimum experience level on one type or variant before beginning training for, and operation of, another type or variant;
- the process whereby flight crew qualified on one type or variant will be trained and qualified on another type or variant; and
- all applicable recent experience requirements for each type or variant.

4.3.3 When operating helicopters with a maximum certificated take-off mass exceeding 5,700 kg, a flight crew member should not fly more than two helicopter types. That flight crew member should not be rostered to fly more than one type, or significantly different variant of a type, during a single duty period. In the case of helicopters with a maximum certificated take-off mass of 5,700 kg or less, a flight crew member should operate not more than three helicopter types or significantly different variants.

4.3.4 For a combination of helicopter and aeroplane operations, a flight crew member may fly one helicopter type and one aeroplane type irrespective of the maximum certificated take-off mass of each helicopter or aeroplane.

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*Requirement End*

## 5 Crew Training for Exit Operation

5.1 An accident report identified differences between actual aircraft door operation in the emergency mode with an active 'power assist' facility and the operation of the same type of door installed in a cabin simulator. Cabin door simulators should accurately simulate all characteristics of the associated doors and full instructions on the specific aircraft door operating characteristics should be provided to flight and cabin crew during training. Differences in door operating characteristics between the actual aircraft doors and the doors installed in cabin simulators can be of critical importance during an emergency evacuation, especially if an incorrect door operation procedure is used. In the worst case, the crew member may not be able to effectively open a fully functional door or exit if incorrect or inadequate procedures have been specified in the Operations Manual and are repeated during training.

## 6 Use and Approval of Full Flight Simulators and Flight Trainers

6.1 Provision is made in the ANO for use of apparatus such as flight simulators, flight trainers and fuselage 'mock-ups' for certain periodical tests. These devices must be individually approved by the CAA and may be used only under the supervision of a person Approved for the purpose. Approvals normally restrict the use of such devices to the particular company's own flight crews. Inspectors will advise operators on the procedure for obtaining such an Approval. Examiners' simulator authority extends only to the device(s) for which the company named on this authority holds a specific written Approval.

6.2 Flight simulators are used extensively for initial, conversion and recurrent training. They particularly lend themselves to the rapid 'ticking off' of required 'exercises' with the very obvious advantages gained in terms of cost and punctuality and, whilst this characteristic should be used to full advantage, its limitations should also be recognised. A predictable sequence of selected tactile tasks alone will not provide sufficient information for an examiner to reach a balanced judgement on a person's handling and operating ability, the latter frequently proving fundamental to the arrest of progressive failures.

6.3 Line-Oriented Flight Training (LOFT) exercises were designed for such a purpose and work well. However, some operators may not have the simulator time or may be limited to testing in an aircraft in order to pursue a full LOFT exercise. This should not prevent some real time assessment being achieved. The CAA has used this philosophy on the Authorised Examiner course since 1973, so it is not new and graduates of that course will know that, with a little imagination, an examiner can generate a scenario with a progressively deteriorating situation that can be revealing but not time consuming. The CAA wishes to encourage the LOFT philosophy to training and testing, with a post-flight debriefing and an open discussion about the training exercise, without the threat of a pass or fail at the end of it.

6.4 Prior to each simulator session Authorised Examiners should check the serviceability in the technical log and the level to which the simulator is cleared, as it may be changed from time to time and at short notice. Additionally, a careful check of the Approval Licence Skill Test (LST) should be made to confirm the simulator's validity for checks and tests. When the simulator instrumentation falls short of the requirement for pilots to be familiar with the electronic flight displays of the aircraft they fly for PT, including any failure modes and procedures, operators are to ensure that satisfactory alternative means are available for pilots to become familiar with the instrumentation they will use.

## 7 Crew Training in Loss of Control

7.1 For multi-pilot aircraft, operators should include the subject of loss of control during recurrent training. This may be in the form of simulator training which can be part of the three-year recurrent training cycle. Dedicated training modules produced by major aircraft manufacturers are available which take the form of a lesson plan and accompanying video.

## 8 Incapacitation Procedures

### 8.1 Incapacitation Drills

8.1.1 Incapacitation drills have been designed to ensure the continued safe flight of a multi-pilot aircraft in the event that one of the pilots becomes incapacitated. The situation where both pilots become incapacitated at the same time has been considered so remote that no procedures have been evolved to cope with the occurrence. Nevertheless such an event may be possible with the malfunction in the engine or air conditioning systems which causes toxic fumes to enter the flight deck. Operators should, therefore, consider this possibility and provide guidance to their crews, including cabin staff, to be aware of the chance of such an event.

### 8.2 Use of Oxygen Masks

8.2.1 The first action in the event of smoke or fumes in the flight deck should be for the flight crew to don oxygen masks and establish communications. Training Inspectors have noted reluctance by crews to use oxygen masks when carrying out recurrent training in simulators. Operators should ensure that these masks are worn when the drills require them and that pilots regularly practise donning the masks so that they are able to react in difficult situations. Routine training/checking should include flying approaches wearing oxygen masks. If during line flying it appears that both pilots are suffering from some form of incapacitation or that one pilot appears to be in any way incapacitated for no obvious reason, then the flight crew should don oxygen masks without delay.

## 9 General Considerations for Tests

9.1 Passengers must not be carried when Instrument Flight screening is used or when simulated emergencies or manoeuvres are to be carried out.

9.2 Stopping of engines in flight or on take-off should be subject to recommendations and advice issued by the CAA from time to time; the assigned FOIs can give guidance.

9.3 Where tests or checks are carried out on flights for the purpose of PT, extra time for briefing and debriefing should be allowed and the consequences of failure considered.

## 10 Periodical Tests - Flight Engineers

10.1 The periodical tests for flight engineers should generally follow the pattern of those for pilots-in-command, omitting those items that are clearly appropriate only to pilots. The tests, which may be combined with the test requirements for licence purposes, should include:

- a) an annual assessment of a flight engineer's competence to perform his duties, whilst executing normal manoeuvres and procedures in flight; and

b) a biannual assessment of a flight engineer's competence to perform executing emergency procedures.

10.2 The tests on the flight engineer's ability to carry out normal procedures must be carried out in the aircraft in flight. His ability to carry out emergency procedures may, however, be tested either in flight or in a flight simulator specifically approved for this purpose. These tests should normally be conducted by specially designated flight engineers, with the exception of an overall assessment of CRM and the performance of the flight crew as a whole, in which case, under exceptional circumstances, it may be conducted by a specifically designated training captain.

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*Requirement*

## 11 Security Training

11.1 An operator shall establish, maintain and conduct training programmes to enable his crew members to take appropriate action to prevent acts of unlawful interference. These training programmes should be designed to enable crew members to take action in the event of sabotage or unlawful seizure of an aircraft, and to minimise the consequences of such events.

11.2 An operator shall also establish and maintain a training programme to acquaint appropriate employees with preventive measures and techniques in relation to passengers, baggage, cargo, mail, equipment, stores and supplies intended for carriage on an aircraft, so that they contribute to the prevention of acts of sabotage or other forms of unlawful interference.

11.3 These training programmes should be compatible with the National Aviation Security Programme.

*Requirement End*  
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## 12 Operations to Elevated Helipads - Training and Recency

12.1 The availability of onshore elevated helipads, particularly in the HEMS industry, has increased in recent years. Given the challenging nature of operations to such sites, training and recency requirements have been clarified and standardised. Appendix 1 to JAR-OPS 3.965 Recurrent Training and Checking requires that the OPC and Line Check are performed 'in an environment representative of the operation'. When operations to elevated helipads are intended, initial training and recurrent checking should specifically cover the appropriate procedures.

a) **Initial Training.** Before a pilot may conduct elevated heliport operations, their training should include a minimum of four landings and four take-offs at an elevated heliport with a TRI/TRE, of which two landings and two take-offs should be at night if applicable.

b) **OPC.** Whenever operations to an elevated helipad are intended, the Category/Group A Helipad procedure is to be checked. If the procedure is not checked at an elevated heliport, it may take place at a ground level site appropriately marked to indicate minimum helipad dimensions.

c) **Recency.** A pilot should not operate to an elevated heliport unless they have carried out a minimum of two landings and two take-offs at an elevated site within the preceding 12 months. If the training conducted concurrently with the OPC is to an elevated helipad, this may be used to meet this requirement. When the training has not been achieved, the pilot should establish recency by performing a landing and take-off at an elevated helipad with a TRI/TRE. When the pilot is qualified on more than one type, it should be accepted that recency gained on one type will meet recency requirements on all types.

## 13 Alternative Training and Qualification Programme (ATQP)

### 13.1 Purpose of an ATQP

13.1.1 Under certain circumstances EU-OPS allows an operator to substitute the training and checking requirements contained within OPS 1.450, 1.945, 1.950, 1.955, 1.965 and 1.980 with those contained within OPS 1.978 and Appendix 1 to OPS 1.978.

13.1.2 An ATQP allows operators to provide a more effective and more operator-specific recurrent training and checking package for its crews. The Programme ensures a higher level of civil aviation safety by utilising improved training and evaluation over the current system. The Programme is a company-specific alternative to traditional training. Ongoing data collection can be developed into a responsive programme that can adapt to an operator's changing requirements such as new equipment, new technology or a differing route structure. Focusing on specific needs of fleets and groups of pilots, targeted training can enhance performance while reducing costs.

13.1.3 Under an ATQP, the CAA may approve significant departures from traditional requirements. An ATQP may employ innovative training and qualification concepts, provided the applicant can demonstrate to the CAA that the resulting aircrew proficiency will meet or exceed the proficiency obtainable through a traditional programme.

### 13.2 Requirements of an ATQP

13.2.1 The requirements and timescales for an ATQP are contained in OPS 1.978 and Appendix 1 to OPS 1.978. The ATQP must contain training and checking which establishes and maintains a proficiency that is not less than the provisions prescribed in EU-OPS. Additional information and guidance can be found in TGL 44, ACJ OPS 1.978.

### 13.3 Application for Approval of an ATQP

13.3.1 Operators should initially contact their assigned FOI. To develop the programme, the operator must conduct the task analysis and establish a safety case to provide justification and a rationale for the programme's structure and content, supported by data gathered from an established flight data analysis and evaluation programme. The programme will give an operator an incentive to develop innovative training methodologies that benefit both training standards and training efficiency. It should be noted that the process is likely to take in excess of two years from first application to implementation of an ATQP. This is detailed in EU-OPS and is driven by the required FDM and training records input over a suitable period. Annex 1 to this Chapter provides further information.

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# **Annex 1 to Chapter 24**

## **Alternative Training and Qualification Programme (ATQP) – Application of the Regulations**

### **1 Introduction**

- 1.1 This Annex sets out minimum regulatory standards for UK EU-OPS operators to establish and run an ATQP. It gives guidance on how to apply the regulations to realise the safety and training benefits of an ATQP while ensuring the integrity of the operation.
- 1.2 It is recognised that most operators run informal training programmes over and above the EU-OPS requirements. The guidance in this document allows credit to be given for this and for these programmes to be formalised under an ATQP. It also recognises that operators will seek to keep their established training standards and methodologies and only make changes where the regulations demand it.

## 2 Regulations

2.1

| EU-OPS Regulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Minimum Regulatory Standard                                                                                                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>(a) An operator, following a minimum of two years' continuous operations, may substitute the training and checking requirements for flight crew specified in Appendix 1 to OPS 1.978(a) by an ATQP approved by the CAA. The two years' continuous operations may be reduced at the discretion of the CAA.</p>                                                                                                                                                                                                                                                                                                                       | <p>The two years' continuous operation may be reduced where, for example, the operator has been subject to a merger / change of name / change of owner but there has been continuity in the types operated, training standards, training personnel, SOPs and FDM programme.</p> |
| <p>(b) The ATQP must contain training and checking which establishes and maintains a level of proficiency demonstrated to be at least not less than the level of proficiency achieved by following the provisions of OPS 1.945, 1.965 and 1.970. The standard of flight crew training and qualification shall be established prior to the introduction of ATQP; the required ATQP training and qualification standards shall also be specified.</p>                                                                                                                                                                                    | <p>The levels of proficiency, training and qualification standards will be established in the safety case (or equivalent) (see ACJ).</p>                                                                                                                                        |
| <p>(c) An operator applying for approval to implement an ATQP shall provide the CAA with an implementation plan in accordance with paragraph (c) of Appendix 1 to OPS 1.978.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>The implementation plan includes a safety case (or equivalent), task analysis and period of operation whilst data is collected (see Appendix 1 to OPS 1.978).</p>                                                                                                            |
| <p>(d) In addition to the checks required by OPS 1.965 and 1.970 an operator shall ensure that each flight crew member undergoes a Line Orientated Evaluation (LOE).</p> <p>(1) The LOE shall be conducted in a simulator. The LOE may be undertaken with other approved ATQP training.</p> <p>(2) The period of validity of an LOE shall be 12 calendar months, in addition to the remainder of the month of issue. If issued within the final three calendar months of validity of a previous LOE the period of validity shall extend from the date of issue until 12 calendar months from the expiry date of that previous LOE.</p> | <p>LOE is a new mandatory requirement under an ATQP (see ACJ).</p>                                                                                                                                                                                                              |

| <b>OPS 1.978<br/>Alternative Training and Qualification Programme</b><br>(See Appendix 1 to OPS 1.978)<br>(See TGL 4.4, ACJ OPS 1.978) | <b>EU-OPS Regulation</b> <p><b>Minimum Regulatory Standard</b></p> <p>An ATQP requires that an LOE and training items are added to the recurrent training curriculum. These additional requirements are balanced by less routine checking through the use of extended validity periods. An operator shall agree with the CAA an implementation timetable for their ATQP and a date for the first extended checks. An operator shall also agree if extended periods of validity require minimum pilot experience levels.</p> <p>(e) After two years of operating within an approved ATOP an operator may, with the approval of the CAA, extend the periods of validity of OPS 1.965 and 1.970 as follows:</p> <p>(1) OPC – 12 calendar months in addition to the remainder of the month of issue. If issued within the final three calendar months of validity of a previous OPC, the period of validity shall extend from the date of issue until 12 calendar months from the expiry date of that previous OPC.</p> <p>(2) Line Check - 24 calendar months in addition to the remainder of the month of issue. If issued within the final six calendar months of validity of a previous line check, the period of validity shall extend from the date of issue until 24 calendar months from the expiry date of that previous line check. The line check may be combined with a Line-Oriented Quality Evaluation (LOQE) with the approval of the CAA.</p> <p>(3) Emergency and Safety equipment checking – 24 calendar months in addition to the remainder of the month of issue. If issued within the final six calendar months of validity of a previous check, the period of validity shall extend from the date of issue until 24 calendar months from the expiry date of that previous check.</p> <p>(f) The ATOP shall be the responsibility of a nominated post holder.</p> <p>The ATQP will normally be the responsibility of the existing nominated post holder for training.</p> |
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| <b>Appendix 1 to OPS 1.978<br/>Alternative Training and Qualification Programme</b><br>(See TGL 44, ACJ OPS 1.978) |                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EU-OPS Regulation</b>                                                                                           | <b>Minimum Regulatory Standard</b>                                                                                                                                                                                                                                                                                                                                                              |
| (a) An operator's ATQP may apply to the following requirements that relate to training and qualifications:         | An equivalent level of safety and proficiency for low visibility operations will be established through the safety case (or equivalent).                                                                                                                                                                                                                                                        |
| (1) OPS 1.450 and Appendix 1 to OPS 1.450 - Low Visibility Operations – Training and Qualifications.               | Most operators' conversion training and checking curricula follow the JAR-FCL requirements for a type/class rating course. Currently, JAR-FCL cannot be varied within an ATQP so scope for varying the EU-OPS requirements is limited. However, an equivalent level of safety and proficiency for Zero Flight Time Training (ZFTT) will be established through the safety case (or equivalent). |
| (2) OPS 1.945 Conversion training and checking and Appendix 1 to OPS 1.945.                                        | An equivalent level of safety and proficiency for differences training and familiarisation training will be established through the safety case (or equivalent).                                                                                                                                                                                                                                |
| (3) OPS 1.950 Differences training and familiarisation training.                                                   | An equivalent level of safety and proficiency for nomination as commander will be established through the safety case (or equivalent).                                                                                                                                                                                                                                                          |
| (4) OPS 1.955 paragraph (b) - Nomination as commander.                                                             | The biggest safety benefits within an ATOP can be gained by varying the recurrent training curriculum. Targeted training items are added to the curricula in place of current requirements by extending periods of validity. An equivalent level of safety and proficiency for recurrent training and checking will be established through the safety case (or equivalent).                     |
| (5) OPS 1.965 Recurrent training and checking and Appendices 1 and 2 to OPS 1.965.                                 | An equivalent level of safety and proficiency for operation on more than one type or variant will be established through the safety case (or equivalent).                                                                                                                                                                                                                                       |
| (6) OPS 1.980 Operation on more than one type or variant and Appendix 1 to OPS 1.980.                              |                                                                                                                                                                                                                                                                                                                                                                                                 |

| EU-OPS Regulation                                                                                                                                                                                                                                                | Minimum Regulatory Standard                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (b) Components of the ATQP - An ATQP shall comprise the following:                                                                                                                                                                                               | See ACJ for further details.                                                                                                                                                                   |
| (1) Documentation that details the scope and requirements of the programme.                                                                                                                                                                                      | See ACJ for further details.                                                                                                                                                                   |
| (2) A task analysis to determine the tasks to be analysed in terms of:                                                                                                                                                                                           | See ACJ for further details.                                                                                                                                                                   |
| (i) knowledge;                                                                                                                                                                                                                                                   |                                                                                                                                                                                                |
| (ii) the required skills;                                                                                                                                                                                                                                        |                                                                                                                                                                                                |
| (iii) the associated skill based training;                                                                                                                                                                                                                       |                                                                                                                                                                                                |
| (iv) the validated behavioural markers.                                                                                                                                                                                                                          |                                                                                                                                                                                                |
| (3) Curricula – the curriculum structure and content shall be determined by task analysis, and shall include proficiency objectives including when and how those objectives shall be met. The process for curriculum development shall be acceptable to the CAA. | See ACJ for further details. The curriculum will be developed using the validated task analysis and this process will be described in the safety case (or equivalent) and implementation plan. |
| (4) A specific training programme for:                                                                                                                                                                                                                           | See ACJ for further details.                                                                                                                                                                   |
| (i) each aeroplane type/class within the ATQP.                                                                                                                                                                                                                   | An ATQP will be established for each fleet, or for groups of fleets where pilots are qualified to operate on more than one type or variant. No mixed fleet flying under an ATQP.               |
| (ii) the instructors (Class Rating Instructor rating/Synthetic Flight Instructor authorisation/Type Rating Instructor rating - CR/SFI/TRI), and other personnel undertaking flight crew instruction.                                                             | See ACJ for further details.                                                                                                                                                                   |
| (iii) the examiners (Class Rating Examiner/Synthetic Flight Examiner/Type Rating Examiner - CRE/SFE/TRE), to include a method for the standardisation of the instructors and examiners.                                                                          | See ACJ for further details.                                                                                                                                                                   |
| (5) A feedback loop for the purpose of curriculum validation and refinement, and to ascertain that the programme meets its proficiency objectives.                                                                                                               | See ACJ for further details.                                                                                                                                                                   |

| EU-OPS Regulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Minimum Regulatory Standard                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (6) A method for the assessment of flight crew during both conversion and recurrent training and checking. The assessment process shall include event-based assessment as part of the LOE. The method of assessment shall comply with the provisions of OPS 1.965.                                                                                                                                                                                                                                                                                                          | Operators may use or adapt their existing methods of assessment that will comply with the provisions of OPS 1.965. Event-based assessment will be introduced for the LOE and incorporated into the documentation and instructor/examiner training. |
| (7) An integrated system of quality control, that ensures compliance with all the requirements, processes and procedures of the programme.                                                                                                                                                                                                                                                                                                                                                                                                                                  | See ACJ for further details.                                                                                                                                                                                                                       |
| (8) A process that describes the method to be used if the monitoring and evaluation programmes do not ensure compliance with the established proficiency and qualification standards for flight crew.                                                                                                                                                                                                                                                                                                                                                                       | If the monitoring and evaluation programmes identify a compliance issue the operator will have a process to correct this. This process and associated timescales will be documented and approved by the CAA.                                       |
| (9) A Data Monitoring/Analysis programme.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | See ACJ for further details.                                                                                                                                                                                                                       |
| (c) Implementation - The operator shall develop an evaluation and implementation strategy acceptable to the CAA, the following requirements shall be fulfilled:                                                                                                                                                                                                                                                                                                                                                                                                             | (1) The implementation process shall include the following stages:<br><br>The following stages may be done in any order or concurrently, as approved by the CAA.                                                                                   |
| (i) a safety case that substantiates the validity of:<br>(A) the revised training and qualification standards when compared with the standards achieved under EU-OPS prior to the introduction of ATQP; and<br>(B) any new training methods implemented as part of ATQP.<br>If approved by the CAA the operator may establish an equivalent method other than a formal safety case.<br><br>(ii) Undertake a task analysis as required by paragraph (b)(2) above in order to establish the operator's programme of targeted training and the associated training objectives. | See ACJ for further details.<br><br>See ACJ for further details.<br><br>See ACJ for further details.                                                                                                                                               |

| <b>Appendix 1 to OPS 1.978</b><br><b>Alternative Training and Qualification Programme</b><br>(See TGL 44, ACJ OPS 1.978)                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EU-OPS Regulation</b>                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Minimum Regulatory Standard</b>                                                                                                                                                                     |
| <p>(iii) A period of operation whilst data is collected and analysed to ensure the efficacy of the safety case or equivalent and validate the task analysis. During this period the operator shall continue to operate to the pre-ATQP EU-OPS requirements. The length of this period shall be agreed with the CAA.</p> <p>(2) The operator may then be approved to conduct training and qualification as specified under the ATQP.</p> | Where operators already collect data that can be used for this purpose, via crew training records, FDM, SMS, etc., they may, with the approval of the CAA, be considered to have met this requirement. |

**TGL 44, ACJ OPS 1.978**  
**Terminology**  
 See OPS 1.978 and Appendix 1 to OPS 1.978

| EU-OPS Regulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Minimum Regulatory Standard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1 Terminology</p> <p>1.1 Line-Oriented Evaluation (LOE). LOE is an evaluation methodology used in the ATQP to evaluate trainee performance, and to validate trainee proficiency. LOEs consist of flight simulator scenarios that are developed by the operator in accordance with a methodology approved as part of the ATQP. The LOE should be realistic and include appropriate weather scenarios and in addition should fall within an acceptable range of difficulty. The LOE should include the use of validated event sets to provide the basis for event-based assessment. See paragraph 1.4 below.</p> | <p>The content of the LOE will be targeted items determined by suitable methodology, such as FDM/SMS analysis, Line Check analysis, LOQE, etc. The scenarios should be appropriate and realistic to the fleet's normal operational environment. Guidance on the event assessment should be provided to training personnel to ensure standardisation. CRM should be integral to the assessment. The LOE may be carried out in an aeroplane flight simulator or flight-training device (level 2). The LOE may be conducted by a suitably trained TRE, Synthetic Flight Examiner (SFE), Class Rating Examiner (CRE), TRI, Class Rating Instructor (CRI) or Synthetic Flight Instructor (SFI).</p> |
| <p>1.2 Line-Oriented Quality Evaluation (LOQE). LOQE is one of the tools used to help evaluate the overall performance of an operation. LOQEs consist of line flights that are observed by appropriately qualified operator personnel to provide feedback to validate the ATQP. The LOQE should be designed to look at those elements of the operation that are unable to be monitored by FDM or Advanced FDM programmes.</p>                                                                                                                                                                                     | <p>LOQE may be used to evaluate or validate aspects of the operation or task analysis that cannot be monitored by any other method. It is not a mandatory part of an ATQP. The appropriately qualified operator personnel must have sufficient training to be able to carry out the task effectively. The CAA will approve a process by which the personnel are suitably qualified.</p>                                                                                                                                                                                                                                                                                                        |
| <p>1.3 Skill-based training. Skill-based training requires the identification of specific knowledge and skills. The required knowledge and skills are identified within an ATQP as part of a task analysis and are used to provide targeted training.</p>                                                                                                                                                                                                                                                                                                                                                         | <p>The skill-based training may be carried out in an aeroplane, flight simulator or flight-training device (level 2). The skill-based training may be conducted by a suitably trained TRE, SFE, CRE, TRI, CRI or SFI.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>1.4 Event-based Assessment. This is the assessment of flight crew to provide assurance that the required knowledge and skills have been acquired. This is achieved within an LOE. Feedback to the flight crew is an integral part of event-based assessment.</p>                                                                                                                                                                                                                                                                                                                                               | <p>An ATQP allows an operator to provide targeted training in place of some EU-OPS mandatory checking. Event-based assessment within an LOE allows an assessment of the most significant operational procedures or areas of risk. The event-based assessment may be carried out in an aeroplane, flight simulator or flight-training device (level 2). The event-based assessment may be conducted by a suitably trained TRE, SFE, CRE, TRI, CRI or SFI.</p>                                                                                                                                                                                                                                   |

2.4

| <b>TGL 44, ACJ to Appendix 1 to OPS 1.978(b)(1)<br/>Requirements, Scope and Documentation of the Programme</b><br>See Appendix 1 to OPS 1.978(b)(1)                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EU-OPS Regulation</b>                                                                                                                                                                                                                                                                                                                                    | <b>Minimum Regulatory Standard</b>                                                                                                                                                                                                                                                                                                                                                                                       |
| 1 The documentation should demonstrate how the operator should establish the scope and requirements of the programme. The documentation should include:                                                                                                                                                                                                     | The documentation will be incorporated into an existing training manual.                                                                                                                                                                                                                                                                                                                                                 |
| 1.1 How the ATQP should enable the operator to establish an alternative training programme that substitutes the requirements as listed in EU-OPS Subparts E and N. The programme should demonstrate that the operator is able to improve the training and qualification standards of flight crew to a level that exceeds the standard prescribed in EU-OPS. | In accordance with OPS 1.978(b), the ATQP should establish and maintain a level of proficiency not less than the current provisions of EU-OPS. The programme should demonstrate that the operator is able to improve the training and qualification standards of pilots. The safety case (or equivalent) should establish that the operator is able to maintain the training and qualification standards of flight crew. |
| 1.2 The operator's training needs and established operational and training objectives.                                                                                                                                                                                                                                                                      | Existing operational and training objectives may be incorporated into an ATQP.                                                                                                                                                                                                                                                                                                                                           |

| <b>TGL 44, ACJ to Appendix 1 to OPS 1.978(b)(1)</b><br><b>Requirements, Scope and Documentation of the Programme</b><br>See Appendix 1 to OPS 1.978(b)(1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| <b>EU-OPS Regulation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Minimum Regulatory Standard</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p>1.3 How the operator defines the process for designing of and gaining approval for the operator's flight crew qualification programmes. This should include quantified operational and training objectives identified by the operator's internal monitoring programmes. External sources may also be used.</p> <p>1.4 How the programme will:</p> <ul style="list-style-type: none"> <li>a. Enhance safety;</li> <li>b. Improve training and qualification standards of flight crew;</li> <li>c. Establish attainable training objectives;</li> <li>d. Integrate CRM in all aspects of training;</li> <li>e. Develop a support and feedback process to form a self-correcting training system;</li> <li>f. Institute a system of progressive evaluations of all training to enable consistent and uniform monitoring of the training undertaken by flight crew;</li> <li>g. Enable the operator to be able to respond to the new aeroplane technologies and changes in the operational environment;</li> <li>h. Foster the use of innovative training methods and technology for flight crew instruction and the evaluation of training systems;</li> <li>i. Make efficient use of training resources, specifically to match the use of training media to the training needs.</li> </ul> | <p>Where considered suitable, existing processes may be incorporated into an ATQP. An operator's existing internal monitoring programme may be used to audit an ATQP against the operational and training objectives.</p> <p>b. 'Improve' being the important word here.</p> <p>c. The data sources used to validate an ATQP may also be used to establish attainable training objectives.</p> <p>f. See ACJ for feedback loop.</p> <p>g. Targeted training may be used for aircraft modifications, new operational policies, etc.</p> <p>h. Use of new training methods and technology may include electronic training records, data evaluation tools, etc.</p> <p>i. Use of appropriate training media may include online programmes, electronic whiteboards, desktop trainers, flight training devices, etc.</p> |

2.5

| <b>TGL 44, ACJ to Appendix 1 to OPS 1.978(b)(2)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <b>Task Analysis</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                 |
| See Appendix 1 to OPS 1.978(b)(2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>EU-OPS Regulation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Minimum Regulatory Standard</b>                                                                                                                                                                                                                                                                                                                                                              |
| 1 For each aeroplane type/class to be included within the ATQP the operator should establish a systematic review that determines and defines the various tasks to be undertaken by the flight crew when operating that type(s)/class. Data from other types/classes may also be used. The analysis should determine and describe the knowledge and skills required to complete the various tasks specific to the aeroplane type/class and/or type of operation. In addition, the analysis should identify the appropriate behavioural markers that should be exhibited. | The validated task analysis may be used to define the training needs and create the training programme. It should be detailed enough to allow the knowledge, skills and behavioural markers to be determined, but not so detailed that the tasks cannot be validated. The competency units for an MPL(A) in JAR-FCL 1, IEM to Subpart K is considered as meeting the minimum needs for an ATQP. |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The task analysis can be validated using any appropriate data, such as training records, FDM, SMS and LOQE.                                                                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The task analysis should be suitably validated in accordance with Appendix 1 to OPS 1.978(c)(iii). The task analysis, in conjunction with the data gathering programme(s), permit the operator to establish a programme of targeted training together with the associated training objectives described in ACJ to Appendix 1 to OPS 1.978(b)(3) paragraph (c) below.                            |

| <b>TGL 44, ACJ to Appendix 1 to OPS 1.978(b)(3)</b><br><b>Training Programme</b><br>See Appendix 1 to OPS 1.978(b)(3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| <b>EU-OPS Regulation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Minimum Regulatory Standard</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 1 The training programme should have the following structure:<br>1.1 Curriculum.<br>1.2 Daily lesson plan.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Existing curricula and lesson plans frameworks may be used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2 The curriculum should specify the following elements:<br>2.1 Entry requirements: A list of topics and content, describing what training level will be required before start or continuation of training.<br>2.2 Topics: A description of what will be trained during the lesson;<br>2.3 Targets/Objectives<br>a. Specific target or set of targets that have to be reached and fulfilled before the training course can be continued.<br>b. Each specified target should have an associated objective that is identifiable both by the flight crew and by the trainers.<br>c. Each qualification event that is required by the programme should specify the training that is required to be undertaken and the required standard to be achieved. (See paragraph 4 below.) | <p>The curriculum for conversion training is unlikely to be varied by an ATQP so the existing elements may be retained. The curriculum for recurrent training should include these elements with the following exceptions:</p> <p>Entry requirements: A simple statement only is required where a pilot is required to do routine recurrent training.</p> <p>Targets/Objectives: Should be specified where appropriate.</p> <p>Specific targets are not required between parts of the same checking/training event, e.g. each day of a simulator check, each sector of a line check, each module of SEP, etc. (as appropriate).</p> |
| 3 Each lesson/course/training or qualification event should have the same basic structure. The topics related to the lesson have to be listed and the lesson targets should be unambiguous.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Existing scoring frameworks may be used to assess if the required standard has been achieved (to be agreed with the CAA).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 4 Each lesson/course or training event whether classroom, CBT or simulator should specify the required topics with the relevant targets to be achieved.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | As above.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

2.7

| <b>TGL 44, ACJ to Appendix 1 to OPS 1.978(b)(4)</b><br><b>Training Personnel</b><br>See Appendix 1 to OPS 1.978(b)(4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| <b>EU-OPS Regulation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Minimum Regulatory Standard</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p>1 Personnel who perform training and checking of flight crew in an operator's ATQP should receive the following additional training on:</p> <ul style="list-style-type: none"> <li>1.1 ATQP principles and goals;</li> <li>1.2 Knowledge/skills/behaviour as learned from task analysis;</li> <li>1.3 LOE/LOFT Scenarios to include triggers/markers/event sets/observable behaviour;</li> <li>1.4 Qualification standards;</li> <li>1.5 Harmonisation of assessment standards;</li> <li>1.6 Behavioural markers and the systemic assessment of CRM;</li> <li>1.7 Event sets and the corresponding desired knowledge/skills and behaviour of the flight crew;</li> <li>1.8 The processes that the operator has implemented to validate the training and qualification standards and the instructor's part in the ATQP quality control; and</li> <li>1.9 LOQE.</li> </ul> | <p>Additional training for training personnel should cover those topics that are new under an ATQP. Additional training is not required where existing qualification standards, assessment standards, behavioural markers and assessment of CRM methods are being incorporated. The training method is not prescribed and any suitable technology or media may be used.</p> <p>Third-party training personnel may be used in an ATQP provided they are appropriately qualified and have received the additional ATQP training.</p> |

| EU-OPS Regulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Minimum Regulatory Standard                                                                                                                                                                                                                                                                                                                                                                                                            |
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| <p>1 The feedback should be used as a tool to validate that the curricula are implemented as specified by the ATQP; this enables substantiation of the curriculum, and that proficiency and training objectives have been met. The feedback loop should include data from operations flight data monitoring, advanced FDM programme and LOE/LOQE programmes. In addition, the evaluation process shall describe whether the overall targets/objectives of training are being achieved and shall prescribe any corrective action that needs to be undertaken.</p> <p>2 The programme's established quality control mechanisms should at least review the following:</p> <ul style="list-style-type: none"> <li>2.1 Procedures for approval of recurrent training;</li> <li>2.2 ATQP instructor training approvals;</li> <li>2.3 Approval of event set(s) for LOE/LOFT;</li> <li>2.4 Procedures for conducting LOE and LOQE.</li> </ul> | <p>The feedback loop should include data from FDM and LOE. Data from an advanced FDM programme and LOQE are only required where an operator has these in place. The feedback loop should be carried out at intervals of between six and twelve months to evaluate the conversion and recurrent training programmes over that period. Where corrective action is required the process and associated timescales will be documented.</p> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>Operators may use and continue to develop existing quality control mechanisms to review an ATQP programme. Audit intervals should be annual for the first two years, but can then be extended to bi-annual subject to the approval of the CAA.</p>                                                                                                                                                                                  |

| <b>TGL 44, ACJ to Appendix 1 to OPS 1.978(b)(6)</b><br><b>Crew Performance Measurement and Evaluation</b><br>See Appendix 1 to OPS 1.978(b)(6)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                            |
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| <b>EU-OPS Regulation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Minimum Regulatory Standard</b>                                                                         |
| <p>1 The qualification and checking programmes should include at least the following elements:</p> <ul style="list-style-type: none"> <li>1.1 A specified structure;</li> <li>1.2 Elements to be tested/examined;</li> <li>1.3 Targets and/or standards to be attained;</li> <li>1.4 The specified technical and procedural knowledge and skills, and behavioural markers to be exhibited.</li> </ul> <p>2 An LOE event should comprise of tasks and sub-tasks performed by the crew under a specified set of conditions. Each event has one or more specific training targets/objectives, which require the performance of a specific manoeuvre, the application of procedures, or the opportunity to practise cognitive, communication or other complex skills. For each event the proficiency that is required to be achieved should be established. Each event should include a range of circumstances under which the crews' performance is to be measured and evaluated. The conditions pertaining to each event should also be established and they may include the prevailing meteorological conditions (ceiling, visibility, wind, turbulence etc.); the operational environment (navigation aid inoperable etc.); and the operational contingencies (non-normal operation etc.).</p> | <p>All these elements have been covered previously.</p> <p>The LOE should be constructed as described.</p> |

| <b>TGL 44, ACJ to Appendix 1 to OPS 1.978(b)(6)</b><br><b>Crew Performance Measurement and Evaluation</b><br>See Appendix 1 to OPS 1.978(b)(6)                                                   |  | <b>EU-OPS Regulation</b>                                                                                                                                                                                                                                                                            | <b>Minimum Regulatory Standard</b>                                                                                                                                                                                                                                                                    |
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| 3 The markers specified under the operator's ATQP should form one of the core elements in determining the required qualification standard. A typical set of markers is shown in the table below: |  | <p>EVENT</p> <p>Awareness of Aeroplane Systems:</p> <ul style="list-style-type: none"> <li>— MARKER</li> <li>— Awareness of Automation Systems:</li> <li>— Awareness of Closed Loop Principle:</li> <li>— Awareness of Resource Management:</li> <li>— Awareness of Technical Resources:</li> </ul> | <p>Operator's existing behavioural markers can be used, adapted and developed for an ATQP</p> <p>Specific targets are not required between parts of the same checking/training event, e.g. each day of a simulator check, each sector of a line check, each module of SEP, etc. (as appropriate).</p> |

2.1.0

| EU-OPS Regulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Minimum Regulatory Standard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| 1 The data analysis programme should consist of: <ul style="list-style-type: none"> <li>1.1 An FDM programme: This programme should include systematic evaluation of operational data derived from equipment that is able to record the flight profile and relevant operational information during flights conducted by the operator's aeroplane. Data collection should reach a minimum of 60% of all relevant flights conducted by the operator before ATOP approval is granted. This proportion may be increased at the discretion of the CAA.</li> </ul>   | Operators' existing FDM programmes may be used or adapted for an ATOP. A data collection rate of 60% should normally be considered adequate where there is good systematic evaluation of the data.                                                                                                                                                                                                                                                                                                                                                                                                |
| 1.2 An Advanced FDM when an extension to the ATOP is requested: An advanced FDM programme is determined by the level of integration with other safety initiatives implemented by the operator, such as the operator's Quality System. The programme should include both systematic evaluations of data from an FDM programme and flight crew training events for the relevant crews. Data collection should reach a minimum of 80% of all relevant flights and training conducted by the operator. This proportion may be varied at the discretion of the CAA. | An advanced FDM programme is not required to gain approval for extended periods of validity or for adding new aircraft types/variants to an existing ATOP. Some FDM programmes are set up to ensure data is dis-identified such that events cannot be identified as being during training or not. There should be no requirement for these protocols to be changed under an ATOP and the same benefits will be given where there are thorough and systematic evaluations of the dis-identified data. A data collection rate of 80% should normally be considered adequate where this is the case. |
| 2 The purpose of either an FDM or advanced FDM programme is to enable the operator to: <ul style="list-style-type: none"> <li>2.1 Provide data to support the programme's implementation and justify any changes to the ATOP;</li> <li>2.2 Establish operational and training objectives based upon an analysis of the operational environment; and</li> <li>2.3 Monitor the effectiveness of flight crew training and qualification.</li> </ul>                                                                                                               | An FDM programme should be used to validate tasks and events at an item level, but should be used to monitor crew training and qualification at the type/variant/fleet level.                                                                                                                                                                                                                                                                                                                                                                                                                     |

| EU-OPS Regulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Minimum Regulatory Standard                                                                                                                                                                                                                                   |
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| <p>3 Data Gathering.</p> <p>3.1 FDM programmes should include a system that captures flight data, and then transforms the data into an appropriate format for analysis. The programme should generate information to assist the operations safety personnel in analysing the data. The analysis should be made available to the ATQP postholder.</p> <p>3.2 The data gathered should:</p> <ol style="list-style-type: none"> <li>Include all fleets that plan to operate under the ATQP;</li> <li>Include all crews trained and qualified under the ATQP;</li> <li>Be established during the implementation phase of ATQP; and</li> <li>Continue throughout the life of the ATQP.</li> </ol> | <p>The data gathered and formatted may be analysed by operations safety personnel or training support personnel for use in an ATQP. Existing data gathering processes, dis-identification protocols and data retention agreements may be used or adapted.</p> |
| <p>4 Data Handling.</p> <p>4.1 The operator should establish a process, which ensures the strict adherence to any data handling protocols, agreed with flight crew representative bodies, to ensure the confidentiality of individual flight crew members.</p> <p>4.2 The data handling protocol should define the maximum period of time that detailed FDM or advanced FDM programme data, including exceedences, should be retained. Trend data may be retained permanently.</p>                                                                                                                                                                                                           | <p>Existing data handling, confidentiality and data retention protocols can be used or adapted in an ATQP.</p>                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p>5 An operator that has an acceptable operations FDM programme prior to the proposed introduction of ATQP may, with the approval of the CAA, use relevant data from other fleets not part of the proposed ATQP.</p>                                         |

2.1.1

| <b>TGL 44, ACJ to Appendix 1 to OPS 1.978(c)(1)(i)</b><br><b>Safety Case</b><br>See Appendix 1 to OPS 1.978(c)(1)(i)                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                            |
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| <b>EU-OPS Regulation</b>                                                                                                                                                                                                                                                                                                                                                                                   | <b>Minimum Regulatory Standard</b>                                                                                                                                                                                                                         |
| 1 Safety Case<br>1.1 A documented body of evidence that provides a demonstrable and valid justification that the programme (ATQP) is adequately safe for the given type of operation. The safety case should encompass each phase of implementation of the programme and be applicable over the lifetime of the programme that is to be overseen.                                                          | The safety case shall establish how the regulations for an ATQP will be met and how the programme will be implemented. Once an ATQP is established and fully documented, the safety case needs to be updated only if major programme changes are proposed. |
| 1.2 The safety case should:<br>a. Demonstrate the required level of safety;<br>b. Ensure the required safety is maintained throughout the lifetime of the programme; and<br>c. Minimise risk during all phases of the programme's implementation and operation.                                                                                                                                            | As above.                                                                                                                                                                                                                                                  |
| 2 Elements of a Safety Case:<br>2.1 Planning: Integrated and planned with the operation (ATQP) that is to be justified;<br>2.2 Criteria: Develop the applicable criteria - see paragraph 3 below;<br>2.3 Documentation: Safety-related documentation – including a safety checklist;<br>2.4 Programme of implementation: To include controls and validity checks; and<br>2.5 Oversight: Review and audits. | Existing training processes and documentation, where suitable, may be used or adapted for use in an ATQP. The elements of a safety case may simply refer to these.                                                                                         |

| EU-OPS Regulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Minimum Regulatory Standard                                                                                                                                                                                                                                                                                                                     |
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| <p>3 Criteria for the establishment of a Safety Case.</p> <p>3.1 The Safety Case should:</p> <ul style="list-style-type: none"> <li>a. Be able to demonstrate that the required or equivalent level of safety is maintained throughout all phases of the programme, including as required by paragraph (c) below;</li> <li>b. Be valid to the application and the proposed operation (ATQP);</li> <li>c. Be adequately safe and ensure the required regulatory safety standards or approved equivalent safety standards are achieved;</li> <li>d. Be applicable over the entire lifetime of the programme;</li> <li>e. Demonstrate Completeness and Credibility of the programme;</li> <li>f. Be fully documented;</li> <li>g. Ensure integrity of the operation and the maintenance of the operations and training infrastructure;</li> <li>h. Ensure robustness to system change;</li> <li>i. Address the impact of technological advance, obsolescence and change; and</li> <li>j. Address the impact of regulatory change.</li> </ul> | <p>A safety case may be submitted as the first part of an application for approval of an ATQP. Therefore, not all the programme criteria may be in place, such as documentation and system changes. This should not affect the approval process provided a timetable for completion of the criteria is included in the implementation plan.</p> |
| <p>4 In accordance with Appendix 1 to OPS 1.978 paragraph (c) the operator may develop an equivalent method other than that specified above.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p>As above, an equivalent method other than a formal safety case would be to present the documentation and implementation for approval.</p>                                                                                                                                                                                                    |

# Chapter 25 Training in the Use of Equipment

## 1 Terrain Awareness and Warning Systems (TAWS)

### 1.1 Training in the Use of TAWS

1.1.1 It is essential that all flight crews are trained to understand the various TAWS modes so that they will react immediately and correctly to alerts and warnings. The training must contain a detailed briefing and discussion on the equipment, its limitations and necessary actions for responding to TAWS alerts and warnings. Training and procedures should be based upon *JAA Administrative and Guidance Material Section 4, Operations, Part 3, Temporary Guidance Leaflet No. 27 'Training Programmes for the Use of TAWS'*. Where a simulator is used for the initial aircraft type conversion course, the instructor or Authorised Examiner should devise realistic scenarios that provide TAWS alerts and warnings. Subsequent refresher training should be incorporated into the proficiency check and occur at least once in every three year period.

### 1.2 Flight Simulator CFIT Scenarios for Training in the Use of TAWS

1.2.1 Operators who have access to flight simulators that have TAWS installed should use these to give pilots practice in responding to TAWS alerts and warnings. Training and procedures should be based upon JAA TGL No. 27. In addition to providing demonstrations of the different modes and inhibitions that apply when the aeroplane is in a landing configuration, two specific exercises should be considered.

1.2.2 The first exercise is to ask the pilot to fly towards terrain at a constant altitude in clear visual conditions with the aircraft not in a landing configuration. He should be instructed not to begin a terrain avoidance manoeuvre until TAWS gives a 'Pull Up' warning. The instructor must, before running this exercise, confirm that if, at this point, the pilot responds correctly to the warning, the aeroplane will clear the terrain feature. This lesson will demonstrate that the TAWS warning comes very late, but that the correct response will avoid collision with the terrain. It will also demonstrate that if the pilot were to have begun his response promptly when the TAWS alert was first annunciated, terrain clearance would have been that much greater.

1.2.3 The second exercise is for the pilot to be 'instructed by radar' whilst flying in reduced visibility to fly towards a similar terrain feature, without placing any constraints upon when he should respond to any TAWS alerts and warnings that he might encounter. Again, this exercise will enhance the need to respond promptly to the TAWS alert (and warning, if this should be annunciated). It will demonstrate that timely and correct action will enable the aircraft to clear the terrain. Such an exercise might be included in a LOFT scenario.

1.2.4 Where flight simulators are not able to allow CFIT exercises such as those described above to be carried out, consideration should be given to making use of flight simulators that can do so, or of modifying the former accordingly.

1.2.5 Training staff should note the extent to which pilots make use of situational information and their readiness to respond promptly when the situation demands, the aim being to discourage over-dependence on automatic mode operations when early - and correct - manual intervention is required. Application of effective CRM in terms of information sharing, load sharing and decision making in order to avoid CFIT should be monitored, and counselling provided if any shortcomings are observed.

## 2 Airborne Collision Avoidance System (ACAS)

- 2.1 The training which ICAO considers desirable for crews to gain optimum understanding of the theoretical aspects of ACAS operation and maximum operating skill in understanding and responding to ACAS indications is published as Annex 1.
- 2.2 During the implementation of ACAS several operational issues were identified that were attributed to deficiencies in pilot training programmes. To address these deficiencies the Annex details a set of performance-based training objectives for ACAS pilot training. The training objectives cover the following:
  - theory of operation;
  - pre-flight operations;
  - general in-flight operations;
  - response to Traffic Advisories (TAs); and
  - response to RAs.

# Annex 1 to Chapter 25

## Performance-Based Training Objectives for ACAS Pilot Training

### 1 Training Objectives

1.1 The training objectives should cover the following:

- theory of operation;
- pre-flight operations;
- general in-flight operations;
- response to TAs; and
- response to RAs.

### 2 Academic Training

2.1 This training is typically conducted in a classroom using both computer-based training (CBT) aids and ACAS documentation. The required level of knowledge should be confirmed by means of a written test or interactive CBT questions.

#### 2.2 Theory of Operation

2.2.1 The pilot must demonstrate an understanding of the following:

- Surveillance:
  - The range of interrogation by the ACAS of other transponder-equipped aircraft. The maximum range of surveillance may be reduced to as little as 4.5 NM by large numbers of ground interrogators and/or ACAS-equipped aircraft.
- Collision avoidance:
  - What influence the modes of transponder have on the TA presentation.
  - When an RA will only be issued against aircraft that are reporting altitude and only in the vertical plane.
  - How an RA against an ACAS-equipped intruder is co-ordinated to ensure complementary RAs are issued.
  - When the failure to respond to an RA deprives the aircraft of the collision protection provided by the ACAS equipment. Additionally, during a co-ordinated RA encounter the failure of one aircraft to manoeuvre in accordance with the RA renders the other aircraft's ACAS less effective than if the first aircraft were not ACAS-equipped.
  - When manoeuvring in a direction opposite to that indicated by an RA is likely to result in further reduction in separation. This is particularly true in the case of a co-ordinated RA encounter.
- Advisory thresholds:
  - Knowledge of the criteria for the issue of TAs and RAs.

- How ACAS advisories are based on time to Closest Point of Approach (CPA) rather than distance.
- When separation standards provided by ATC are different from those against which ACAS issues alerts.
- The thresholds for issuing a TA or RA vary with altitude. The thresholds are larger at higher altitudes.
- How RAs are chosen to provide the desired vertical separation at the CPA. As a result, RAs can instruct a climb or descent through the intruder aircraft's altitude.
- The limitations of the ACAS equipment:
  - ACAS will neither track nor display aircraft that are not equipped with a transponder, have an inoperable transponder or have a Mode A transponder.
  - A knowledge of which aircraft system or instrumentation failures will lead to the automatic failure of the ACAS.
  - Due to limited azimuth resolution, the bearing information displayed by ACAS is not sufficiently accurate to support the initiation of horizontal manoeuvres based solely on the traffic display.
  - Stall warnings, TAWS and wind-shear warnings take precedence over ACAS advisories. When a TAWS or wind-shear warning is active the ACAS will automatically switch to TA-only mode with the aural annunciation inhibited.
  - ACAS will neither display nor give alerts against intruders with a vertical speed in excess of 10,000 ft/min, e.g. rapidly climbing or descending military aircraft.
  - ACAS may not display all proximate traffic in areas of high-density traffic.
  - Some aircraft less than 380 ft AGL may not be displayed.
- The conditions under which certain functions of ACAS are inhibited:
  - Heights above the ground at which various RAs are inhibited.
  - Heights above the ground at which all aural annunciations are inhibited.
  - Altitudes and configurations under which climb and increase climb RAs are inhibited. Manoeuvring in the required sense of the RA, even when the aeroplane performance is not sufficient to satisfy full compliance with the climb rate required by the RA, will still reduce the risk of collision.

## 2.3 Operating Procedures

2.3.1 The pilot must demonstrate the knowledge required to operate ACAS and interpret the information presented by ACAS. The training should achieve the following:

- Enable the pilot to correctly operate the ACAS controls:
  - Use of the self-test function.
  - Use of the traffic display range selection depending on the air traffic environment and its use to reduce the display range to increase display resolution when an advisory is issued.
  - Recommended use of the 'Above/Below' mode selector during climbs and descents.
  - If available, the proper selection of the display of absolute or relative altitude and the associated limitations.

- Enable the pilot to correctly interpret the information displayed by ACAS:
  - Other and proximate traffic.
  - Non-altitude reporting traffic.
  - No-bearing TAs and RAs.
  - Off-scale TAs and RAs.
  - RAs – information displayed on the traffic display and the meaning of the red and green areas on the RA display.
  - Knowledge of when the green areas will and will not be displayed.
  - An understanding of the RA display limitations, i.e. if a vertical speed tape is used and the range of the tape is less than 2,500 ft/min, how an 'increase rate' RA will be displayed.
  - How a 'Track Up' display will require the pilot to make a mental adjustment for drift when assessing the relative bearing of a potential threat.
- Ensure that the pilot has an understanding of the use of TA-only mode including:
  - A knowledge of the operator's guidance for the use of TA-only mode.
  - The reason for using this mode and situations in which its use may be desirable.
  - Knowing that TA aural annunciations are inhibited below 500 ft AGL.
- Ensure that pilots know the combined crew actions when responding to TAs and RAs including:
  - Crew duties when a TA is issued.
  - Crew duties and call-outs when responding to an RA with a clear definition of who will fly the aircraft during a response to an RA.
  - When in receipt of simultaneous and conflicting instructions to manoeuvre from ATC and an RA, the RA is followed and ATC are notified using the standard phraseology.
  - Communications with ATC during an RA.
  - Conditions under which an RA will not be followed and who will make that decision.
- Ensure that pilots are aware of the requirements for reporting an RA to ATC and other authorities.

### 3 Manoeuvre Training

- 3.1 The training of pilots to correctly respond to ACAS displayed information is best conducted in a full flight simulator equipped with ACAS. The simulator should have controls and displays that are similar in appearance and operation to those in the aircraft.
- 3.2 If the operator does not have access to an ACAS-equipped simulator, the initial training should be conducted by means of interactive CBT. The ACAS display and controls should be similar to those on the aircraft that the pilot will fly. The interactive CBT display should display scenarios in real time. The pilot must be able to identify when the correct response has been made and what response should have been made following an incorrect response.

3.3 The manoeuvre training should cover a broad variety of scenarios so that the crews can experience the full capability of the ACAS equipment. This training should also include demonstrations of the consequences of a slow or late response, and manoeuvring in opposition to the direction of the displayed RA.

- TA response:
  - The division of duties between the PF and the PM.
  - The proper interpretation of the displayed information – bearing, range, data tag and trend arrow.
  - The visual search for the traffic causing the TA.
  - Not to manoeuvre solely based on the ACAS displayed information due to azimuth resolution limitations.
  - When visual acquisition is attained, the right-of-way rules used to maintain or attain safe separation.
  - To ensure that no unnecessary manoeuvres are initiated and that the limitations of making manoeuvres based solely on visual acquisition are understood.
- RA response:
  - The division of duties between the PF and the PM.
  - The proper interpretation of the displayed information.
  - For an RA response requiring a change in vertical speed, that it is initiated in the correct direction within five seconds of the RA being displayed.
  - For 'increase rate', 'reversal', 'weakening' and 'strengthening' RAs, that the vertical speed modification or reversal manoeuvre is initiated within two and a half seconds of the RA being displayed.
  - The recognition of altitude-crossing encounters and the proper response to these RAs.
  - For RAs that do not require a change in vertical speed, that the vertical speed needle or pitch angle remains outside the red area of the RA display.
  - For 'maintain rate' RAs, that the vertical speed is not reduced. Pilots should recognise that a 'maintain rate' RA may result in crossing through the intruder's altitude.
  - If a justified decision is made not to follow an RA, that the resulting vertical rate is not in a direction opposite to the sense of the displayed RA.
  - The deviation from the current clearance is minimised by levelling the aircraft when the RA weakens or when 'Clear of Conflict' is annunciated and a prompt return to the current clearance is executed.
  - When possible an ATC clearance is complied with while responding to an RA. For example, if the aircraft can level at the assigned altitude while responding to a 'reduce climb' or 'reduce descent' RA, it should be done.
  - A knowledge of the ACAS multi-aircraft logic and that ACAS can optimise separation from two other aircraft by climbing or descending towards one of them.
  - A prompt response is made when a climb RA is issued at the aircraft's maximum altitude, even if the rate of climb demanded cannot be achieved.

## 4 Initial Training

4.1 The pilot's understanding and competence in the operation of ACAS should be checked in a full flight simulator equipped with an ACAS display and controls that are similar to those in the aircraft that the pilot will fly. The simulator should be able to generate a range of scenarios that include:

- Initial RAs requiring a change in vertical speed.
- Initial RAs that do not require a change in vertical speed.
- 'Maintain rate' RAs.
- Altitude-crossing RAs.
- 'Increase rate' RAs.
- RA reversals.
- Weakening RAs issued while the aircraft is at the maximum altitude.
- Multi-aircraft RA encounters.

4.2 If an operator does not have access to an ACAS-equipped full flight simulator then the pilot's understanding and competence in the operation of ACAS should be checked using interactive CBT, with an ACAS display and controls similar in appearance and operation to those in the aircraft that the pilot will fly. The CBT should include all types of RA listed in paragraph 4.1 above.

## 5 Recurrent Training

5.1 ACAS recurrent training ensures that pilots maintain the appropriate knowledge and skills in the operation of ACAS. The recurrent training should be integrated into and/or conducted in conjunction with other established recurrent training programmes.

5.2 The recurrent training should include significant issues and operational concerns that have been identified by the operator.

5.3 Recurrent training should include both academic and simulator manoeuvre training and should address any significant issues identified by line operations, equipment or procedural changes, or operations in airspace where high numbers of TAs and RAs have been reported.

5.4 ACAS monitoring programmes periodically publish findings from the analyses of ACAS events. The results of these analyses typically discuss technical and operational issues and are therefore a good source of information that should be included in the planning of the recurrent training.

5.5 Where recurrent training is conducted in a simulator, pilots should fly all the RA scenarios listed in paragraph 4.1 above over a four-year period.

5.6 Where recurrent training is conducted using CBT, pilots should fly all the RA scenarios listed in paragraph 4.1 above over a two-year period.

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# Chapter 26 Tests/Checks Required for Aircraft Certificated for Single Pilot Operation but Operated Multi-pilot under EU-OPS/JAR-OPS 3

## 1 Introduction

- 1.1 With the introduction of JAR-FCL tests/checks the situation with regard to aircraft certified as single pilot but operated under EU-OPS/JAR-OPS 3 as multi-pilot is as follows:
  - 1.1.1 OPCs should be conducted in the normal operating environment, i.e. with two pilots.
  - 1.1.2 LPCs may be either combined with the OPC or conducted separately. In the latter case the check should be conducted in accordance with the Single Pilot Aeroplane Licence Proficiency Check (LPC SPA) in the single pilot role. When the LPC is to be combined with the OPC, two options are available:
    - a) If the operator specifies in his Operations Manual that all operations including non-PT/positioning flights are to be conducted multi-pilot then the combined LPC/OPC may be conducted multi-pilot. However, the test should be flown to the LPC SPA format. After a successful completion of the test the candidate's licence page FCL150CJAR should be endorsed with the aircraft type and the restriction MP (Multi-Pilot), e.g. C501/MP. The Instrument Rating page should also be completed.
    - b) If the operator specifies that non-PT operations/positioning flights may be conducted as single pilot then the combined LPC/OPC should still be carried out in the multi-pilot role but in addition it will be necessary to repeat Section 6 of the LPC SPA operating as single pilot in much the same way as training captains are required to carry out the Right Hand Seat items of the proficiency check.
    - c) If the above tests are carried out in an aeroplane then the examiner must occupy a pilot's seat.
    - d) Pilots operating SPA under EU-OPS/JAR-OPS 3 rules, i.e. as multi-pilot, will not be required to undergo further MCC training for endorsement of an MPA on their licence provided they have operated multi-pilot for an AOC operator for a minimum of 500 hours and have undergone two OPCs.
    - e) Some aircraft, such as the Cessna Citation series aircraft, have been included in both the SPA and MPA grouping under JAR-FCL. The appropriate test in this case will be decided by the certification of aircraft in the Flight Manual.

## 2 Helicopters

- 2.1 The above paragraphs also apply to helicopter pilots except that where the helicopter operator specifies that non-PT/positioning flights may be conducted single pilot, then a combined LPC/OPC should be carried out in the multi-pilot role. In addition, it will be necessary to repeat items 2.3.2 and 2.8 of the LPC/SPH (Single-Pilot Helicopter) check operating as single pilot.

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# Chapter 27 Recording of Flight Times for Flight Crew Licensing

## 1 Introduction

1.1 Flight time recorded in order to comply with Articles 145(3) and 149 of the ANO 2009 shall continue to be recorded in accordance with the operator's approved Flight Time Limitation Scheme and Articles 145(1)(a) and 149 of the ANO 2009. The rules on logging of flight time are laid down in JAR-FCL 1.080 and JAR-FCL 2.080 as appropriate. When an aircraft crew consists of more than the required number of pilots, i.e. a 'heavy' crew, the following should apply when recording flight times.

## 2 Pilot in Command

2.1 The designated commander of the aeroplane may log as pilot in command all the flight time. This includes rest taken on board.

## 3 Co-Pilot

3.1 The designated co-pilot of the aeroplane may log as co-pilot all the time he acts as co-pilot whilst sitting in a pilot's seat. He may log as Pilot In Command Under Supervision (PICUS) all the time he occupies a pilot's seat and acts as pilot in command under the supervision of the pilot in command or a cruise relief pilot substituting for the pilot in command. He may also log as pilot in command all the time he is acting as pilot in command and substituting for the designated commander of the aircraft when he is taking rest. He may not log as flight time any periods during which he does not occupy a pilot's seat.

## 4 Cruise Relief Pilot

4.1 A cruise relief pilot may log as pilot in command all the time he occupies a pilot's seat as relief for the designated commander. He may log as co-pilot all the time he occupies a pilot's seat as relief for the co-pilot. He may log as PICUS all the time he occupies a pilot's seat and acts as pilot in command under the supervision of the designated commander or his relief. He may not log as flight time any periods during which he does not occupy a pilot's seat.

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# Chapter 28 Additional Factors for Helicopter Pilots' Periodic Tests

## 1 Introduction

- 1.1 The periodic tests for helicopter pilots should be based, as far as it is practicable to do so, on those for aeroplane pilots.
- 1.2 Commanders and co-pilots should normally be checked in their respective seats.
- 1.2.1 Commanders whose duties also require them to carry out the duties of the co-pilot, or commanders required to conduct training or examining duties, shall complete their proficiency checks respectively from left and right hand seats, on alternate proficiency checks, provided that when the type rating proficiency check is combined with the OPC the commander completes his training or checking from his normally occupied seat.
- 1.2.2 Examiners shall hold a licence and rating at least equal to the licence or rating for which they are authorised to conduct skill tests or proficiency checks; if conducting an OPC or line check, the examiner must hold a current OPC or line check with the relevant operator on the relevant type.

### 1.3 Line Checks – All Pilots

- 1.3.1 Operators' training staff should recognise the wide variety of roles in which pilots may be engaged and the content of the line check should reflect this. In any event the duration of the line check should not be less than 40 minutes.
- 1.3.2 For pilots who are required to operate at night in VMC the check must include a night section and appropriate certification.
- 1.3.3 For pilots who are required to operate in IMC the check must include an IFR section and appropriate certification. To satisfy the requirements of the Commanders' and co-pilots' instrument approach proficiency, at least one instrument approach must be flown, in particular pilots engaged in offshore IMC operations should carry out at least one radar approach to an offshore installation.

- 1.4 **Conduct of Specialist Task Checks.** The conduct of specialist task checks may best be carried out as an extension to the OPC but should be formally certified.

### 1.5 OPCs – Pilots Required to Operate in IMC

- 1.5.1 Some manoeuvres can only be conducted in VMC, and it follows that the OPC will require both a VMC and an IMC section. It is therefore acceptable to treat these sections as separate checks, each having the same validity. The OPC instrument section is referred to as the OPC(I).
- 1.5.2 To ensure that those items of check which are appropriate to night operation and those which should only be attempted in daylight are checked at least annually, it is recommended that the check should be conducted alternately by day and night.
- 1.5.3 The content of the OPC should also include the addition of items peculiar to helicopters, in particular:
  - a) engine failures before and after the TDP and landing decision point for each certificated profile. At least one continued take-off must be conducted in simulated IMC;

- b) flight and engine control systems malfunctions for which accepted procedures are included in the RFM. At least one instrument approach should be flown with a degradation of the flight control system/auto-pilot; and
- c) recovery from unusual attitudes and techniques for auto-rotation in IMC.

1.5.4 Emergencies such as tail rotor failure, double engine failure and icing problems which would be impossible or only possible with an unacceptable risk factor to practise in flight should be covered in an STD or by discussion on the ground.

## 1.6 **OPCs – Pilots Required to Operate at Night in VMC**

1.6.1 **Two-Pilot Operation.** For helicopters that are operated by two pilots, each holding a valid IR and OPC(I), there are no specific requirements for OPCs to be carried out at night. However, companies must examine their night operating procedures, and if night performance profiles, e.g. helipad or deck operations, require procedures or techniques that are unique to the night environment, then appropriate training and alternating night/day OPCs must be incorporated into the recurrent training and checking programme. For pilots without a valid IR and OPC(I), an Instrument Night Qualification (INQ) and night OPC requirement are the same as detailed in paragraphs 1.6.2 and 1.6.3 for single pilot operation.

1.6.2 **Single-Pilot Operation.** To operate single pilot at night in VMC, the pilot must hold either a valid IR and OPC(I) or an INQ. Pilots who do not hold a valid IR and OPC(I) are required to demonstrate their competence while executing specified manoeuvres and procedures in flight in simulated instrument flight conditions, prior to commencing night operations in VMC, and thereafter at six-monthly intervals. The training and checking syllabus for the INQ is detailed in paragraph 2 below. This check was previously referred to as the OPC NQ (Night Qualification) – it must not be confused with, and is in addition to, the requirement for an OPC to be carried out at night, detailed in paragraph 1.6.3 below.

1.6.3 Prior to commencing night operations in VMC, pilots shall carry out an OPC at night. Thereafter, each alternate OPC shall be conducted at night. An OPC conducted at night shall qualify a pilot for both day and night operations.

## 1.7 **OPCs – Pilots Required to Operate by Day in VMC**

1.7.1 Such pilots need only be checked in day visual conditions and in this case the check should include the applicable items of the relevant paragraphs above.

## 1.8 **Instrument Rating (Helicopters)**

1.8.1 The helicopter IR is valid only in respect of the helicopter type on which the test was conducted. Although an IR lasts for 12 months, for it to remain valid for PT an instrument check shall be carried out at each six-monthly OPC as detailed in paragraph 1.5.1.

## 1.9 **Operations to Oil and Gas Installations and Vessels at Night**

1.9.1 Operators who intend to work in the offshore environment to oil and gas installations shall ensure that all pilots are initially qualified in night deck landings and thereafter remain recent.

1.9.2 An initial night deck landing qualification will qualify a pilot to land on and depart from an installation at night. The qualification shall be valid for 12 months, and may be revalidated by operating to a deck at night within the 12-month period. A pilot whose night deck recency has expired may operate to a deck at night provided he is in-date for day deck landings and is accompanied by a suitably qualified Line Training Captain.

## 1.10 **Operations to Elevated Helipads**

1.10.1 For guidance on periodic tests of operations to elevated helipads, see Chapter 24, paragraph 12.

## **2 Training and Checking Required for a Public Transport Helicopter Night Qualification for Flight Crew who do not hold an IR and OPC(I)**

### **2.1 Introduction**

2.1.1 The training and checking requirements and skill levels necessary of a helicopter INQ are listed below. The INQ is only required by flight crew whose licence does not include an instrument rating which has been validated by an OPC(I) and who carry out PT or CAT operations at night in VMC.

2.1.2 The pilot conducting the training and/or checking (the Training Captain) shall be a TRE with a current IR (Helicopters) or approved by the CAA to carry out the INQ. The pilot under test (the pilot) shall pass all sections of the INQ. Failure in more than one section will require the pilot to take the entire check again. A pilot failing only one section shall take the failed section again. Further training may be required following any failed INQ. Failure to achieve a pass in all sections of the check in two attempts shall require further training as determined by the examiner.

**NOTE:** For a Training Captain without a current IR, to be approved to carry out the INQ check, the qualifications required are: TRE on type with current Flying Instructor rating who teaches or who has taught instrument flying to Commercial Pilot Licence (CPL) standard, and has held an IR, and who has been assessed during the TRE check as competent to examine for the INQ.

2.1.3 The INQ check is type-specific, and shall be carried out in the helicopter type in flight.

### **2.2 Conduct of Check**

2.2.1 The check is intended to simulate a practical flight and should be carried out in Day VFR under simulated instrument flight conditions. The route to be flown shall be chosen by the Training Captain. An essential element is the ability of the pilot to plan and conduct the flight from routine briefing material. The pilot shall undertake the flight planning and shall ensure that all equipment and documentation for the execution of the flight are on board. The duration of the flight shall be at least 30 minutes.

2.2.2 The pilot shall normally be required to fly the helicopter from a position where the pilot-in-command functions can be performed and to carry out the check as if there is no other crew member. The Training Captain shall take no part in the operation of the helicopter, except when intervention is necessary in the interests of safety or to avoid unacceptable delay to other traffic. The pilot shall indicate to the Training Captain the checks and duties carried out, including the identification of radio facilities. Checks shall be completed in accordance with the authorised checklist for the helicopter on which the check is being taken. Power settings and speeds should be agreed with the Training Captain before the start of the check and should normally conform to those given in the operations or flight manual of the helicopter concerned.

### **2.3 Flight Check Tolerances**

2.3.1 The pilot shall demonstrate the ability to:

- operate the helicopter within its limitations;
- complete all manoeuvres with smoothness and accuracy;
- exercise good judgement and airmanship;
- apply aeronautical knowledge; and
- maintain control of the helicopter at all times in such a manner that the successful outcome of a procedure or manoeuvre is never in doubt.

2.3.2 The following limits are for general guidance. The Training Captain shall make allowance for turbulent conditions and the handling qualities and performance of the helicopter used.

Height: Generally  $\pm 150$  ft

Heading: Generally  $\pm 10^\circ$

Speed: Generally  $\pm 10$  kt

## 2.4 **Contents of the INQ**

### **Section 1**

#### **Pre-Departure**

- a) Aircraft performance calculation; mass and balance.
- b) Pre-flight inspection.
- c) Knowledge of Operations Manual weather minima requirements.
- d) Pre-take-off instrument serviceability checks.

### **Section 2**

#### **General Handling**

*(Coupled autopilot modes may **not** be used for this section.)*

Control of the helicopter by reference solely to instruments, including:

- a) Transition to instrument flight during climb out.
- b) Climbing and descending turns with sustained Rate 1 bank angle.
- c) Speed changes in level flight maintaining a constant heading and altitude.
- d) Rate 1 turns to specific headings maintaining a constant altitude.
- e) Autorotation and recovery to level flight.
- f) Limited panel (main attitude indicator failure).
- g) Recoveries from unusual attitudes, to include: Low IAS and High rate of descent; High IAS; High Bank angles.

### **Section 3**

#### **Emergency Homing and Let Down Procedure**

*(Coupled autopilot modes, if fitted, may be used for this section.)*

Control of the helicopter by reference solely to instruments, including:

- a) Setting and checking of navigational aids, identification of facilities if applicable.
- b) Homing to a nominated point, as briefed by the Training Captain, using pilot interpreted aids or simulated ground instructions.
- c) Level flight, control of heading, altitude and airspeed, power setting.
- d) Altimeter settings.
- e) ATC liaison and compliance, (simulated if appropriate) RTF procedures.
- f) Instrument let down to an airfield as briefed by the Training Captain (can be by use of pilot interpreted aids or ground instructions which may be simulated).

## Chapter 29 Cabin Safety Equipment

### 1 Cabin Crew Direct View

- 1.1 Operators with aircraft that are required to meet the direct view requirements of CS 25.785(h) should include instructions both in their safety training and in their Operations Manual. Where specified seats are required by the certification of the aircraft to be occupied by cabin crew for take-off and landing, this should be reflected in safety training and in the Operations Manual - Cabin Safety Procedures.
- 1.2 Whilst mirrors are not a substitute for direct view, a reasonable amount of vision from the cabin crew station into the passenger compartment can be achieved in most cabin configurations. Operators should consider the provision and installation of mirrors on aircraft where the amount of direct view from cabin crew stations is restricted.
- 1.3 Where mirrors are fitted, operators' procedures should include a pre-flight check in order to ensure that they are correctly positioned and that an adequate view of the passenger compartment is available from the seated position at the cabin crew station. When mirrors are installed adjacent to ovens or hot cups, which may have been switched on prior to flight, there should be a pre-flight check to ensure that the surface of the mirror is free from condensation.

### 2 Placarding of Emergency Equipment Carried in the Passenger Cabin

- 2.1 EASA Certification Specification CS 25.1561(b) states that 'each location, such as a locker or compartment, that carries any fire extinguishing, signalling or other lifesaving equipment must be marked accordingly'. Paragraph (c) also states that: 'Stowage provisions for required emergency equipment must be conspicuously marked to identify the contents and facilitate the easy removal of the equipment'.
- 2.2 In the event that equipment locations have been changed or equipment has been removed, but some stowage compartment placards have not been removed or compartments re-placarded, displayed information regarding the stowage of equipment will be incorrect. Such inconsistencies in placarding of emergency equipment has the potential to confuse not only cabin crew, but also passengers who may take upon themselves the use of such equipment in the event of an emergency.
- 2.3 Operators should ensure that the placarding of their emergency equipment is correct and remove any such placards that are no longer relevant. They should ensure that they have a procedure to address any change of the scale and location of emergency equipment in respect of the placarding of stowage compartments or locations. In addition, operators should ensure that any configuration drawings or diagrams defining the location of emergency equipment are amended accordingly.

### 3 Waste Containment

- 3.1 All receptacles for towels, paper and other waste are to be constructed of materials resistant to fire as required by CS 25.853. Their fire containment should be demonstrated by test.
- 3.2 The CAA does not approve waste bags. It is, however, the responsibility of the operator to control the quality of their waste bags in order that resistance to fire is maintained. The fire containment should be demonstrated by test. Waste bags may only be stowed in toilet compartments during the final phases of flight, provided that they contain only low-density waste such as paper and plastic cups.

## 4      **Trash Compactor Boxes**

- 4.1      On some flights, the waste generated can exceed the capacity of the trash compactor boxes and necessitate the removal of the full box from the trash compactor. The full box is then temporarily stowed in another area in the galley or in the passenger cabin. Operators should ensure that boxes that are removed from the trash compactor during the flight are manufactured from fire resistant materials and are supplied complete with an acceptable flammability certificate.

# Chapter 30 Cabin Crew Standard Operating Procedures

## 1 Cabin Crew Uniforms

- 1.1 Operators should provide cabin crew uniforms, which readily distinguish the wearer as a member of the cabin crew. Uniforms should, whenever practicable, be manufactured from non-thermoplastic material such as wool, and particular attention should be paid to uniform linings and melt factors.
- 1.2 When designing cabin crew uniforms, operators should take into account cabin crew duties in an emergency situation and ensure that articles of uniform cannot delay donning or interfere with the effective use of emergency equipment.

## 2 Cabin Crew Footwear

- 2.1 Care should be exercised in the provision of cabin crew footwear. Flat shoes should be worn during take-off, landing and emergency situations to allow cabin crew to carry out their duties and avoid damage to evacuation slides.

## 3 Cabin Crew Pre-Flight Briefings

- 3.1 Cabin crew should be given a safety briefing prior to the commencement of any flight and, in a series of consecutive flights, after each full rest period. Consideration should be given to the following:
  - a) Pre-flight briefing areas should afford privacy.
  - b) Copies of the relevant Operations Manual - Cabin Safety Procedures and current safety notices should be available.
  - c) All cabin crew present should be required to answer satisfactorily at least one question on aircraft safety (emergency drills, safety equipment location and usage) or one on first aid.
  - d) The allocation of cabin crew to specific crew stations should take due account of the operational experience of individual cabin crew.
  - e) Safety 'reminders' that address any recent changes to safety-related issues or any perennial problems should be included.
  - f) The action to be taken by the senior cabin crew member if it becomes apparent that any person displays inadequate knowledge of safety-related issues.

## 4 Cabin Crew Seats and Harnesses

- 4.1 Cabin crew required to be carried by EU-OPS 1.990 should occupy specifically assigned seats with full harness for take-off and landing. Cabin crew should be required to carry out pre-flight checks of their seats in good time prior to take-off and should be aware of the following:
  - a) The seat should readily and fully deploy.
  - b) The harness should function correctly and, in the case of inertia reel harnesses, the mechanism should lock when pulled sharply. Non-inertia harnesses should be readily accessible, free of any obstructions and be ready for immediate use. Fastening and adjustment mechanisms should be operational.

- c) Cabin crew seats, equipped with self-stowing mechanisms, should be fully operational, i.e. when the seat is deployed it should automatically retract to the fully closed position when pressure is no longer applied.

**NOTE:** Operator MEL criteria will apply.

## **5 Embarkation and Disembarkation of Passengers**

- 5.1 A significant number of MORs have been received regarding the removal of steps from aeroplanes without the agreement of the crew. Such actions have the potential to cause injury to both passengers and crew.
- 5.2 Appendix 2 to OPS 1.175(c)(2)(ii) states: [Ground Staff] - 'An operator contracting other organisations to provide certain services retains responsibility for the maintenance of proper standards. In such circumstances, a nominated post holder must be given the task of ensuring that any contractor employed meets the required standards'.
- 5.3 Operators should ensure that their ground-handling procedures, for both their own staff and any sub-contractors, are adequate to ensure safe practice and that steps are not removed from aeroplanes until the crew are ready either to close the doors, or to 'man' the doors until they are ready for closure. There should be agreement between the ground-handling staff and the crew before any action is taken to remove the steps.

## **6 Disabled Persons and Persons of Reduced Mobility (PRMs)**

### **6.1 General**

- 6.1.1 Regulation (EC) No. 1107/2006 prohibits an air carrier from refusing carriage to a PRM. However, an exception provides that an air carrier may refuse to embark a PRM in order to meet applicable safety requirements or if the size of the aircraft or its door makes embarkation or carriage physically impossible.
- 6.1.2 Guidance material advises that, in normal circumstances, PRMs should not be seated adjacent to an emergency exit and, where PRMs form a significant proportion of the total number of passengers on board, the number of PRMs should not exceed the number of able-bodied passengers capable of assisting with an evacuation.
- 6.1.3 An operator must be prepared to carry as many PRMs as permitted by the requirements and it is not open to an operator to set for itself a lower limit. However, the maximum number of PRMs may depend on a number of variables including the type and configuration of the aircraft, the extent of the reduced mobility or disability of the PRM and the number of able-bodied passengers.
- 6.1.4 Generally, the maximum number of PRMs who may be carried is likely to be much greater than the number of PRMs typically seeking carriage. For larger aircraft, it seems unlikely that an operator will be in a position to refuse to carry a PRM because of the EU-OPS/JAR-OPS 3 limit. Smaller aircraft may have a lower limit due to the size of the entrance door, presence of integral steps and location and size of other emergency exits.
- 6.1.5 Operators should ensure that their Operations Manuals contain information relating to their current procedures and limitations for the carriage of PRMs and that these meet the requirements of the Regulation and associated guidance material contained in the Department for Transport Code of Practice, which is available via [www.dft.gov.uk/transportforyou/access/aviationshipping](http://www.dft.gov.uk/transportforyou/access/aviationshipping).

## 6.2 Supplementary Restraint for Persons of Reduced Mobility

6.2.1 EU-OPS, JAR-OPS 3 and the ANO require the aircraft commander to ensure that at certain times each passenger on board occupies a seat or berth with his safety belt (or harness where provided) properly secured. These regulations also require the aircraft commander to ensure that multiple occupancy of seats does not occur except by one adult and one infant who is properly secured by a supplementary loop belt or other restraint device.

6.2.2 Where it is not possible for persons, because of physical disability, to be secured by the safety belt or harness alone, an acceptable means of compliance is to use a supplementary restraint device subject to the conditions described below:

- A supplementary restraint device, support or comfort aid may be used provided the use of the aircraft safety belt or safety harness is retained as part of the restraint system.
- It is the responsibility of the operator to ensure the supplementary restraint device, together with such persons, is adequately secured.
- Provisions should be made for the pre-boarding of such persons.
- The aircraft commander should be satisfied that all reasonable steps have been taken to ensure that, in the interests of safety, such persons are adequately secured before take-off, landing and whenever he deems it necessary.

6.2.3 Such persons should advise the operator, prior to the flight, of the request for the use of a supplementary restraint device.

6.2.4 If an operator determines that such persons cannot be adequately secured when using a supplementary restraint device, the operator retains the right to refuse its use.

6.2.5 Operators who wish to use this acceptable means of compliance should ensure that their Operations Manuals and Training Manuals include the applicable procedures.

6.2.6 When compliance with the regulations cannot be achieved, the operator must apply to the CAA's Flight Operations Policy department for an exemption.

## 7 Stowage of Cabin Baggage and other Items

7.1 Aircraft operators are well aware of the potential hazards caused by excessive amounts of baggage in aircraft cabins. Such hazards include the risk of injury to passengers from overloaded overhead lockers and the potential to obstruct rapid escape from the aircraft cabin should an emergency evacuation be required.

7.2 Instruction should be given to personnel who have direct contact with passengers (check-in and departure gate staff, cabin crew and flight crew) on how to enforce company procedures. Management involved with traffic movements and customer services should be fully familiar with company procedures for restricting cabin baggage. The most effective filters for the control of cabin baggage are at check-in and the departure lounge. It is at this stage that excessive cabin baggage can be redirected to the aircraft hold. Templates and gauges are an effective way of controlling excess baggage and should be utilised at both check-in and in the departure lounge to ensure that only baggage that meets the operator's criteria is taken into the aircraft cabin.

7.3 Awareness and training of personnel are the most effective ways of dealing with the problem.

7.4 Cabin baggage may only be stowed in approved stowages. Operators should provide clear and unequivocal advice to flight and cabin crew as to which stowages are approved. Overhead lockers and other stowages should be clearly placarded with mass limitations and enclosed by latched doors or load bearing nets as appropriate; cabin crew should be made aware of the need to ensure that limitations are not exceeded. Under-seat stowages may only be used if the seat is equipped with a restraint bar and the baggage is of a size to fit entirely under the seat.

7.5 Baggage should not be stowed in toilets, immediately forward or aft of bulkheads, or in such a manner that it will impede access to emergency equipment. Particular attention should be paid to maintaining the integrity of all evacuation routes. Any baggage that cannot be stowed in an approved stowage should be relocated to the hold.

7.6 All catering supplies, blankets, pillows, newspapers and other items should be securely stowed for take-off and landing in approved stowages that provide forward, upward and lateral restraint.

7.7 Crew effects, including baggage and clothing, should only be stowed in approved stowages. Particular care should be taken to ensure that doors and exits, including operating handles, are not obstructed and that there is ready access to emergency equipment.

## **8      Seat Allocation for Family Groups**

8.1 The separation of family groups, especially children, may lead to problems in emergency situations. During emergency evacuations, group members separated from other members of the family or party might seek each other out during the evacuation process. Such actions could have an adverse effect on passenger flow rates towards emergency exits and might seriously affect the outcome of an evacuation. Additionally, infants and young children would need assistance from adults in the donning of oxygen masks during decompression.

8.2 Operators' procedures in respect of seat reservations, seat allocation, check-in procedures and cabin crew duties should take into account the following factors:

- Children accompanied by adults should ideally be seated in the same seat row as the adult. In wide-bodied aircraft, children and accompanying adults should not be separated by more than one aisle.
- Where the above is not possible, children should be separated by no more than one seat row from accompanying adults.
- Seat allocation procedures for family groups, including adults, should reflect the above.
- When large parties of children are carried, operators should take into account the principles of the above criteria and apply suitable seating arrangements.
- Whenever small numbers of infants and children are travelling together, the operator should make every effort to ensure that they are allocated seats where they can be readily supervised by the responsible accompanying adult in both normal and abnormal conditions.

8.3 Operators who operate a free seating policy should have procedures in place to ensure that family groups are seated in accordance with these criteria.

## 9 Occupancy of Passenger Seats next to Self-Help Emergency Exits

- 9.1 The aircraft certification process for emergency evacuation assumes that seats next to self-help emergency exits are occupied by passengers (or in some instances by cabin crew). From an operational perspective, the occupancy of such seats has the potential benefit of a passenger being able to operate the emergency exit at an early stage if an emergency evacuation is required. If these seats are unoccupied, the operation of the exit and subsequent evacuation could be delayed. This situation would require passengers to move from their seats to the exit and then familiarise themselves with its operation (the instructions for which are often located on a passenger seat-back) prior to opening the exit.
- 9.2 Operators should ensure that the passenger seats immediately adjacent to self-help emergency exits are occupied during the taxi, take-off and landing phases of flight. Such procedures should take into account any seating restrictions for certain categories of passengers in line with Operations Manual procedures.
- 9.3 Operators should also consider providing an abbreviated briefing to passengers seated at self-help emergency exits in order to determine their suitability to occupy those seats, seek their initial agreement to assist in an emergency and to advise them to read and understand the operating instructions contained on the seat-back placards, exit hatch and safety card.

## 10 Passenger Information for Self-Help Emergency Exits

- 10.1 Passengers seated adjacent to self-help emergency exits should be readily able to determine the correct method of opening and disposing of exits in an emergency. This information is required by EU-OPS 1.285 to be provided on the passenger safety cards and is also required by CAP 747 *Mandatory Requirements for Airworthiness*, Generic Requirement No. 3, to be featured on seat-back placards.
- 10.2 To ensure consistency and to minimise confusion for passengers, the information provided on the safety cards should be comparable to the instructions on the placards. There is no reason why the information provided on the safety card and on the seat-back placard should not be identical. Differences between safety cards and seat-back placards can at best be confusing and at worst can provide conflicting information. The method of opening the exit should take into account the ergonomics of the exit design, e.g. if the exit should be operated from the seated position, then this should be clearly depicted. Operators should be aware that some placards required by Generic Requirement No. 3 are subject to aircraft type certification.

## 11 Pre-flight Passenger Safety Briefing

- 11.1 Operators should adopt a positive approach to the pre-flight briefing of passengers. Briefings should not be introduced with the statement that operators are required to provide such information. The serving of drinks and the handing out of newspapers, magazines, menus, headsets etc. should not take place during the briefing.
- 11.2 Operators should ensure that:
  - a) cabin crew conduct the briefing in a professional and interested manner. The wording and presentation of the demonstration should encourage passengers to pay attention;

- b) equipment for the demonstration is checked for serviceability and is readily available;
- c) if a video briefing is used, cabin crew are clearly visible to all passengers during the briefing. Video screens should be monitored for serviceability during the briefing and cabin crew should assist any passengers who may have viewing difficulties. Cabin crew should interact with the video at the appropriate time to point out the location of the exits; and
- d) recurrent training includes safety briefing training, particularly for cabin crew who operate on aircraft where video briefings are normally given.

11.3 Passengers' attention should be drawn to the fact that their understanding of safety information may protect them in differing emergency situations.

## **12 Pre-flight Passenger Safety Briefing - Smaller Aircraft**

- 12.1 The requirement for a demonstration of the use of oxygen equipment and lifejackets for passengers is applicable to all aircraft in which the equipment is to be carried, regardless of aircraft size or type, or whether a cabin crew member is carried. On smaller aircraft, the crew member's ability to demonstrate the location and use of the safety equipment, particularly the donning of a lifejacket, can be limited by the size of the cabin.
- 12.2 Regardless of whether it is a flight crew or cabin crew member that conducts the briefing, the operator should ensure that the content is compliant with the requirements and this should be achieved by the use of a formal checklist or announcement. Guidance, including the checklist or announcement, must form part of the Operations Manual which should be carried on board the aircraft.
- 12.3 When it is not practicable to use a video briefing and it is difficult for crew members to stand up and don a lifejacket during the passenger pre-flight briefing, the description of the operation, the salient features and location within the aircraft can be achieved by a crew member holding up an unstowed, uninflated lifejacket. Alternatively, the demonstration could be conducted outside the aircraft or in a departure lounge prior to departure.

## **13 Passenger Safety Cards**

- 13.1 The pre-flight passenger safety briefing is required by EU-OPS 1.285 and JAR-OPS 3.285 to be supplemented with a passenger safety card relating to the type and variant of aircraft to be operated. Information contained in the card should be consistent with the content of the passenger briefing.
- 13.2 The operator should ensure that, for each aircraft type and variant to be operated, a copy of the relevant passenger safety briefing card is included as part of the Operations Manual.
- 13.3 The seated passenger should be able to see, identify and have access to the card when it is in its normal location on board the aircraft. Cards should be designed with this in mind. The card should be placed prominently in the seat pocket or dedicated stowage.
- 13.4 The card should be a separate item and not part of the in-flight magazine or any other information. Cards should be readily identifiable as safety information with a distinctive message to that effect. The safety card should not contain information that is not essential for safety. Internationally recognised symbols may be used and the

languages used in conjunction with these symbols should relate to the routes operated. Cards should be easy to understand and ideally will make use of multicoloured pictures and drawings and avoid cramped and confusing information. Use of words should be kept to a minimum. Care should be taken when utilising a variety of media (e.g. photographs and diagrams) so that the dominant type of medium does not detract from the essential information. The layout of the card should follow a logical sequence; priority being given to mandatory requirements both in sequence and size.

13.5 Passenger safety cards are required to provide the following information as appropriate:

- a) Seat belts and harnesses - instructions for fastening, adjusting and unfastening.
- b) Exit location - location of each exit, routes to exits and the exits most likely to be available in the event of a ditching.
- c) Exit operation for all types of exit - operation of each exit, directional movement of handles, opening movement of exit and disposal of exit hatches. Emergency escape routes from the cabin via over-wing exits should also be shown. (Illustrations should show a person operating the exit and be representative of actual exit size.)

**NOTE:** Illustrations showing self-help exits should not show a crew member opening the exit.

- d) Evacuation slides - correct method of use, manual inflation handle and restrictions for high-heeled shoes.
- e) Brace position - detailed positions for all types of seat orientation and pitch. The brace position for an adult with an infant secured on their lap should also be shown. See Chapter 31, paragraph 1 'Passenger Brace Position', for further information.
- f) Drop-down oxygen masks - location, donning and adjustment of mask and initiation of oxygen flow. Masks for infants and children should only be fitted after those of their guardians.
- g) Lifejackets - removal from stowage, removal from container and donning, preferably from a seated position. Restrictions for inflation inside the aircraft cabin.
- h) Slide rafts - location, correct method of use for boarding and seating, manual inflation handle and detachment.
- i) Life rafts - location, removal, preparation for use, method and location for launching, inflation, boarding and detachment.

13.6 Copies of seat-back placards (as required by CAP 747 *Mandatory Requirements for Airworthiness*, Generic Requirement No. 3 for type III and type IV exits) should be submitted to the Flight Operations Inspectorate Department at the same time as the passenger safety card.

## 14 The Secured Cabin - Procedures and Training

14.1 Operators' procedures and training for securing the cabin should emphasise the following:

- a) Cabin crew should ensure their own safety so that should an emergency arise they are able to carry out their emergency procedures and render assistance to passengers.

- b) Cabin crew who are required by EU-OPS and JAR-OPS 3 to be carried on board the aircraft should, whilst the aircraft is taxiing, remain at their cabin crew stations, unless they are required to carry out duties related to the safety of the aircraft and its passengers, e.g. passenger safety briefing, cabin secure checks, etc. Operators should ensure that at any time the aircraft is on the ground, provision for the safe and rapid evacuation of passengers in an emergency is maintained.
- c) All cabin crew should be seated, with their harnesses fully fastened, at their crew stations before and during the take-off and landing phases of the flight.
- d) Cabin crew should be aware of the consequential effects of a preceding aircraft's vortex wake that may cause sudden and severe turbulence during the take-off and landing phases of the flight.
- e) All bar, galley and catering equipment should be correctly stowed:
  - i) when the aircraft is taxiing;
  - ii) during take-off and landing;
  - iii) when instructed to do so during turbulence; and
  - iv) when the equipment is not in use.
- f) After landing, whilst the aircraft is taxiing, the seat belt regulations still apply and cabin crew should not assist passengers with their baggage, coats etc. during this time. It is recommended that an appropriate briefing advises passengers that personal items may only be removed when the aircraft has come to a complete stop with the engines shut down and the seat belt signs switched off.

## 15 Cabin Lighting

15.1 The dimming of interior cabin lights, particularly when taking off and landing at night, is recommended.

## 16 Spillage of Flight Crew Drinks

16.1 There is a potential for an incident to occur when liquids in open containers are mishandled on aircraft flight decks. Operators should ensure that their procedures for handling drinks and other items in and around the flight deck are appropriate. Clear advice should be given to cabin crew on how best to route drinks when passing them about, so as to avoid any risk of accidental spillage onto electrical equipment or other controls.

## 17 Catering Trolleys

17.1 Aircraft catering trolleys should not be left unattended during the cruise phase of flight.

17.2 CAP 747 *Mandatory Requirements for Airworthiness* Generic Requirement No. 22 requires that aircraft catering trolleys carry the following placarded instructions:

- a) That they should be stored and secured during take-off, turbulent weather and landing.
- b) That the gross mass of the unit, or the combined gross mass of the unit and any other galley insert when stowed together, should not exceed the placarded maximum content mass of the compartment where stowed.

- c) That when removed from their stowage they should not be left unattended.
- 17.3 Additionally, most placards installed by catering trolley manufacturers require trolleys to be stowed during the taxi phase of flight.

## **18 Circuit Breakers - Operational Use**

- 18.1 In-flight use of CBs will usually involve the action of resetting a CB which has tripped because of an electrical overload or fault. The re-establishment of electrical power to a circuit which is at fault involves an element of risk. In flight, cabin crews should not reset CBs associated with domestic services/equipment such as ovens, water boilers etc. because, by definition, the circuits involved are mostly within passenger areas and the inconvenience caused by the loss of service would not justify any possible distress occasioned by 'electrical smells'. Resetting of CBs is only allowed in accordance with the Flight Manual procedures and when there is no associated condition of smoke or fumes. A second reset should not be attempted.

## **19 Disruptive Passengers**

- 19.1 Operators should provide instructions, advice and training to all relevant staff on dealing with passengers who have been drinking excessively or who are disruptive. Such advice should include when to deny boarding rights and reiterate the commander's prerogative to exercise the powers, as conferred by the ANO, to protect the safety of the aircraft and passengers.
- 19.2 Any incident of disruptive behaviour of passengers should be reported under the MORS when the incident meets the MOR criteria.

## **20 Air Turbulence**

- 20.1 If air turbulence is forecast, the flight crew should brief the senior cabin crew member prior to departure.
- 20.2 When air turbulence is encountered, the flight crew should direct appropriate action via the senior cabin crew member. If the in-flight service is to be discontinued, all trolleys, galleys and cabin equipment should be secured and checks undertaken to ensure that passengers are seated with their seat belts fastened.
- 20.3 If advised, cabin crew should take their seats and fasten harnesses as soon as is reasonably practicable. Cabin crew procedures should allow them to advise the flight crew of turbulence being encountered in the cabin. This may be particularly significant on large aircraft types.
- | 20.4 Table 17 may provide further assistance.

## **21 Injury to Cabin Crew during the Final Phase of Flight**

- 21.1 There are cases where cabin crew have suffered injury during the final phase of flight. Cabin crew need to be aware of their responsibilities during the taxi, take-off and landing phases of flight and the need for them to be secured by harness at their crew station. When evaluating their response to a safety issue, cabin crew should bear in mind their responsibilities to the majority of passengers and the need to protect themselves so as to be physically able to carry out their key functions in the event of an evacuation. Cabin crew should not attempt to assist individual passengers during times when Operations Manual procedures require them to be seated.

21.2 Operations Manuals should include information regarding individual cabin crew members evaluating their responses to safety issues. Cabin crew should take into account their responsibilities to the majority of passengers and the need to protect themselves so as to be physically able to carry out their key functions in the event of an evacuation.

**Table 17** Actions that Should be Taken During Turbulence

| TURBULENCE CATEGORIES                                                                                                                                                                                                                                   | SEAT BELT SIGN ON (COMMANDER'S DISCRETION)                                                                                                                                                                                                                        | CONDITIONS                                                                                                                                                                                                                                                                                                                                                                                                                                             | ACTION REQUIRED |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Light Turbulence</b> - Turbulence that momentarily causes slight, erratic changes in altitude/attitude.                                                                                                                                              | <ul style="list-style-type: none"> <li>Passengers may feel a slight strain against seat belts.</li> <li>Unsecured objects may be displaced slightly.</li> <li>Cabin service may be conducted.</li> <li>Little or no difficulty encountered in walking.</li> </ul> | <p><b>Commander</b></p> <ul style="list-style-type: none"> <li><b>FASTEN SEAT BELT</b> sign on if required.</li> </ul> <p><b>Cabin crew</b></p> <ul style="list-style-type: none"> <li>Verify passenger seat belts fastened and bassinets unoccupied.</li> <li>Verify infant/child is secured in approved restraint device.</li> <li>Secure unattended trolleys, loose cabin, service and galley items.</li> <li>Verify toilets unoccupied.</li> </ul> |                 |
| <b>SEAT BELT SIGN MUST BE ON</b>                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |
| <b>Moderate Turbulence</b> - Turbulence that is similar to light turbulence but of greater intensity. Changes in altitude/attitude occur but the aircraft remains in positive control at all times. It usually causes variations in indicated airspeed. | <ul style="list-style-type: none"> <li>Passengers feel definite strain against seat belts.</li> <li>Unsecured objects are dislodged.</li> <li>Cabin service may be difficult.</li> <li>Difficulty in walking.</li> </ul>                                          | <p><b>Commander</b></p> <ul style="list-style-type: none"> <li><b>FASTEN SEAT BELT</b> sign must be on.</li> </ul> <p><b>Cabin crew</b></p> <ul style="list-style-type: none"> <li>Confer with cabin crew to determine if service should be interrupted and cabin crew seated.</li> <li>Make Public Address (PA) instructing passengers and cabin crew to be seated, followed by interphone call to cabin crew.</li> </ul>                             |                 |
| <b>Severe Turbulence</b> - Turbulence that causes large, abrupt changes in altitude/attitude. It usually causes large variations in indicated airspeed. Aircraft may be momentarily out of control.                                                     | <ul style="list-style-type: none"> <li>Passengers are forced violently against seat belt.</li> <li>Unsecured objects are tossed about.</li> <li>Cabin service is impossible.</li> <li>Walking is impossible.</li> </ul>                                           | <p><b>Commander</b></p> <ul style="list-style-type: none"> <li><b>FASTEN SEAT BELT</b> sign must be on.</li> </ul> <p><b>Cabin Crew</b></p> <ul style="list-style-type: none"> <li>Make PA instructing passengers and cabin crew to be seated, followed by interphone call to cabin crew.</li> </ul>                                                                                                                                                   |                 |
| <b>Extreme Turbulence</b> - Turbulence in which the aircraft is violently tossed about and is practically impossible to control. It may cause structural damage.                                                                                        |                                                                                                                                                                                                                                                                   | <p><b>SIT DOWN IMMEDIATELY ON NEAREST SEAT AND FASTEN SEAT BELT.</b></p> <ul style="list-style-type: none"> <li>Advise passengers to sit down and fasten seat belts.</li> </ul>                                                                                                                                                                                                                                                                        |                 |
| <b>Clear Air Turbulence</b> - When other than light turbulence is encountered unexpectedly.                                                                                                                                                             | <ul style="list-style-type: none"> <li>A variety of above conditions may occur, depending on the severity of clear air turbulence.</li> </ul>                                                                                                                     | <p><b>Commander and Cabin Crew</b></p> <ul style="list-style-type: none"> <li>Take appropriate action based upon intensity of turbulence.</li> </ul>                                                                                                                                                                                                                                                                                                   |                 |

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# Chapter 31 Cabin Crew Safety and Emergency Procedures

## 1 Passenger Brace Position

1.1 The most appropriate brace for impact position depends on numerous factors. These include:

- the direction and strength of impact forces;
- the physical size and characteristics of individual passengers;
- the cabin configuration, especially in relation to the strike envelope of the passenger;
- the seat pitch; and
- the type of restraint system.

1.2 In the event of an accident, passengers are better protected if they adopt a brace-for-impact position. Research has shown that the following brace position may minimise the potential for injury in an aircraft impact situation (see Figure 3 below).

- a) Upper Body - should be bent forward as far as possible with the chest close to the thighs and knees, with the head touching the seat-back in front. The hands should be placed one on top of the other and on top of the head with the forearms tucked in against each side of the face. Fingers should **not** be interlocked.
- b) Legs - the lower legs should be inclined aft of the vertical with the feet placed flat on the floor.

1.3 The seat belt should be worn as tight as possible and as low on the torso as possible.

1.4 This information may only be relevant to forward-facing passenger seats, with lap strap restraints, in large aircraft. In seat/restraint configurations and seat pitches where the brace position cannot be readily adopted, a brace position as close as possible to this should be attempted. Operators' safety cards should show the brace position most applicable to their aircraft with regard to restraint systems, seating configuration and spacing.



**Figure 3** Forward-Facing Passenger Brace Position

## 2 Passenger Briefing at Self-Help Exits in a Premeditated Emergency

- 2.1 Operators should ensure that their procedures for cabin preparation for an emergency landing or ditching detail the briefing to be given by a member of cabin crew to passengers seated at self-help exits.
- 2.2 Passengers should be given the option not to sit next to an emergency exit.
- 2.3 The briefing should include the following as appropriate:
  - a) Passengers seated in self-help exit row seats should be given a specific verbal briefing.
  - b) Passengers' attention should be drawn to the pictorial instructions on the passenger safety card and placards adjacent to the exits.
  - c) Location of the exit.
  - d) Instructions as to when, or if, the exit should be opened.
  - e) Instructions for the operation of the exit.
  - f) Description of the exit as a removable hatch or a hinged exit.
  - g) Guidance as to the weight of the exit hatch and the necessity for it to be removed from a seated or standing position.
  - h) Instructions for disposal of the exit hatch.
  - i) Necessity to follow any further commands given by the cabin crew.
  - j) Verification that passengers have understood the briefing.

## 3 Cabin Depressurisation - Post-decompression Announcements

- 3.1 Passengers may become concerned at the lack of information or advice in the initial phase of the decompression. A 'Pre-Recorded Announcement' (PRA) would provide this information at an earlier stage than could be achieved by a flight crew or cabin crew announcement. If the content of the PRA is considered insufficient or is not available, a Public Address (PA) announcement should be made when it is considered safe to do so. This will ensure passengers are aware of the nature of the situation and the actions to be taken to ensure correct use of the oxygen system.
- 3.2 It is also likely that there will be a smell of burning within the cabin following the activation of an emergency chemically-generated oxygen system.
- 3.3 As soon as practicable, after oxygen masks have been deployed, operators with this type of system should advise passengers that there is the possibility of a smell of burning associated with the normal operation of chemically-generated oxygen systems. Operators should ensure that post-decompression procedures and PA announcements address these issues. Such information should not apply to the normal pre-flight briefing of passengers and should only be announced in the event of an actual decompression.

## 4 Cabin Depressurisation - Cabin Crew Duties

- 4.1 Operations Manuals should contain cabin crew procedures in the event of depressurisation. These should include information about when cabin crew may commence assisting passengers in a decompression. Procedures should be sufficiently flexible so that if communications with the flight crew fail, cabin crew are

aware of the precautions they should take to ensure they do not suffer injury or incapacitation and when they can initiate action. This action includes ensuring, where appropriate, that passengers are strapped in and receiving oxygen (smoking materials are extinguished), and first aid is given to those who need it.

4.2 Passenger safety cards and pre-flight safety briefings should provide clear and concise information in respect of the use of the oxygen system.

## 5 Oven Fires

5.1 Oven fires can be caused by a variety of factors, the dangers of which would be minimised by thorough inspections of ovens both for cleanliness and for the presence of foreign objects.

5.2 Cabin crew pre-flight checks should include a requirement for all ovens to be inspected not only for cleanliness, but also to ensure that no foreign objects are present. Cabin crew procedures should include a requirement to inspect ovens prior to switching the oven on to ensure that no foreign objects are present and that packaging does not constitute a hazard. Cabin crew procedures should include guidance as to the steps to be taken following a spillage of food or grease within an oven during a flight, and on the entry to be made in the Cabin Defect Log and/or Technical Log as appropriate.

5.3 Operators should ensure that their catering contractors are aware of the importance of checking oven racks prior to loading ovens to ensure that no foreign objects such as labels, cardboard packaging etc. are attached to the racks.

5.4 The primary hazard from an oven fire occurs when the door of a heated oven is opened. The introduction of outside oxygen can cause a flash fire. In dealing with an oven fire or oven overheat, the following procedure is recommended:

- Isolate the electrics and keep the door closed. In most incidents the fire will self-extinguish.
- Monitor the situation. Have a fire extinguisher, fire gloves and protective breathing equipment to hand.
- If the situation worsens, or it is thought that fire still exists in the oven, open the oven door just enough to insert the nozzle of the fire extinguisher. Insert the nozzle of the fire extinguisher and discharge a small amount of the extinguishant; consideration should be given to donning PBE and fire gloves prior to opening the oven door. Close the oven door and monitor the oven. Repeat this procedure if necessary.

## 6 Fires in the Cabin Caused by PEDs

6.1 Following a number of fires caused by lithium-battery-powered PEDs, ICAO amended Doc 9481 *Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods* to include guidance to cabin crew on dealing with such incidents.

6.2 Passengers and crew routinely travel with a wide variety of lithium-battery-powered PEDs, e.g. laptop computers, mobile phones and MP3 players. CAA Paper 2003/4 *Dealing With In-Flight Lithium Battery Fires In Portable Electronic Devices* detailed work undertaken to consider the causes of such incidents and study the effect of various extinguishing media.

- 6.3 A number of reported incidents involving fires caused by lithium batteries in PEDs have been reported. The causes of these incidents have not been determined and there is a possibility that they were as a result of abuse, e.g. a non-rechargeable battery which had been re-charged, or counterfeit batteries. Whatever the cause, the actions to be taken to address a fire would be the same.
- 6.4 Work undertaken by the FAA has shown that to prevent a portable equipment fire from intensifying, it is imperative to cool it as quickly as possible, for example by dousing with water, soft drinks or any other cold liquid that is available on the aircraft. This appears at odds with the general understanding of dealing with electrical fire, where water is not a suitable extinguishant. It has also been shown that as the fire intensifies, battery cells emit spontaneous jets of fire. Therefore, it is important that the device is not moved until it has been sufficiently cooled.
- 6.5 Guidance to enable cabin crew to respond to dangerous goods incidents should be included in Operations Manuals and training material. Information specific to cabin fires involving PEDs should also be provided. Text from the ICAO Doc 9481 *Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods* effective 1 January 2009 is reproduced in Annex 1 to this Chapter, and provides a suggested checklist that operators may wish to adopt.

# Annex 1 to Chapter 31

## Cabin Crew Checklist for Fires Involving PEDs in the Passenger Cabin During Flight

### 1 Brief Cabin Crew Checklist

#### **INITIAL ACTION**

- Notify pilot-in-command.
- Use standard procedure/obtain and use fire extinguisher.
- Remove external electrical power from device (if applicable).
- Douse device with water (or other non-flammable liquid) to cool cells and prevent ignition of adjacent cells.
- Do not move device, until satisfied it has cooled sufficiently.
- Remove power to remaining electrical outlets until the aircraft's system can be determined to be free of faults, if the device was previously plugged in.

#### **AFTER LANDING**

- Identify to ground personnel the device and where stowed.
- Make appropriate entry in maintenance log.

### 1.1 Amplified Cabin Crew Checklist for Fires Involving PEDs in the Passenger Cabin During Flight

#### **INITIAL ACTION**

##### **NOTIFY PILOT-IN-COMMAND**

Any incident concerning dangerous goods should be notified immediately to the pilot-in-command who should be kept informed of all actions taken and of their effect. It is essential that the cabin crew and the flight crew co-ordinate their actions and that each be kept fully informed of the other's actions and intentions.

##### **USE STANDARD PROCEDURE/OBTAIN AND USE FIRE EXTINGUISHER**

Standard emergency procedures must be used to deal with any fire. Although Halon has been shown not to be effective against lithium metal fires, Halon will be effective in fighting the subsequent fire of surrounding materials, or in fighting a lithium ion battery fire.

**REMOVE EXTERNAL ELECTRICAL POWER FROM DEVICE (IF APPLICABLE)**

A battery has a higher likelihood of catching fire through thermal runaway during or immediately following a charging cycle, although the effects of thermal runaway may be delayed for some period of time. By removing external power from the device, it will be assured that additional energy is not being fed to the battery to promote a fire.

**DOUSE DEVICE WITH WATER (OR OTHER NON-FLAMMABLE LIQUID) TO COOL CELLS AND PREVENT IGNITION OF ADJACENT CELLS**

If available, a water extinguisher should be used to cool the cells in a battery that have ignited, preventing the spread of heat to adjacent cells. If a water extinguisher is not available, any non-flammable liquid may be used to cool the cells and device.

**DO NOT MOVE DEVICE**

A battery pack involved in a fire has been shown to reignite and emit flames many times as heat is transferred to other cells in the pack. It is preferable to cool the device using water (or other non-flammable liquid); injuries may occur if the device reignites while it is being moved.

**REMOVE POWER TO REMAINING ELECTRICAL OUTLETS UNTIL THE AIRCRAFT'S SYSTEM CAN BE DETERMINED TO BE FREE OF FAULTS, IF THE DEVICE WAS PREVIOUSLY PLUGGED IN**

By removing power to the remaining electrical outlets it can be assured that a malfunctioning aircraft system does not contribute to additional failures of passenger PEDs.

## Chapter 32 Cabin Crew Training

### 1 Crew Co-ordination and Combined Training

- 1.1 The successful containment and outcome of an aircraft emergency depends heavily upon effective co-ordination and two-way communication between cabin crew and flight crew.
- 1.2 Operators should make every effort to provide combined training for cabin crew and flight crew. Much of the training that both should receive prior to operating PT aircraft covers common criteria; i.e. initial training, conversion and differences training, etc. Particular emphasis should be placed on the provision of joint practice in aircraft evacuations and other emergencies so that all who are involved learn of the duties other crew members should perform before, during and after evacuation, thereby appreciating the necessity for effective two-way communications in such emergencies.
- 1.3 When combined training cannot be arranged, an operator's instructors should adopt the role of flight crew or cabin crew, as appropriate. It is important that there is effective liaison between cabin crew and flight crew training departments to promote consistency of drills and procedures. Provision should be made for cabin crew instructors to observe and comment on flight crew training and vice versa.

### 2 Attestation of Initial Safety Training

- 2.1 EU-OPS 1.1005 requires the Authority, the operator or a UK CAA approved training organisation to deliver an attestation of safety training to each cabin crew member following the successful completion of initial training. The CAA has decided not to deliver attestations to cabin crew therefore these should be delivered by the operator or a UK CAA approved training organisation. Operators may continue to use third-party training organisations for certain elements of training but the operator remains responsible for delivering the attestation.
- 2.2 Training organisations who are approved by the UK CAA to conduct initial training and deliver the attestation can be found on the CAA website, at:  
[www.caa.co.uk/default.aspx?catid=1464&pagetype=90&pageid=10787](http://www.caa.co.uk/default.aspx?catid=1464&pagetype=90&pageid=10787).
- 2.3 A copy of the attestation should form part of the training record for each cabin crew member and a sample copy should be included in the Operations Manual. A copy must be delivered to the cabin crew member. EU-OPS does not require cabin crew to carry their attestation.
- 2.4 The format of the attestation must be acceptable to the CAA and, as a minimum, an attestation should contain the following information:
  - Name of operator or training organisation delivering the attestation and the AOC/ Organisation approval number as applicable;
  - Cabin crew member name;
  - Confirmation of completion of an initial safety training course in accordance with OPS 1.1005;
  - Confirmation of successful completion of the associated check in OPS 1.1025;
  - Dates of start and end of course; and
  - Date of issue.

2.5 Annex 1 shows a format for an attestation recommended by the European Commission.

### **3 Cabin Crew who already hold an Attestation of Initial Safety Training**

3.1 Operators may wish to recruit cabin crew who already hold an attestation of initial training.

3.2 Initial training is not operator specific and does not contain standard operating or emergency procedures. Therefore the following items should be considered:

- Fire and Smoke**

Specific operator procedures for communication and co-ordination, and equipment carried.

- Water Survival Training**

Equipment used during training, particularly liferafts, sliderafts and flotation equipment.

- Survival Training**

Areas of operation and equipment carried.

- Medical Aspects and First Aid**

Specific operator procedures for dealing with first aid situations, type of equipment carried and areas of operation.

- Passenger Handling**

Specific operator procedures with regard to aircraft configuration and equipment carried.

- Security**

Content of training in accordance with the requirements of the UK NASP.

- Communication**

Method, technique and use of a common language.

- Discipline and Responsibilities**

Specific operator requirements with regard to documentation, procedures and FTL.

- CRM**

Introductory CRM has been completed to an equivalent standard.

### **3.3 Checking**

3.3.1 Operators should ensure that each cabin crew member has successfully passed the checks required by OPS 1.1025.

### **3.4 Training Records Including Attestation**

3.4.1 Currency for those items of initial training that have an expiry date must be determined. If current validity cannot be confirmed by reviewing previous training records, the operator must carry out these items of training.

3.4.2 In any event, the operator should have a procedure in place to determine competency.

3.4.3 Records of all training and checking as required by OPS 1.1035 must be maintained including a copy of the attestation.

### 3.5 **Minimum Requirements**

3.5.1 The requirements of OPS 1.995 must be complied with, as possession of an attestation does not indicate medical fitness to discharge duties.

3.5.2 Possession of an attestation does not confirm actual operational experience as a cabin crew member. Operators should ensure that consideration is given to the level of previous experience held by the cabin crew member.

3.5.3 Operators proposing to accept initial training provided wholly by a UK CAA approved training organisation or other AOC holder should include in their Operations Manual detailed criteria for the acceptance of such training.

## 4 **Training in the Use of Assist Spaces**

4.1 Cabin crew assist spaces are a certification requirement for floor level Type I and Type A exits.

4.2 The assist space allows cabin crew to stand to one side of the exit path once the exit has been opened and to give positive assistance to passengers evacuating the aircraft. The assist space should not project into the minimum exit path dimension requirements.

4.3 Assist spaces should be so located to provide protection for the cabin crew and minimise the possibility of being inadvertently forced out of the aircraft. The location of the occupied assist space should not hinder the egress of passengers through the exit. Operators with aircraft that are required to have assist spaces should include specific information on their location in the Operations Manuals. This should also be included in safety training for crowd control during an emergency evacuation.

## 5 **Use of Representative Training Devices**

5.1 If operators use a representative training device for practical safety training and testing, it should accurately represent the aircraft in the following areas as appropriate.

- a) Layout of the cabin in relation to exits, emergency exits, galley areas and safety equipment stowage; dimensions should be an accurate representation typical of aircraft in the fleet.
- b) Both cabin crew and passenger seat positioning - with particular accuracy where these are immediately adjacent to exits.
- c) Seat dimensions and seat pitch.
- d) Operation of exits and emergency exits in all modes of operation - particularly in relation to method of operation and mass and balance.
- e) Extent of movement and associated forces of all controls for all equipment and services.
- f) Provision of the emergency equipment of the type provided in the aircraft.
- g) Cabin markings.
- h) Cabin lighting.
- i) Cabin crew communications equipment and associated control panels.

- j) Evacuation slides, including normal and standby methods of operation.
- k) Height and angle of inflated evacuation slides.

5.2 Operators should have a documented procedure in place to ensure that such devices are representative of the aircraft, particularly with regard to door operating forces and an ongoing maintenance procedure to ensure such devices remain representative.

## **6 Pressurised Cabins – Use of Exits**

- 6.1 In recent years, there have been two accidents where cabin crew opened exits whilst the cabin was still pressurised. In both accidents the cabin crew who operated the exits were forcibly ejected from the aeroplane cabin by a combination of the residual cabin pressure and the rapid movement of the exit, with the result that fatal injuries were sustained. One accident occurred during an emergency evacuation whilst the other accident happened at the start of a routine disembarkation.
- 6.2 The problem can occur if an exit is forced open when the aeroplane has not been fully depressurised. The exit will rapidly open, with the associated danger that the person operating the exit may be ejected from the cabin with possible serious consequences. Residual pressurisation may result from system malfunction or incorrect application of procedures.
- 6.3 Prevention of accidents and incidents involving aeroplane pressurisation requires correct actions to be taken by both flight crew and cabin crew. Flight crew and cabin crew must be trained to immediately recognise any indication that the aeroplane is pressurised and that any attempt to open the exits should only be made when complete depressurisation had been achieved. Indication of a pressurisation problem might be evident by system design or by abnormally high operating loads on the exit handle.

## **7 Procedures for the Deployment of an Evacuation Slide**

- 7.1 In a practice deployment of an evacuation slide, cabin crew operated the emergency exit and immediately pulled the slide manual inflation handle, before the exit was fully opened. As a consequence, the slide failed to deploy properly and, had an evacuation been required, the slide would not have been usable. This procedure for the deployment of the slide was not in accordance with the slide manufacturer's recommendations. It has been noted that some operators detail a similar emergency evacuation procedure in their Operations Manuals. Operators should ensure that their Operations Manuals contain procedures for the deployment of the evacuation slide that are in accordance with the slide manufacturer's recommendation.

## **8 Cabin Crew Training – Touch Drills**

- 8.1 Appendix 1 to EU-OPS 1.1015(b)(3) states that annual recurrent training for cabin crew includes 'Touch-drills by each cabin crew member for opening normal and emergency exits for passenger evacuation.' *JAA Administrative and Guidance Material*, Section 4, Part 3, TGL 44, IEM to Appendix 1 to JAR-OPS 1.1005/1.1010/1.1015/1.1020 - Training Methods, states that: 'Training may include the use of mock-up facilities, video presentations, computer based training and other types of training.'
- 8.2 Operators may achieve the requirement for touch-drills in different ways such as the utilisation of CBT modules, life-sized photographs, or other technologies. The following criteria should be taken into consideration:

- a) To achieve a comparable result, the medium to be utilised should be representative of the exit.
- b) The means of achieving training should be specified in Part D of the Operations Manual.

## **9 Cabin Crew Fire and Smoke Training**

### **9.1 Training Conducted by Third-Party Organisations**

- 9.1.1 Operators may use third-party training organisations, which might include other AOC holders, to carry out mandatory training on their behalf. Such organisations and the training they are contracted to provide should be documented in the Operations Manual Part D - Training.
- 9.1.2 Under the terms of their AOC, operators are wholly responsible for all aspects of training detailed in the Operations Manual Part D - Training. Operators should ensure third-party training organisations are subject to a robust and documented audit process to ensure compliance with the Operations Manual Part D - Training.
- 9.1.3 An operator should ensure that third-party training organisations are provided with, and training personnel have easy access to, a copy of each part of the Operations Manual relevant to the training being conducted. This should include relevant amendments to the Operations Manual.
- 9.1.4 Fire-fighting equipment used in practical training conducted by a third-party organisation should be representative of that used by the operator.
- 9.1.5 Theoretical and practical training should reflect the procedures documented in the operator's Operations Manual. Where a third-party training organisation is providing training for cabin crew from more than one operator on the same training course, careful consideration should be given to those training elements that are not generic and are driven by the individual operator's Operations Manual. These training elements may include the number of cabin crew carried, the aircraft type(s) operated and the equipment installed. Consideration should be given to limiting the training provided under such circumstances to those elements that are consistent between operators.
- 9.1.6 Certification of training and checking provided by a third-party organisation should clearly identify the training and checking completed and state the compliance of the training with the operator's Operations Manual Part D - Training.

### **9.2 Training Instructors**

- 9.2.1 Training should be conducted by suitably qualified instructors, who have the knowledge, ability and experience to perform such training.
- 9.2.2 The company Operations Manual Part D - Training should include the experience and qualification requirements for instructors and a detailed training programme. As a minimum this should include:
  - Instruction in training techniques, i.e. a 'train the trainer' course.
  - A programme of familiarisation with the operator's training, i.e. observation of training being conducted by an experienced trainer.
  - A programme of conducting training whilst under observation by a suitably qualified person, such as an experienced trainer or training manager.
  - An initial check of proficiency and programme of regular checks to verify ongoing proficiency.

9.2.3 Third-party training organisation instructors should have a comprehensive knowledge of applicable regulatory requirements and a generic knowledge of cabin crew operational procedures relevant to dealing with an in-flight fire. Third-party training organisation instructors should have a detailed working knowledge of the following for each of the operators they provide training for:

- The specific operator's procedures for dealing with an in-flight fire, to include cabin crew actions including co-ordination and communication with the flight crew.
- The specific operator's aircraft and the systems/installations on board that might impact on in-flight fire situations, including cabin layouts, galley installations, In-Flight Entertainment (IFE) systems, crew rest areas, cargo compartments accessible in-flight, and any other areas and systems/installations requiring the involvement of cabin crew procedures.
- The specific operator's in-flight fire-fighting equipment and the location of such equipment.

### **9.3 Training Syllabi**

9.3.1 Fire and smoke training syllabi should be detailed in the Operations Manual Part D - Training and should include the following:

- Procedures for dealing with all types of in-flight fire, to include cabin crew actions including co-ordination and communication with the flight crew.
- Aircraft types/variants and the systems/installations on board that might impact on in-flight fire situations, including cabin layouts, galley installations, IFE systems, crew rest areas, cargo compartments accessible in-flight, and any other areas and systems/installations requiring the involvement of cabin crew procedures.
- Fire-fighting equipment and the location of such equipment.

### **9.4 Theoretical Fire Training**

9.4.1 Theoretical training should emphasise the necessity for cabin crew to respond promptly to incidents involving fire and smoke (as required by Appendix 1 to OPS 1.1005). The time available for cabin crew and flight crew to deal with fires before they become uncontrollable should also be stressed and cabin crew should be provided with an awareness of flight crew workload in the event that an in-flight fire necessitates a diversion.

### **9.5 Practical Fire Training**

9.5.1 Practical training should reflect an operator's equipment and procedures and, wherever practicable, cabin crew training should be combined with flight crew training. Fire-fighting equipment used in training should be representative, in all aspects, of the operator's equipment and should be maintained in serviceable condition to ensure it remains representative. Specific regard should be given to the following:

- PBE: to include removal from stowage and container, method of donning and use whilst conducting a task relevant to the operator's fire-fighting procedures in a simulated smoke-filled environment. Training should ensure that any practical differences between PBE carried on the aircraft and used in training are detailed. Trainees should complete the practical donning of PBE wearing the operator's uniform, including hairstyles and jewellery.
- Fire extinguishers: to include removal from stowage, method of operation, application techniques for different fire scenarios and use whilst wearing PBE. Training should ensure that any practical differences between fire extinguishers carried on the aircraft and those used in training, such as the difference in the force

of discharge, are detailed. If practical fire training and smoke training are completed separately, consideration should be given to incorporating this into the training conducted in a simulated smoke-filled environment.

- Communication: to include the technique and terminology for communicating information to the flight crew, with particular emphasis on the importance of informing the flight crew immediately. Consideration should be given to the use of representative communication equipment and the possible barriers presented by the wearing of PBE.
- Co-ordination: to include co-operation with other crew members, with particular emphasis on the urgency of response to fire and smoke events, provision of additional fire-fighting equipment, and passenger management techniques.
- Fire scenarios: cabin crew should receive practical training in extinguishing fires representative of those that may be encountered on the operator's aircraft, with consideration given to presenting trainees with multiple fire scenarios. Emphasis should be given on detecting and locating the source of the fire or smoke, the importance of locating and accessing concealed fires, and monitoring for and extinguishing re-ignition. Such training should incorporate the use of all fire fighting equipment carried by the operator.

## 9.6 **Practical Fire Training Facilities**

9.6.1 Practical fire and smoke training facilities should ensure training requirements can be completed in an environment that realistically represents an aircraft interior with regard to lighting, spatial restrictions and limitations of movement when performing required tasks. Facilities should be capable of replicating a fire representative of an aeroplane interior fire and the associated smoke density, enabling practical training requirements to be combined and conducted in a realistic environment.

9.6.2 There should be the capability of providing training for appropriate in-flight fire scenarios including, but not limited to, the following fire risk areas: oven; waste bin and/or gash cart; toilet; IFE system; seating including in-seat electrics; overhead lockers; PEDs; fires concealed behind panelling requiring the use of a jemmy or fire axe as appropriate. Provision should be made for suitable stowages to be installed to facilitate practice in the removal of fire-fighting equipment representative of that carried by the operator.

## 9.7 **Verification of Trainee Proficiency**

9.7.1 Training syllabi should detail the specific skills a trainee is required to demonstrate when performing tasks in order to achieve proficiency in practical training. This will include the correct donning of PBE, wearing PBE in a smoke-filled environment and using fire extinguisher(s) correctly, application method and techniques to extinguish a fire, and prevent re-ignition. Instructors should be confident that the trainee can wear the PBE effectively and demonstrate the appropriate techniques when extinguishing a fire.

9.7.2 Operators should define the minimum criteria required to demonstrate proficiency during practical training. Required practical training should be undertaken with the trainee performing tasks representative of the operator's procedures and representative of the aircraft type(s) and cabin crew complement. Consideration should be given to the following:

- PBE: each cabin crew member should demonstrate correct preparation and donning of the PBE and should wear the PBE in an enclosed smoke-filled environment whilst conducting a task relevant to the operator's fire-fighting procedures.

- Fire extinguisher: each cabin crew member should demonstrate correct operation of the fire extinguisher, correct discharge of the extinguishing agent, actually extinguishing a fire by use of the fire extinguisher, extinguishing fire re-ignition and post-fire control procedures and monitoring.
- Communication: each cabin crew member should demonstrate the correct technique and terminology for communicating information to the flight crew. This should be conducted in a representative environment, with the crew member wearing PBE and preferably using representative communication equipment.
- Co-ordination: each cabin crew member should demonstrate the specific actions necessary for co-ordination and assistance in accordance with the operator's procedures. Consideration should be given to the removal of fire-fighting equipment from its stowage and techniques for passenger management.

## 10 Fire-Fighting Training – Use of Halon Fire Extinguishers

- 10.1 The Montreal Protocol places restrictions on the manufacture and use of halons used in portable extinguishers on aircraft. This has necessitated the CAA agreeing to easements in certain aspects of practical fire training.
- 10.2 Conversion and differences training and three-yearly recurrent training may be achieved by using an extinguisher fully representative of the halon extinguisher in respect of size, mass and operating characteristics but charged with an alternative agent to normal operating pressures (subject to approval of the extinguisher manufacturer). Operators should show a film, approved by the CAA, which demonstrates methods of extinguishing fires and characteristics of aircraft interior fires. The film includes the use of halon extinguishers on fires related to typical aircraft situations.
- 10.3 The principal objective of practical fire training is to instil confidence into cabin crew members as to the effectiveness of extinguishing agents, equipment and fire-fighting procedures in order that they can demonstrate competency and proficiency to deal successfully with a fire on board an aircraft. In view of the difficulties with the use of halon for practical training, this principal objective will only be achieved if all aspects relating to the characteristics and use of halon are emphasised.
- 10.4 The training programme should include as a minimum:
  - a) **Background.** Before practical training commences, all cabin crew should be fully briefed as to the reason why halon is carried on board the aircraft but cannot be used for fire training. They should be made aware that the extinguishing agent used for training may exhibit different characteristics to halon and that these will be identified by the instructor. The importance of their complete understanding of all aspects of the use of halon should be stressed.
  - b) **Selection of Agent.** Cabin crew should be able to identify the appropriate agent to fight any fire. Therefore they should be conversant with the characteristics of halon including an understanding of its qualities and any limitations as to its use. This should include halon's penetrative qualities, its ability to extinguish successfully most types of fire, lack of cooling properties etc.

- c) **Operation of Extinguisher.** Training should enable cabin crew to identify physical and handling characteristics of the extinguisher. All cabin crew should physically handle and operate an extinguisher, which should be fully representative of the type of halon extinguisher carried on board the aircraft. This may be an empty unit. A structured 'touch drill' should be undertaken by each cabin crew member to demonstrate correct operation of the extinguisher including release of any safety mechanism. Instruction should be given to ensure that cabin crew are able to assess serviceability, readily identify the extinguisher in clear and poor visibility, and judge the size and mass of the unit. The location of the discharge nozzle and the importance of orientation of the extinguisher itself, i.e. upright during use, should be emphasised.
- d) **Extinguishing a Live Fire.** All cabin crew should extinguish a live fire during practical training. Operators should endeavour to make the necessary provision for all cabin crew members to carry out this part of the training as required by EU-OPS and JAR-OPS 3 Subpart O, using the type(s) of fire extinguisher carried on board the aircraft. If use of the representative aircraft fire extinguisher is not achievable, a substitute extinguisher should be as similar as possible to that carried on board the aircraft. When considering a substitute extinguisher for this practical exercise, operators should be aware that any major discrepancies in basic characteristics, e.g. size, mass, operating mechanism, etc., are not acceptable.
- e) **Application.** Having emphasised the efficiency of halon as an extinguishing agent it is important to stress that appropriate application is essential to the success of any fire-fighting action. The correct techniques for successful discharge and application should be demonstrated. (This may include the force required to discharge a full extinguisher.) Cabin crew should be warned of the consequence of inappropriate operation. Information regarding noise and discharge force associated with halon extinguishers along with information on range, duration and toxicity should be provided.
- f) **Post-discharge Characteristics.** Cabin crew should be made aware of the effects of discharging halon on a fire including the probability of reduced visibility due to white smoke and the products of incomplete combustion, increased toxicity, etc. Post-discharge control, i.e. necessity to use a cooling agent in some circumstances and careful monitoring of the fire area, should also be included.

## 11 Practical Application of Halon Fire Extinguishers

- 11.1 Cabin crew dealing with in-flight fires have on occasions not been able to activate fire extinguishers and have either relied on the assistance of other cabin crew or passengers, or have opted for a 'back-up' fire extinguisher. In either event, there would have been an inevitable delay in initiating discharge of the extinguishing agent. The consequences of such a scenario for a single cabin crew operation, or on aircraft where no cabin crew are required to be carried, could of course be more serious.
- 11.2 The design of some halon fire extinguishers incorporates an integral seal that must be broken in order to achieve discharge of the extinguishing agent. The potential problem of aircraft crew not being able to operate some halon fire extinguishers might be caused by the lack of practical training in respect of the initial pressure needed to break the integral fire extinguisher seal. The amount of initial pressure required to operate a 'live' extinguisher should be stressed during the training.
- 11.3 Operators should ensure that cabin crew members are aware of the potential difference in initial pressure required to operate a fire extinguisher on the aircraft from that required to operate a fire extinguisher during training.

## 12 In-flight Fires – Federal Aviation Administration

(FAA Advisory Circular AD 120-80)

12.1 The Advisory Circular addresses the following issues:

- a) The dangers of in-flight fires, with particular emphasis on hidden fires that may not be visible or easily accessed by the crew. The importance of recognising and quickly assessing the conditions that may be associated with hidden fires and the importance of taking immediate action to gain access to fires that are located behind interior panels.
- b) How to deal with in-flight fires, emphasising the importance of aircraft crew taking immediate and aggressive action in response to signs of an in-flight fire while stressing the effectiveness of halon fire extinguishers.
- c) The importance of appropriate aircraft crew training in dealing with hidden fires, the effective application of halon fire extinguishers behind interior panels, and the urgency of the aircraft crew's action in dealing with such fires.
- d) The Advisory Circular complements the guidance previously developed for aircraft crew concerning the proper use of fire extinguishers.
- e) The Advisory Circular includes information from research conducted by the FAA's Technical Centre.

12.2 The Advisory Circular contains information on the subtle causes of fire such as wiring failures, electrical component failures, lightning strikes, bleed air leak and faulty circuit protection.

12.3 The Advisory Circular also includes information on the indications of hidden fires, the resources available for dealing with in-flight fires and the use of fire extinguishers. Flight crew procedures are also addressed.

12.4 In-flight fires have featured in many fatal aircraft accidents. The rapid actions of both cabin crew and flight crew in dealing with an in-flight fire is essential if continued safe flight is to be achieved. In fatal accidents involving in-flight fire, the time lapse between crew awareness of a fire situation to the time that the fire has become catastrophically uncontrollable is between seven and 35 minutes. For incidents involving hidden fires, an approximate estimate is that only one third of aircraft will reach an aerodrome before the fire becomes uncontrollable.

12.5 The FAA Advisory Circular (AC 120-80) is available on the FAA website at [www.airweb.faa.gov](http://www.airweb.faa.gov).

## 13 Transfer of Cabin Crew Training

### 13.1 General

13.1.1 An operator may take account of a cabin crew member's previous initial, conversion and, where applicable, senior cabin crew member training provided by another AOC holder. Such training should be subject to a robust audit process in order to establish compliance with both EU-OPS requirements and the accepting operator's approved syllabi.

## 13.2 Transfer of Training from Another AOC Holder

13.2.1 Some elements of initial, conversion and, where applicable, senior cabin crew member training provided by another AOC holder may be taken into account and the initial and conversion training syllabi abbreviated accordingly. The operator must satisfy himself that the previous training complies with both the requirements of EU-OPS Subpart O and the operator's own training syllabi. The operator must also satisfy himself that the training being accepted was conducted by suitably qualified persons and that trainees have undergone an appropriate check to verify proficiency. Where the operator's approved syllabi are abbreviated as the result of accepting previous training, the amended syllabi must be submitted to the CAA for approval prior to the commencement of training.

13.2.2 Where a cabin crew member holds an attestation of initial safety training issued by an EU-OPS AOC holder in accordance with OPS 1.1005, an operator may take into account training encompassed by the attestation. Such training should be subject to an audit process to verify compliance with the accepting operator's approved syllabi.

## 13.3 Methodology and Scope

13.3.1 In order to accept training provided by another AOC holder it will be necessary for an operator to establish the compliance of the training to be transferred. The operator should conduct and document an audit process with sufficient scope to demonstrate that the training to be transferred is acceptable. As a minimum, the following should be included in the audit scope:

- compliance check of the syllabi for the training to be accepted against the relevant requirements of EU-OPS Subpart O;
- compliance check of the syllabi for the training to be accepted against the operator's approved syllabi;
- assessment of those operational procedures encompassed by the training against the operator's accepted procedures;
- assessment of equipment and representative training devices used;
- verification of the qualifications of persons who conducted the training to be accepted. As a minimum, this should comply with the operator's requirements for the qualifications of training personnel; and
- verification of an appropriate check of proficiency.

## 13.4 Training Records

13.4.1 A copy of all training records in respect of training and checking accepted from another operator must be obtained and maintained in accordance with OPS 1.1035. An operator must ensure the validity of any items requiring recurrent training and checking. The period of validity and expiry dates of items requiring recurrent training remain applicable. It is not permissible to re-date the period of validity from the date of acceptance of the training, and it is the operator's responsibility to ensure that recurrent training is conducted in order to maintain validity where required.

13.4.2 Where training is accepted from a non-EU-OPS AOC holder and a crew member does not hold an attestation of safety training, the training must be delivered in accordance with OPS 1.1005. In cases where an operator accepts all initial training from an EU-OPS AOC holder or an Approved Training Organisation, a copy of the crew member's attestation must be obtained and held by the operator in accordance with OPS 1.1005. If the accepting operator is responsible for conducting any part of initial training, an attestation of initial safety training must be delivered in accordance with OPS 1.1005.

### 13.5 Documentation

13.5.1 The process for verifying the compliance of training to be transferred should be documented by the operator in a proposal. This should include the methodology and scope of any audits undertaken and a record of non-conformities between the training being accepted and the operator's approved training syllabi. Where such non-conformities are identified, appropriate action to be taken in order to demonstrate compliance should be documented in the proposal. The proposal detailing the training to be transferred and justification for the transfer, together with supporting documentation and syllabi for approval, should be submitted to the assigned FOI prior to the commencement of training.

## 14 Cabin Crew Operating with more than One AOC Holder

**NOTE:** For the purpose of this guidance, 'Operator A' is the operator providing the cabin crew and 'Operator B' is the operator with whom the cabin crew are temporarily operating.

14.1 The responsibility for the supervision of cabin crew operating with two AOC holders rests with the AOC holder with whom they are operating on any given flight. Thus, when operating with Operator B, it is that operator that has responsibility for the procedures to be followed, the training, and conduct whilst on duty and the records of the cabin crew 'on loan'.

14.2 Before commencing operations, Operator B should prepare a safety case for the use of Operator A's crews. The safety case should identify and document differences between the two operators' procedures and equipment, identify potential problem areas and detail actions to address these issues.

14.3 Operator B might identify training that could be considered appropriate to be transferred from Operator A. The cabin crew training programme should satisfy the requirements of EU-OPS initial and conversion/differences training and address the areas highlighted by the safety case. The syllabus should include the need for pre-flight cabin crew briefings that focus on areas that differ between the two operations.

14.4 Prior to commencing operations, Operator B should submit a training syllabus to the assigned FOI and cabin crew should be provided with a copy of the relevant parts of Operator B's Operations Manual.

14.5 Cabin crew should be provided with information on lines of report and a contact in Operator B's organisation from which they can seek clarification or assistance on any safety related issue.

14.6 In order to minimise the potential problems associated with cabin crew operating to different procedures, the following limitations should be considered:

- Cabin crew should be limited to operating with a maximum of two AOC holders at any one time.
- Where cabin crew are operating concurrently with two AOC holders, they should normally be limited to one aircraft type or variant of a type with each operator.

14.7 In addition, consideration should be given to a senior cabin crew member from Operator B operating as part of the crew when cabin crew from Operator A are used.

14.8 When cabin crew have operated exclusively with another operator, on return to the parent company, consideration should be given to some form of refresher training particularly when a different set of operating procedures have been used. If the period has been more than six months, the parent company should provide refresher training or recurrent training in accordance with EU-OPS Subpart O requirements.

## Annex 1 to Chapter 32

### Recommended Format of Attestation

#### EU-OPS - Subpart O

#### Attestation of cabin crew initial safety training

|                                                                                                                                                                                              |                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| 1.<br>Reference number:<br>UK - 1000 - 12345                                                                                                                                                 | 2.<br>ATTESTATION OF<br>CABIN CREW INITIAL SAFETY TRAINING |
| 3.<br>Issuing body:                                                                                                                                                                          |                                                            |
| 4.<br>Pursuant to Regulation (EC) No. 3922/91 of the European Parliament and of the Council for the time being in force, attests that:                                                       |                                                            |
| 5.<br>Full name:                                                                                                                                                                             |                                                            |
| 6.<br>Nationality:                                                                                                                                                                           |                                                            |
| 7.<br>Date and place of birth:                                                                                                                                                               |                                                            |
| 8.<br>has completed an initial safety training course in accordance with Annex III - OPS 1.1005, and has successfully passed the associated check in accordance with Annex III - OPS 1.1025. |                                                            |
| 9.<br>Dates of start and end of the course:                                                                                                                                                  |                                                            |
| 10.<br>Number of hours of training:                                                                                                                                                          |                                                            |
| 11.<br>Competent Authority:                                                                                                                                                                  | The United Kingdom Civil Aviation Authority                |
| 12.<br>Signature and title of issuing officer:                                                                                                                                               |                                                            |
| 13.<br>Date of issue:                                                                                                                                                                        |                                                            |
| 14.<br>This attestation shall not be considered as showing compliance with the other cabin crew training requirements.                                                                       |                                                            |

**Instructions:**

- a) Size shall be not less than one eighth A4.
- b) The document must be issued by the operator or a training organisation holding the relevant approval. In all cases reference of the competent Authority of the Member State shall be stated.
- c) The attestation of cabin crew initial safety training is recognised in all Member States and it is not necessary to re-issue the document when working in another Member State.
- d) The attestation should be retained by the holder.

**Block 1:** The attestation reference number shall commence with the letters 'UK' followed by the AOC number (or for training organisations the number of their CAA approval) and a sequential, individual issue number assigned by the issuing body.

**Block 2:** The sentence as shown.

**Block 3:** Identification details of the issuing body as relevant shall be entered and shall at least provide the full name of the organisation, mail address, official seal, stamp or logo, as applicable, and

- in the case of an operator, the AOC number and reference to the approval by the CAA to provide cabin crew training and to issue attestations as specified in the Operations Approval document; and
- in the case of an approved training organisation, the reference number of the approval by the CAA.

**Block 4:** The sentence as shown.

**Block 5:** The full name (surname and first name) stated in the official identity document of the attestation holder shall be entered.

**Block 6 and 7:** Nationality and date and place of birth stated in the official identity document of the attestation holder shall be entered.

**Block 7:** Standard date format shall be used: i.e. day/month/year in full (e.g. 12/12/2006).

**Block 8:** The sentence as shown.

**Block 9:** Standard date format shall be used: i.e. day/month/year in full (e.g. 12/12/2006).

**Block 10:** The total number of hours of training undergone by the attestation holder shall be entered.

**Block 11:** The sentence as shown.

**Block 12:** This block shall show the signature and job title of the officer acting on behalf of the issuing body.

**Block 13:** Standard date format shall be used: i.e. day/month/year in full (e.g. 12/12/2006).

**Block 14:** The sentence as shown.

## **Chapter 33 Cabin Crew Operations Manuals**

### **1 Specimen Cabin Safety Procedures Manual**

1.1 To assist operators in identifying SOPs that are likely to be required in order to conduct the safe operation of aeroplanes, Annex 1 to this Chapter lists a number of topics which should be considered when drafting a Cabin Safety Procedures Manual.

### **2 Specimen Cabin Safety Training Manual**

2.1 To assist operators in the compilation of a Cabin Crew Training Manual, Annex 2 to this Chapter gives a sample layout.

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# **Annex 1 to Chapter 33**

## **Specimen Cabin Safety Procedures Manual**

### **Chapter 1 General**

- Operations Manuals to be carried
- Operations Manual amendment and revisions
- Role of the Authority and power of Inspectors
- Laws, regulations, procedures and operators' responsibilities
- Competence of cabin crew
- Cabin crew responsibilities and operating restrictions
- Cabin crew composition
- Senior cabin crew members
- Minimum requirements for cabin crew (age and medical assessment)
- Operation on more than one type or variant
- Chain of command
- Responsibility and authority of commander
- Procedures for the use of vacant cabin crew seats
- Flight time limitations, duty time limitations and rest requirements
- Occurrence and accident reporting
- Crew health precautions
- Safety on the ramp
- Quality system
- Common language
- Terminology and definitions
- Theory of flight
- Passenger distribution
- Meteorology
- Surface contamination
- Areas of operation

### **Chapter 2 Standard Operating Procedures**

- Pre-flight safety briefing of cabin crew
- Pre-departure safety equipment checks
- Passenger embarkation and distribution
  - Cabin preparation for flight
  - Fuelling with passengers on board, embarking or disembarking
  - Control of passengers

- Restrictions on passengers
- Monitoring passengers for compliance with restrictions
- Passenger seat allocation/restrictions
  - ABP seating (including unsupervised exits)
  - PRM seating
  - Mass and balance
- Exit arming/disarming
- Procedures for securing cabin and galleys
  - Passenger safety belts and harnesses
  - Position of tray tables, seat backs, armrests, headrests and In-Flight Entertainment (IFE)
  - Beds, sleeper seats and footrests
  - Passenger and crew baggage
  - Exits and escape paths
  - Galleys and galley equipment
  - Doors, curtains and dividers
  - Aircraft electronic equipment
  - PEDs
  - Toilets
- Definition and timing of 'cabin secure' check to flight crew
- Cabin lights – procedures for dimming cabin lights
- Cabin crew at stations / use of seat harness
- Taxi, take-off, post-take-off, pre-landing, landing, post-landing
  - Cabin crew safety duties during each phase
  - Cabin crew at station during taxi, take-off and landing
  - Cabin crew alert to hazards and subsequent actions
- In-flight requirements
- Flight crew drinks/meals
- Access/communication with flight crew
- Preparation for landing
- Passenger disembarkation
  - Control of passengers
  - Restrictions on passengers
  - Monitoring passengers for compliance with restrictions
- Passenger briefings
  - Embarkation
  - Pre-take-off safety

- Post-take-off
- Turbulence
- Post-landing
- Refuelling/de-fuelling
- Transit
- Transit procedures
- Unauthorised carriage
- Inadmissible passengers and refusal of embarkation
- Influence of alcohol and drugs
- Endangering safety
- Carriage of special categories of passengers
  - Children and infants
  - PRM
  - Passengers on stretchers
  - Unaccompanied minors
  - Prisoners in custody
  - Deportees
- Hand baggage
  - Stowages
  - Mass/size/quantity
- Smoking on board
- Injury and death on board
- Live animals in the cabin
- PED use and restrictions
- Carriage of weapons
- General Surveillance
  - Toilets
  - Cabin and galleys
  - Flight deck
  - Cargo areas
- Fire Prevention
  - Smoking restrictions enforced
  - Aircraft electrical equipment
  - Fire detection systems – checking for tampering
- Passenger restraint
  - Passenger seats
  - Child restraint devices
  - Extension seat belts

## Turbulence

Types of air turbulence

Flight crew notification for cabin crew

Actions to be taken by cabin crew – communication

– crew/passenger security

– cabin service activities

## Abnormal Procedures

Senior Cabin Crew Member (SCCM) – inability to operate

Reduction in minimum number of cabin crew

Inoperative exits

Inoperative cabin crew seats

Unserviceable equipment, e.g. interphones, Public Address (PA) systems, etc.

Other procedures as applicable

## **Chapter 3 Safety Equipment – General**

Illustrations, diagrams, pre-flight serviceability, use and operation of the following:

Fire extinguishers

Fire axe/crowbars

Portable Breathing Equipment (PBE)

Smoke goggles

Fire gloves

Torches

Oxygen (fixed and portable)

First-aid kits

Emergency medical kits

Survival equipment

Pyrotechnics

Locator beacons

Flotation equipment

  Infant life jackets

  Adult life jackets

  Life cots

  Life rafts

Megaphones

Non-mandatory or special equipment

## Chapter 4 Emergency Procedures

Definitions of types of emergencies

Rejected take-off

Notification of emergencies

Crew co-ordination

Cabin crew to cabin crew

Cabin crew to flight crew

Flight crew to cabin crew

Assistance of ABPs

Criteria for selection of ABPs

Content and method of briefing

Re-seating of ABPs

Land-evacuation and ditching

Procedures in planned emergencies

Procedures in unplanned emergencies

Individual crew member responsibilities

Brace positions

Crew brace position

Passenger brace position

Timing of brace command

Initiation of evacuation

Instructions for evacuation

Unusable exits

Crowd control

Cabin crew assist spaces

Passenger management during evacuation

Exit by-pass, dried-up exits, etc.

Passenger management after evacuation

Evacuation of PRM

PA announcements

Announcements/instructions for a planned emergency evacuation

Announcements/instructions for an unplanned emergency evacuation

Ground-based emergency services

Pilot incapacitation

Use of pilot's seat mechanism

Fastening/unfastening of pilot's seat harness

Use of pilot's oxygen equipment

- Administering first aid
- Use of pilot's checklist
- Decompression
  - Time of useful consciousness
  - Types of decompression
  - Cabin crew actions
  - Communication with flight crew and passengers
  - Monitoring of passengers
  - Action to be taken when aircraft is level
  - Check of passengers and cabin secure
  - Administering oxygen as appropriate
- Fire
  - Theory of fire and smoke
    - Principles of combustion
    - Classification of types of fire
  - Possible fire sources and high-risk areas
  - General procedures
    - Immediately locate and identify fire source
    - Appropriate techniques for attacking fires
    - Communication with flight crew
    - Communication and co-ordination with cabin crew
    - Communication when using PBE
    - Provision of back-up equipment and crew members
  - Control of passengers
    - Control/management of passengers
    - Protection of passengers
  - Specific Fire Scenarios
    - Galley equipment including ovens, catering equipment and supplies
    - Waste containers, toilets, stowage compartments, baggage, seat, electrical, flight deck, lift, IFE systems, PEDs and hidden fires
  - Extinguishing agents
    - Characteristics of agent
    - Limitations and restrictions
    - Suitable alternative agents and procedures
  - Smoke and Fumes
    - Protection of crew and passengers
    - Smoke removal procedures
    - Installation of smoke barriers (if installed)

## Chapter 5 Aircraft Type Specific – Systems, Equipment and Procedures

- Aeroplane description
- Cabin configuration
  - Safety equipment – location of equipment diagram
  - Flight crew and cabin crew seats and harnesses
  - Passenger seats
  - Stowage areas
  - Toilets
  - Galley appliances
  - Water supply systems – sinks, drains, water shut-off
  - Curtains, partitions
  - Lifts
  - Rest areas
- Minimum crew complement / normal crew complement
- Cabin crew seating positions (including mandatory seats)
- Cabin crew duties – specific areas of responsibilities
  - Pre-departure safety equipment and security checks
  - Passenger embarkation
  - Fuelling with passengers on board, embarking or disembarking
  - Passenger safety briefing positions
  - Cabin secure
  - Arming/disarming
  - Passenger disembarkation
- Electrical systems
  - Normal lighting system
  - Emergency lighting system including floor proximity lights and external lights
  - Galley systems power shut-off, appliance overheat/malfunction
  - CBs
  - Smoke detectors
  - Evacuation alarms
- Oxygen systems
  - Cabin system – location, use, operation
  - Flight deck system – location, use, operation
  - Supplementary oxygen systems – location, use, operation
- Communication systems
  - Interphones

Passenger address  
Crew call system  
Passenger information signs  
Passenger call  
Audio, video and other in-seat systems  
Exits  
Full description of each exit  
Location  
Operation from inside aircraft  
Operation from outside aircraft  
Operation of arming/disarming systems  
Use of door straps  
Use of slides  
Use of slide rafts  
Use of ropes and any other assist devices

## **Chapter 6    First Aid**

Physiology of flight including oxygen requirements and hypoxia  
Medical emergencies  
Asthma  
Choking  
Heart attacks  
Stress reactions and allergic reactions  
Shock  
Stroke  
Epilepsy  
Diabetes  
Air sickness  
Hyperventilation  
Gastro-intestinal disturbance  
Emergency childbirth  
The unconscious  
Burns  
Wounds  
Fractures and soft-tissue injuries  
Practical cardio-pulmonary resuscitation  
Travel health and hygiene  
Operations into tropical and sub-tropical areas

- Risk of contact with infectious diseases
- Reporting of infectious diseases
- Protection from infection
- Avoidance of water-borne and food-borne illnesses
- Hygiene on board
- Death on board
- Handling of clinical waste
- Aircraft disinsection
- Alertness management, physiological effects of fatigue and sleep physiology
- Circadian rhythms and time zone changes
- Use of first-aid kits, emergency medical kits, first-aid oxygen
- Other medical equipment (including defibrillators)

**Chapter 7    Survival Search and Rescue**

- Search and rescue procedures
- Basic principles of survival – protection, location, water and food
- Water survival
- Polar survival
- Desert survival
- Jungle survival
- Survival first aid and hygiene

**Chapter 8    Dangerous Goods**

- As required by the Technical Instructions

**Chapter 9    Security including Hijacks and Bombs**

- As required by the National Aviation Security programme

- Security requirements
- Reporting acts of unlawful interference
- Aeroplane search procedure checklist

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## **Annex 2 to Chapter 33**

### **Training Manual - Typical Outline of Contents**

#### **1 Preface**

Amendment process  
Revision status  
List of effective pages  
Status of manual  
Contents

#### **2 Introduction**

Instructors including structure of Training Department:

- Names
- Qualification criteria
- Subjects qualified to teach
- Third-party training organisations
- Duties and responsibilities

Training Facilities and equipment used

Type of examinations and methods of checking

Pass or fail criteria (including actions in event of failure)

#### **3 Initial Training**

Requirements

Syllabus as per EU-OPS as appropriate to operation:

- Include only relevant training items
- Give detail about practical exercises
- Expand on EU-OPS requirements to show detail of training
- Exams to be taken

#### **4 Conversion and Differences Training**

Requirements

Syllabus as per EU-OPS as appropriate to operation and aircraft type:

- Include only relevant training items
- Give detail about practical exercises
- Expand on EU-OPS requirements to show detail of training
- Exams to be taken

Include syllabus for each aircraft type

## 5 Familiarisation

Requirements

Aircraft visit:

- Syllabus as per EU-OPS as appropriate to operation and aircraft
- Conduct and supervision of visit
- Documentation

Familiarisation Flights:

- Number required
- Conduct and supervision
- Documentation

## 6 Single Cabin Crew Member Training

Requirements and experience

Additional items:

- Include only relevant training items
- Expand on EU-OPS requirements to show detail of training
- Exams to be taken
- Familiarisation flying

## 7 Senior Cabin Crew Member Training

Requirements and experience

Syllabus as per EU-OPS as appropriate to operation:

- Include only relevant training items
- Expand on EU-OPS requirements to show detail of training
- Exams to be taken
- Check flights (if appropriate to operator) including number of sectors

## 8 Recurrent Training

Requirements

Syllabus as per EU-OPS as appropriate to operation:

- Include only relevant training items
- Give detail about practical exercises
- Expand on EU-OPS requirements to show detail of training
- Exams to be taken

## **9 Triennial Recurrent Training**

Requirements

Syllabus as per EU-OPS as appropriate to operation:

- Include only relevant training items
- Give detail about practical exercises
- Expand on EU-OPS requirements to show detail of training
- Exams to be taken

## **10 Refresher Training**

Requirements

Syllabus as per EU-OPS as appropriate to operation:

- Include only relevant training items
- Give detail about practical exercises
- Expand on EU-OPS requirements to show detail of training
- Exams to be taken

## **11 Programmes**

(Note: These can also be in the format of Trainers' Notes or retained separately as an Appendix to the Training Manual. However, they should be referenced in the Training Manual and be a controlled document. Their revision status should be the same as that of the Manual.)

For each training course, a programme should be included

Course structure including number of days, instructors and students

Any pre-course requirements such as self-study

The programme should include the following:

- Subject (which should be easily cross referenced to syllabus)
- Duration of session
- Theory or practical
- Training items required such as equipment or videos

## **12 Training Records**

Criteria for completion of records

Actions of instructor with regard to countersigning, filing etc.

Retention of records

Sample copy of each training record used

Attestation procedure and sample document

### **Notes**

Each page should be numbered and dated

Revision/amendment number may be included

Training Record forms should clearly show revision status

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