Mauritius Civil Aviation Requirements

MCAR-AOCR

Air Operators Certification Requirements - Helicopters

Issue 1 Rev 0
Dated 04 March 2015
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DEPARTMENT OF CIVIL AVIATION
HELICOPTER SUPPLEMENT TO AIRCRAFT OPERATOR
CERTIFICATE REQUIREMENTS

Chapter One

INTRODUCTION

This supplement has been issued to augment Aircraft Operator Certificate Requirements (AOCR) and establish specific requirements for the operation of helicopters for the State of Mauritius. This document contains requirements for helicopter operations, however general requirements pertaining to the operation of both fixed wing and rotary aircraft can be found in AOCR.

The requirements are prefixed with ‘AOCR’ standing for ‘Aircraft Operator Certificate Requirements’ followed by the subpart then the reference number, e.g. AOCR.GEN.200 which stands for ‘Aircraft Operator Certificate Requirements for, General, 200’. A subpart may be further subdivided, e.g. AOCR.SPA.RVSM.105.

To aid understanding acceptable means of compliance (AMC) and guidance material (GM) have been embodied into the text immediately after the requirement. AMC has been coloured dark red, whilst GM is coloured Green. An operator may propose an ‘alternative means of compliance’ which will be reviewed and assessed by the Authority. If found acceptable will be included in this document for the use of all organisations.

If there is insufficient guidance information within this document refers to TGL 44 or UK CAA CAP789 for further explanatory information. [not updated any more by UK CAA]

This Air Operator Certification Requirements has been issued by the Authority pursuant to Regulation 135 of the Civil Aviation Regulations 2007.

This MCAR-AOCR will gradually replace the MCAR-AOCR dated March 2008. Operators should demonstrate full compliance with the above Requirements by 03 March 2016

[Signature]
I POKHUN
Ag Director of Civil Aviation
CHAPTER 2 ORGANISATION REQUIREMENTS

A FLIGHT CREW

AOCR.FC.005 Scope

This part establishes requirements to be met by the operator conducting commercial air transport operations related to flight crew training, experience and qualification.

AOCR.FC.100 Composition of flight crew

(a) The composition of the flight crew and the number of flight crew members at designated crew stations shall be not less than the minimum specified in the aircraft flight manual or operating limitations prescribed for the aircraft.

(b) The flight crew shall include additional flight crew members when required by the type of operation and shall not be reduced below the number specified in the operations manual.

(c) All flight crew members shall hold a licence and ratings issued by the Authority and appropriate to the duties assigned to them.

(d) The flight crew member may be relieved in flight of his/her duties at the controls by another suitably qualified flight crew member.

(e) When engaging the services of flight crew members who are working on a freelance or part-time basis, the operator shall verify that all applicable requirements of these requirements and the relevant elements of Part-FCL, including the requirements on recent experience, are complied with, taking into account all services rendered by the flight crew member to other operator(s) to determine in particular:

(1) the total number of aircraft types or variants operated; and

(2) the applicable flight and duty time limitations and rest requirements.

AMC1 AOCR.FC.100(c) Composition of flight crew

OPERATIONAL MULTI-PILOT LIMITATION (OML)

The operator should ensure that pilots with an OML on their medical certificate only operate aircraft in multi-pilot operations when the other pilot is fully qualified on the relevant type of aircraft, is not subject to an OML.
**DEPARTMENT OF CIVIL AVIATION**
**HELICOPTER SUPPLEMENT TO AIRCRAFT OPERATOR CERTIFICATE REQUIREMENTS**

**AOCR.FC.105 Designation as pilot-in-command/commander**

(a) One pilot amongst the flight crew, qualified as pilot-in-command in accordance with MCAR-Part-FCL shall be designated by the operator as pilot-in-command/commander.

(b) The operator shall only designate a flight crew member to act as pilot-in-command/commander if he/she has:

   (1) the minimum level of experience specified in the operations manual;

   (2) adequate knowledge of the route or area to be flown and of the aerodromes, including alternate aerodromes, facilities and procedures to be used;

   (3) in the case of multi-crew operations, completed an operator’s command course if upgrading from co-pilot to pilot-in-command/commander.

(c) The pilot-in-command/commander or the pilot, to whom the conduct of the flight may be delegated, shall have had initial familiarisation training of the route or area to be flown and of the aerodromes, facilities and procedures to be used. This route/area and aerodrome knowledge shall be maintained by operating at least once on the route or area or to the aerodrome within a 12-month period.

(d) In the case of performance class B aeroplanes involved in commercial air transport operations under VFR by day; (c) shall not apply.

**AMC1 AOGR.FC.105 (b) (2) ;( c) Designation as pilot-in-command/commander**

**ROUTE/AREA AND AERODROME KNOWLEDGE FOR COMMERCIAL AIR TRANSPORT OPERATIONS**

For commercial air transport (AOGR) operations, the experience of the route or area to be flown and of the aerodrome facilities and procedures to be used should include the following:

(a) Area and route knowledge

   (1) Area and route training should include knowledge of:

      (i) terrain and minimum safe altitudes;

      (ii) seasonal meteorological conditions;
(iii) meteorological, communication and air traffic facilities, services and procedures;

(iv) search and rescue procedures where available; and

(v) navigational facilities associated with the area or route along which the flight is to take place.

(2) Depending on the complexity of the area or route, as assessed by the operator, the following methods of familiarisation should be used:

(i) for the less complex areas or routes, familiarisation by self-briefing with route documentation, or by means of programmed instruction; and

(ii) in addition, for the more complex areas or routes, in-flight familiarisation as a pilot in command/commander or co-pilot under supervision, observer, or familiarisation in a flight simulation training device (FSTD) using a database appropriate to the route concerned.

(b) Aerodrome knowledge

(1) Aerodrome training should include knowledge of obstructions, physical layout, lighting, approach aids and arrival, departure, holding and instrument approach procedures, applicable operating minima and ground movement considerations.

(2) The operations manual should describe the method of categorisation of aerodromes and, in the case of CAT operations, provide a list of those aerodrome categorised as B or C.

(3) All aerodromes to which an operator operates should be categorised in one of these three categories:

(i) category A - an aerodrome that meets all of the following requirements:

   (A) an approved instrument approach procedure;

   (B) at least one runway with no performance limited procedure for take-off and/or landing;

   (C) published circling minima not higher than 1000 ft above aerodrome level; and
(D) night operations capability.

(ii) category B - an aerodrome that does not meet the category A requirements or which requires extra considerations such as:

(A) non-standard approach aids and/or approach patterns;

(B) unusual local weather conditions;

(C) unusual characteristics or performance limitations; or

(D) any other relevant considerations including obstructions, physical layout, lighting etc.

(iii) category C - an aerodrome that requires additional considerations to a category B aerodrome;

(iv) offshore installations may be categorised as category B or C aerodromes, taking into account the limitations determined in accordance with AMC2 AOCR.OP.MPA.105

Use of aerodromes and operating sites.

(c) Prior to operating to a:

(1) category B aerodrome, the pilot-in-command/commander should be briefed, or self-briefed by means of programmed instruction, on the category B aerodrome(s) concerned. The completion of the briefing should be recorded. This recording may be accomplished after completion or confirmed by the pilot-in-command/commander before departure on a flight involving category B aerodrome(s) as destination or alternate aerodromes.

(2) category C aerodrome, the pilot-in-command/commander should be briefed and visit the aerodrome as an observer and/or undertake instruction in a suitable FSTD. The completion of the briefing, visit and/or instruction should be recorded.

AMC1 AOCR.FC.105(c) Designation as pilot-in-command/commander

ROUTE/AREA AND AERODROME RECENCY

(a) The 12-month period should be counted from the last day of the month:

(1) when the familiarisation training was undertaken; or
(2) of the latest operation on the route or area to be flown and of the aerodromes, facilities and procedures to be used.

(b) When the operation is undertaken within the last 3 calendar months of that period, the new 12-month period should be counted from the original expiry date.

**AMC2 AOCR.FC.105(c) Designation as pilot-in-command/commander**

**ROUTE/AREA AND AERODROME RECENCY - PERFORMANCE CLASS B–AEROPLANES OPERATED UNDER VFR BY NIGHT OR IFR IN CAT OPERATIONS**

In the case of CAT operations with performance class B aeroplanes operating under visual flight rules (VFR) by night or instrument flight rules (IFR), the knowledge should be maintained as follows:

(a) except for operations to the most demanding aerodromes, by completion of at least 10 flight sectors within the area of operation during the preceding 12 months in addition to any required self-briefing;

(b) operations to the most demanding aerodromes may be performed only if:

(1) the pilot-in-command/commander has been qualified at the aerodrome within the preceding 36 months by a visit as an operating flight crew member or as an observer;

(2) the approach is performed in visual meteorological conditions (VMC) from the applicable minimum sector altitude; and

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

**GM1 AOCR.FC.110 (d) Designation as pilot-in-command/commander**

**PERFORMANCE CLASS B AEROPLANES OPERATED UNDER VFR BY DAY IN CAT OPERATIONS**

For CAT operations under VFR by day with performance class B aeroplanes, the operator should take account of any requirement that might be stipulated in specific cases by the State of the aerodrome.

**AOCR.FC.110 Flight engineer**

When a separate flight engineer station is incorporated in the design of an aeroplane, the flight crew shall include one crew member who is suitably qualified in accordance with applicable national rules.
AOCR.FC.115  Crew resource management (CRM) training

(a) Before operating, the flight crew member shall have received CRM training, appropriate to his/her role, as specified in the operations manual.

(b) Elements of CRM training shall be included in the aircraft type or class training and recurrent training as well as in the command course.

AOCR.FC.120  Operator conversion training

(a) In the case of aeroplane or helicopter operations, the flight crew member shall complete the operator conversion training course before commencing unsupervised line flying:

(1) when changing to an aircraft for which a new type or class rating is required;

(2) when joining an operator.

(b) The operator conversion training course shall include training on the equipment installed on the aircraft as relevant to flight crew members’ roles.

AOCR.FC.125  Differences training and familiarisation training

(a) Flight crew members shall complete differences or familiarisation training when required by Part-FCL and when changing equipment or procedures requiring additional knowledge on types or variants currently operated.

(b) The operations manual shall specify when such differences or familiarisation is required.

AMC1 AOCR.FC.125 Differences training and familiarisation training

(a) Differences training require additional knowledge and training on the aircraft or an appropriate training device. It should be carried out:

(1) when introducing a significant change of equipment and/or procedures on types or variants currently operated; and

(2) in the case of aeroplanes, when operating another variant of an aeroplane of the same type or another type of the same class currently operated; or
(3) in the case of helicopters, when operating a variant of a helicopter currently operated.

(b) Familiarisation training requires only the acquisition of additional knowledge. It should be carried out when:

(1) operating another helicopter or aeroplane of the same type; or

(2) when introducing a significant change of equipment and/or procedures on types or variants currently operated.

AOCR.FC.130 Recurrent training and checking

(a) Each flight crew member shall complete annual recurrent flight and ground training relevant to the type or variant of aircraft on which he/she operates, including training on the location and use of all emergency and safety equipment carried.

(b) Each flight crew member shall be periodically checked to demonstrate competence in carrying out normal, abnormal and emergency procedures.

AOCR.FC.135 Pilot qualification to operate in either pilot’s seat

Flight crew members who may be assigned to operate in either pilot’s seat shall complete appropriate training and checking as specified in the operations manual.

AOCR.FC.140 Operation on more than one type or variant

(a) Flight crew members operating more than one type or variant of aircraft shall comply with the requirements prescribed in these requirements for each type or variant, unless credits related to the training, checking, and recent experience requirements are defined in the data established.

(b) Appropriate procedures and/or operational restrictions shall be specified in the operations manual for any operation on more than one type or variant.

AOCR.FC.145 Provision of training

(a) All the training required in these requirements shall be conducted:

(1) in accordance with the training programmes and syllabi established by the operator in the operations manual;
(2) by appropriately qualified personnel. In the case of flight and flight simulation training and checking, the personnel providing the training and conducting the checks shall be qualified in accordance with Part-FCL.

(b) When establishing the training programmes and syllabi, the operator shall include the mandatory elements for the relevant type as defined in the data established in accordance with Part FCL.

(c) Training and checking programmes, including syllabi and use of individual flight simulation training devices (FSTDs), shall be approved by the Authority.

(d) The FSTD shall replicate the aircraft used by the operator, as far as practicable. Differences between the FSTD and the aircraft shall be described and addressed through a briefing or training, as appropriate.

(e) The operator shall establish a system to adequately monitor changes to the FSTD and to ensure that those changes do not affect the adequacy of the training programmes.

**AMC1 AOCR.FC.145 (b) Provision of training**

**NON-MANDATORY (RECOMMENDATION) ELEMENTS**

When developing the training programmes and syllabi, the operator should consider the non-mandatory (recommendation) elements for the relevant type that are provided in the data established in accordance with Regulations.

**AMC1 AOCR.FC.145 (d) Provision of training**

**FULL FLIGHT SIMULATORS (FFS)**

The operator should classify any differences between the aircraft and FFS in accordance with the Air Transport Association (ATA) chapters as follows:

**Compliance Levels**

(a) Level A differences:

(1) no influence on flight characteristics;

(2) no influence on procedures (normal and/or abnormal);

(3) differences in presentation; and

(4) differences in operation.
(b) Level B differences:

(1) no influence on flight characteristics;
(2) influence on procedures (normal and/or abnormal); and
(3) possible differences in presentation and operation.

Method: flight crew information, computer-based training, system device training or special instruction by instructor.

(c) Level C differences:

(1) influence on flight characteristics;
(2) influence on procedures (normal and/or abnormal); and
(3) eventually differences in presentation and operation.

Method: special instruction by instructor, a selected partial training on another FSTD or aircraft or a waiver because of previous experience, special instruction or training programme.

(d) Level D differences:

(1) influence on flight characteristics; and/or
(2) influence on procedures (normal and/or abnormal); and/or
(3) differences in presentation and/or operation; and
(4) FSTD is level D qualified and is used for zero flight-time training (ZFTT).

Method: a specified partial training on another FSTD or aircraft or a waiver because of previous experience, special instruction or training programme.

AOCR.FC.200 Composition of flight crew

(a) There shall not be more than one inexperienced flight crew member in any flight crew.
(b) The commander may delegate the conduct of the flight to another pilot suitably qualified in accordance with Part-FCL provided that the requirements of AOCR.FC.105 (b) (1), (b) (2) and (c) are complied with.

(c) Specific requirements for aeroplane operations under instrument flight rules (IFR) or at night.

(1) The minimum flight crew shall be two pilots for all turbo-propeller aeroplanes with a maximum operational passenger seating configuration (MOPSC) of more than nine and all turbojet aeroplanes.

(2) Aeroplanes other than those covered by (c)(1) shall be operated with a minimum crew of two pilots, unless the requirements of AOCR.FC.202 are complied with, in which case they may be operated by a single pilot.

(d) Specific requirements for helicopter operations.

(1) For all operations of helicopters with an MOPSC of more than 19 and for operations under IFR of helicopters with an MOPSC of more than 9:

(i) the minimum flight crew shall be two pilots; and

(ii) the commander shall be the holder of an airline transport pilot licence (helicopter) (ATPL (H)) with an instrument rating issued in accordance with Part-FCL.

(2) Operations not covered by (d) (1) may be operated by a single pilot under IFR or at night provided that the requirements of AOCR.FC.202 are complied with.

**AMC1 AOCR.FC.200 (a) Composition of flight crew**

**CREWING OF INEXPERIENCED FLIGHT CREW MEMBERS**

The operator should establish procedures in the operations manual taking into account the following elements:

**Aeroplanes**

(a) The operator should consider that a flight crew member is inexperienced, following completion of a type rating or command course, and the associated line flying under supervision, until he/she has achieved on the type either:
(1) 100 flight hours and flown 10 sectors within a consolidation period of 120 consecutive days; or

(2) 150 flight hours and flown 20 sectors (no time limit).

(b) A lesser number of flight hours or sectors, subject to any other conditions that the Authority may impose, may be acceptable to the Authority when one of the following applies:

(1) a new operator is commencing operations;

(2) an operator introduces a new aeroplane type;

(3) flight crew members have previously completed a type conversion course with the same operator;

(4) credits are defined in the data established in accordance with Regulations; or

(5) the aeroplane has a maximum take-off mass of less than 10 tonnes or a maximum operational passenger seating configuration (MOPSC) of less than 20.

Helicopters

(c) The operator should consider that, when two flight crew members are required, a flight crew member, following completion of a type rating or command course, and the associated line flying under supervision, is inexperienced until either:

(1) he/she has achieved 50 flight hours on the type and/or in the role within a period of 60 days; or

(2) he/she has achieved 100 flight hours on the type and/or in the role (no time limit).

(d) A lesser number of flight hours, on the type and/or in the role, and subject to any other conditions which the Authority may impose, may be acceptable to the Authority when one of the following applies:

(1) a new operator is commencing operations;

(2) an operator introduces a new helicopter type;

(3) flight crew members have previously completed a type conversion course with the same operator (reconversion); or
AOCR.FC.A.201 In-flight relief of flight crew members

(a) The commander may delegate the conduct of the flight to:

(1) another qualified commander; or

(2) for operations only above flight level (FL) 200, a pilot who complies with the following minimum qualifications:

(i) ATPL;

(ii) conversion training and checking, including type rating training, in accordance with AOCR.FC.220;

(iii) all recurrent training and checking in accordance with AOCR.FC.230 and AOCR.FC.240;

(iv) route/area and aerodrome competence in accordance with AOCR.FC.105.

(b) The co-pilot may be relieved by:

(1) another suitably qualified pilot;

(2) for operations only above FL 200, a cruise relief co-pilot that complies with the following minimum qualifications:

(i) valid commercial pilot licence (CPL) with an instrument rating;

(ii) conversion training and checking, including type rating training, in accordance with AOCR.FC.220 except the requirement for take-off and landing training;

(iii) recurrent training and checking in accordance with AOCR.FC.230 except the requirement for take-off and landing training.

(c) A flight engineer may be relieved in flight by a crew member suitably qualified in accordance with applicable national rules.
AOCR.FC.202 Single-pilot operations under IFR or at night

In order to be able to fly under IFR or at night with a minimum flight crew of one pilot, as foreseen in AOCR.FC.200(c)(2) and (d)(2), the following shall be complied with:

(a) The operator shall include in the operations manual a pilot’s conversion and recurrent training programme that includes the additional requirements for a single-pilot operation. The pilot shall have undertaken training on the operator’s procedures, in particular regarding:

(1) engine management and emergency handling;
(2) use of normal, abnormal and emergency checklist;
(3) air traffic control (ATC) communication;
(4) departure and approach procedures;
(5) autopilot management, if applicable;
(6) use of simplified in-flight documentation;
(7) single-pilot crew resource management.

(b) The recurrent checks required by AOCR.FC.230 shall be performed in the single-pilot role on the relevant type or class of aircraft in an environment representative of the operation.

(c) For aeroplane operations under IFR the pilot shall have:

(1) a minimum of 50 hours flight time under IFR on the relevant type or class of aeroplane, of which 10 hours are as commander; and

(2) completed during the preceding 90 days on the relevant type or class of aeroplane:

   (i) five IFR flights, including three instrument approaches, in a single-pilot role; or

   (ii) an IFR instrument approach check.

(d) For aeroplane operations at night the pilot shall have:
(1) a minimum of 15 hours flight time at night which may be included in the 50 hours flight time under IFR in (c)(1); and

(2) completed during the preceding 90 days on the relevant type or class of aeroplane:

(i) three take-offs and landings at night in the single pilot role; or

(ii) a night take-off and landing check.

(e) For helicopter operations under IFR the pilot shall have:

(1) 25 hours total IFI Flight experience in the relevant operating environment; and

(2) 25 hours flight experience as a single pilot on the specific type of helicopter, approved for single-pilot IFR, of which 10 hours may be flown under supervision, including five sectors of IFR line flying under supervision using the single-pilot procedures;

(3) completed during the preceding 90 days:

(i) five IFR flights as a single pilot, including three instrument approaches, carried out on a helicopter approved for this purpose; or

(ii) an IFR instrument approach check as a single pilot on the relevant type of helicopter, flight training device (FTD) or full flight simulator (FFS).

**AOCR.FC.205 Command course**

(a) For aeroplane and helicopter operations, the command course shall include at least the following elements:

(1) training in an FSTD, which includes line oriented flight training (LOFT) and/or flight training;

(2) the operator proficiency check, operating as commander;

(3) command responsibilities training;

(4) line training as commander under supervision, for a minimum of:

(i) 10 flight sectors, in the case of aeroplanes; and
(ii) 10 hours, including at least 10 flight sectors, in the case of helicopters;

(5) completion of a line check as commander and demonstration of adequate knowledge of the route or area to be flown and of the aerodromes, including alternate aerodromes, facilities and procedures to be used; and

(6) crew resource management training.

AMC1 ORO.FC.205 Command course

COMBINED UPGRADING AND CONVERSION COURSE — HELICOPTER

If a pilot is converting from one helicopter type or variant to another when upgrading to commander:

(a) the command course should also include a conversion course in accordance with ORO.FC.220; and

(b) additional flight sectors should be required for a pilot transitioning onto a new type of helicopter.

AOCR.FC.215 Initial operator’s crew resource management (CRM) training

(a) The flight crew member shall have completed an initial CRM training course before commencing unsupervised line flying.

(b) Initial CRM training shall be conducted by at least one suitably qualified CRM trainer who may be assisted by experts in order to address specific areas.

(c) If the flight crew member has not previously received theoretical training in human factors to the ATPL level, he/she shall complete, before or combined with the initial CRM training, a theoretical course provided by the operator and based on the human performance and limitations syllabus for the ATPL as established in Part-FCL.

AMC1 AOCR.FC.115&215 Crew resource management (CRM) training

CRM TRAINING – CAT OPERATIONS

(a) General

(1) CRM training should reflect the culture of the operator as well as type of operation and be conducted by means of both classroom training and practical exercises including group discussions and
accident and serious incident reviews to analyse communication problems and instances or examples of a lack of information or crew management.

(2) Whenever it is practicable to do so, consideration should be given to conducting relevant parts of CRM training in FSTDs that reproduce, in an acceptable way, a realistic operational environment and permit interaction. This includes, but is not limited to, appropriate line-oriented flight training (LOFT) scenarios conducted in FSTDs.

(3) It is recommended that, whenever possible, initial CRM training be conducted in a group session away from the pressures of the usual working environment so that the opportunity is provided for flight crew members to interact and communicate in an environment conducive to learning.

(b) Initial CRM Training

(1) Initial CRM training programmes are designed to provide knowledge of, and familiarity with, human factors relevant to flight operations. The course duration should be a minimum of 1 day for single-pilot operations and 2 days for all other types of operations. It should cover all the elements indicated in (f).

(2) The CRM trainer should:

(i) possess group facilitation skills;

(ii) have and maintain adequate knowledge of the operation and the aircraft type, preferably through current CAT experience as a flight crew member;

(iii) have successfully passed the human performance and limitations (HPL) examination whilst recently obtaining the airline transport pilot licence (ATPL); or followed a theoretical HPL course covering the whole syllabus of the HPL examination;

(iv) have completed initial CRM training;

(v) have received additional education in the fields of group management, group dynamics and personal awareness; and

(vi) be supervised by suitably qualified CRM training personnel when conducting his/her first initial CRM training session.
(3) The operator should ensure that initial CRM training addresses the nature of the operations of the operator concerned, as well as the associated procedures and the culture of the operator. This will include areas of operations that produce particular difficulties or involve adverse climatic conditions and any unusual hazards.

(4) If the operator does not have sufficient means to establish initial CRM training, use may be made of a course provided by another operator, or a third party or training organisation. In this event the operator should ensure that the content of the course meets his/her operational requirements. When crew members from several companies follow the same course, CRM core elements should be specific to the nature of operations of the companies and the trainees concerned.

(5) The flight crew member’s CRM skills should not be assessed during initial CRM training.

c) Operator conversion course – CRM training

(1) If the flight crew member undergoes a conversion course with a change of aircraft type, elements of CRM should be integrated into all appropriate phases of the operator’s conversion course, in accordance with (f).

(2) If the flight crew member undergoes a conversion course with a change of operator, elements of CRM should be integrated into all appropriate phases of the operator’s conversion course, in accordance with (f).

(3) The flight crew member should not be assessed when completing elements of CRM training that are included in the operator conversion course.

d) Command course – CRM training

(1) The operator should ensure that elements of CRM are integrated into the command course in accordance with (f).

(2) The flight crew member should not be assessed when completing elements of CRM training that are included in the command course, although feedback should be given.

e) Recurrent CRM training

(1) The operator should ensure that:
(i) elements of CRM are integrated into all appropriate phases of recurrent training every year, in accordance with (f), and that modular CRM training covers the same areas over a maximum period of 3 years; and

(ii) relevant modular CRM training is conducted by CRM trainers qualified according to (b) (2).

(2) The flight crew member should not be assessed when completing elements of CRM training that are included in the recurrent training.

(f) Implementation of CRM

(1) Table 1 indicates which elements of CRM should be included in each type of training.

Table 1: Elements of CRM to be included in training

<table>
<thead>
<tr>
<th>Core Elements</th>
<th>Initial CRM Training</th>
<th>Operator conversion course when changing type*</th>
<th>Operator conversion course when changing operator</th>
<th>Command course</th>
<th>Recurrent training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human error and reliability, error chain, error prevention and detection</td>
<td>In-depth</td>
<td>In-depth</td>
<td>Overview</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operator safety culture, standard operating procedures (SOPs), organisational factors</td>
<td>Not required</td>
<td>In-depth</td>
<td>Overview</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress, stress management, fatigue &amp; vigilance</td>
<td>In-depth</td>
<td>Not required</td>
<td>In-depth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information acquisition and processing situation awareness, workload management</td>
<td>Overview</td>
<td></td>
<td>In-depth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision making</td>
<td>Overview</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication and coordination inside and outside the flight crew compartment</td>
<td>Overview</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership and team behaviour synergy</td>
<td>As</td>
<td></td>
<td>In-depth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automation, philosophy of the use of automation (if relevant to the type)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific type-related differences</td>
<td>required</td>
<td>In-depth</td>
<td>As required</td>
<td>As required</td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
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</tr>
<tr>
<td>Case studies</td>
<td>In-depth</td>
<td>In-depth</td>
<td>In-depth</td>
<td>In-depth</td>
<td></td>
</tr>
</tbody>
</table>

* Credit may be given when converting between similar aircraft types such as Airbus family as agreed with the Authority.

(g) Coordination between flight crew and cabin/technical crew training

(1) Operators should, as far as practicable, provide combined training for flight crew and cabin/technical crew including briefing and debriefing.

(2) There should be an effective liaison between flight crew and cabin/technical crew training departments. Provision should be made for transfer of relevant knowledge and skills between flight and cabin/technical crew instructors.

(h) Assessment of CRM skills

(1) Assessment of CRM skills is the process of observing, recording, interpreting and debriefing crews and crew member’s performance and knowledge using an acceptable methodology in the context of overall performance. It includes the concept of self-critique, and feedback which can be given continuously during training or in summary following a check. In order to enhance the effectiveness of the programme this methodology should, where possible, be agreed with flight crew representatives.

(2) NOTECHS (non-technical skills evaluation) or other acceptable methods of assessment should be used. The selection criteria and training requirements of the assessors and their relevant qualifications, knowledge and skills should be established.

(3) Assessment of CRM skills should:

(i) provide feedback to the crew and the individual and serve to identify retraining where needed; and

(ii) be used to improve the CRM training system.

(4) Prior to the introduction of CRM skills assessment, a detailed description of the CRM methodology including terminology used should be published in the operations manual.

(5) Methodology of CRM skills assessment
(i) The operator should establish the CRM training programme including an agreed terminology. This should be evaluated with regard to methods, length of training, depth of subjects and effectiveness.

(ii) A training and standardisation programme for training personnel should then be established.

(iii) The assessment should be based on the following principles:

(A) only observable, repetitive behaviours are assessed;

(B) the assessment should positively reflect any CRM skills that result in enhanced safety;

(C) assessments should include behaviour that contributes to a technical failure, such technical failure being errors leading to an event that requires debriefing by the person conducting the line check; and

(D) the crew and, where needed, the individual are verbally debriefed.

(6) De-identified summaries of all CRM assessments by the operator should be used to provide feedback and such feedback should be used to update and improve the operator’s CRM training.

(7) Operators should establish procedures, including retraining, to be applied in the event that personnel do not achieve or maintain the required standards.

(8) If the operator proficiency check is combined with the type rating revalidation/renewal check, the assessment of CRM skills should satisfy the multi-crew cooperation requirements of the type rating revalidation/renewal. This assessment should not affect the validity of the type rating.

(i) Levels of training

(1) Overview. When overview training is required it should normally be instructional in style. Such training should refresh knowledge gained in earlier training.

(2) In-depth. When in-depth training is required it should normally be interactive in style and should include, as appropriate, case studies, group discussions, role play and consolidation of
knowledge and skills. Core elements should be tailored to the specific needs of the training phase being undertaken.

(j) Use of automation

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

(i) the application of the operations policy concerning the use of automation as stated in the operations manual; and

(ii) system and human limitations associated with the use of automation.

(2) The objective of this training should be to provide appropriate knowledge, skills and behavioural patterns for managing and operating automated systems. Special attention should be given to how automation increases the need for crews to have a common understanding of the way in which the system performs, and any features of automation that make this understanding difficult.

AMC1.1 AOCR.FC.115&.215 Crew resource management (CRM) training

CRM TRAINER

The acceptable means of compliance are as set out in AMC1 AOCR.FC.115&.215, except for (b) (2) of that AMC, for which the following qualifications and experience are also acceptable for a CRM trainer:

(a) a flight crew member holding a recent qualification as a CRM trainer may continue to be a CRM trainer even after the cessation of active flying duties;

(b) an experienced non-flight crew CRM trainer having a knowledge of HPL; and

(c) a former flight crew member having knowledge of HPL may become a CRM trainer if he/she maintains adequate knowledge of the operation and aircraft type and meets the provisions of AMC1 AOCR.FC.115&.215, (b)(2)(i), (iv), (v) and (vi).

GM1 AOCR.FC.115&.215 Crew resource management (CRM) training

GENERAL
(a) Crew resource management (CRM) is the effective utilisation of all available resources (e.g. crew members, aircraft systems, supporting facilities and persons) to achieve safe and efficient operation.

(b) The objective of CRM is to enhance the communication and management skills of the flight crew member concerned. The emphasis is placed on the non-technical aspects of flight crew performance.

AOCR.FC.220 Operator conversion training and checking

(a) CRM training shall be integrated into the operator conversion training course.

(b) Once an operator conversion course has been commenced, the flight crew member shall not be assigned to flying duties on another type or class of aircraft until the course is completed or terminated. Crew members operating only performance class B aeroplanes may be assigned to flights on other types of performance class B aeroplanes during conversion courses to the extent necessary to maintain the operation.

(c) The amount of training required by the flight crew member for the operator’s conversion course shall be determined in accordance with the standards of qualification and experience specified in the operations manual, taking into account his/her previous training and experience.

(d) The flight crew member shall complete:

(1) the operator proficiency check and the emergency and safety equipment training and checking before commencing line flying under supervision (LIFUS); and

(2) the line check upon completion of line flying under supervision. For performance class B aeroplanes, LIFUS may be performed on any aeroplane within the applicable class.

(e) In the case of aeroplanes, pilots that have been issued a type rating based on a zero flight-time training (ZFTT) course shall:

(1) commence line flying under supervision not later than 21 days after the completion of the skill test or after appropriate training provided by the operator. The content of such training shall be described in the operations manual;

(2) complete six take-offs and landings in a FSTD not later than 21 days after the completion of the skill test under the supervision of a type rating instructor for aeroplanes (TRI(A)) occupying the
other pilot seat. The number of take-offs and landings may be reduced when credits are defined in the data established and agreed with the Authority. If these take-offs and landings have not been performed within 21 days, the operator shall provide refresher training. The content of such training shall be described in the operations manual;

(3) conduct the first four take-offs and landings of the LIFUS in the aeroplane under the supervision of a TRI (A) occupying the other pilot seat. The number of take-offs and landings may be reduced when credits are defined and agreed with the Authority.

**AMC1 AOCR.FC.220 Operator conversion training and checking**

**OPERATOR CONVERSION TRAINING SYLLABUS**

(a) General

(1) The operator conversion training should include, in the following order:

(i) ground training and checking, including aircraft systems, and normal, abnormal and emergency procedures;

(ii) emergency and safety equipment training and checking, (completed before any flight training in an aircraft commences);

(iii) flight training and checking (aircraft and/or FSTD); and

(iv) line flying under supervision and line check.

(2) When the flight crew member has not previously completed an operator’s conversion course, he/she should undergo general first-aid training and, if applicable, ditching procedures training using the equipment in water.

(3) Where the emergency drills require action by the non-handling pilot, the check should additionally cover knowledge of these drills.

(4) The operator’s conversion may be combined with a new type/class rating training as required by MCAR-FL.

(5) The operator should ensure that the personnel integrating elements of CRM into conversion training are suitably qualified.

(b) Ground training
(1) Ground training should comprise a properly organised programme of ground instruction supervised by training staff with adequate facilities, including any necessary audio, mechanical and visual aids. Self-study using appropriate electronic learning aids, computer-based training (CBT) etc. may be used with adequate supervision of the standards achieved. However, if the aircraft concerned is relatively simple, unsupervised private study may be adequate if the operator provides suitable manuals and/or study notes.

(2) The course of ground instruction should incorporate formal tests on such matters as aircraft systems, performance and flight planning, where applicable.

(c) Emergency and safety equipment training and checking

(1) Emergency and safety equipment training should take place in conjunction with cabin/technical crew undergoing similar training with emphasis on coordinated procedures and two-way communication between the flight crew compartment and the cabin.

(2) On the initial conversion course and on subsequent conversion courses as applicable, the following should be addressed:

(i) Instruction on first-aid in general (initial conversion course only); instruction on first-aid as relevant to the aircraft type of operation and crew complement including those situations where no cabin crew is required to be carried (initial and subsequent).

(ii) Aero-medical topics including:

(A) hypoxia;

(B) hyperventilation;

(C) contamination of the skin/eyes by aviation fuel or hydraulic or other fluids;

(D) hygiene and food poisoning; and

(E) malaria.

(iii) The effect of smoke in an enclosed area and actual use of all relevant equipment in a simulated smoke-filled environment.
(iv) Actual firefighting, using equipment representative of that carried in the aircraft on an actual or simulated fire except that, with Halon extinguishers, an alternative extinguisher may be used.

(v) The operational procedures of security, rescue and emergency services.

(vi) Survival information appropriate to their areas of operation (e.g. polar, desert, jungle or sea) and training in the use of any survival equipment required to be carried.

(vii) A comprehensive drill to cover all ditching procedures where flotation equipment is carried. This should include practice of the actual donning and inflation of a life-jacket, together with a demonstration or audio-visual presentation of the inflation of life-rafts and/or slide-rafts and associated equipment. This practice should, on an initial conversion course, be conducted using the equipment in water, although previous certified training with another operator or the use of similar equipment will be accepted in lieu of further wet-drill training.

(viii) Instruction on the location of emergency and safety equipment, correct use of all appropriate drills, and procedures that could be required of flight crew in different emergency situations. Evacuation of the aircraft (or a representative training device) by use of a slide where fitted should be included when the operations manual procedure requires the early evacuation of flight crew to assist on the ground.

(d) Flight training

(1) Flight training should be conducted to familiarise the flight crew member thoroughly with all aspects of limitations and normal, abnormal and emergency procedures associated with the aircraft and should be carried out by suitably qualified class and type rating instructors and/or examiners. For specific operations such as steep approaches, ETOPS, or operations based on QFE, additional training should be carried out, based on any additional elements of training defined for the aircraft type in the data, where they exist.

(2) In planning flight training on aircraft with a flight crew of two or more, particular emphasis should be placed on the practice of
LOFT with emphasis on CRM, and the use of crew coordination procedures, including coping with incapacitation.

(3) Normally, the same training and practice in the flying of the aircraft should be given to co-pilots as well as commanders. The ‘flight handling’ sections of the syllabus for commanders and co-pilots alike should include all the requirements of the operator proficiency check required by AOCR.FC.230.

(4) Unless the type rating training programme has been carried out in an FSTD usable for ZFTT, the training should include at least three take-offs and landings in the aircraft.

(e) Line flying under supervision (LIFUS)

(1) Following completion of flight training and checking as part of the operator’s conversion course, each flight crew member should operate a minimum number of sectors and/or flight hours under the supervision of a flight crew member nominated by the operator.

(2) The minimum flight sectors/hours should be specified in the operations manual and should be determined by the following:

(i) previous experience of the flight crew member;

(ii) complexity of the aircraft; and

(iii) the type and area of operation.

(3) For performance class B aeroplanes, the amount of LIFUS required is dependent on the complexity of the operations to be performed.

(f) Passenger handling for operations where no cabin crew is required

Other than general training on dealing with people, emphasis should be placed on the following:

(1) advice on the recognition and management of passengers who appear or are intoxicated with alcohol, under the influence of drugs or aggressive;

(2) methods used to motivate passengers and the crowd control necessary to expedite an aircraft evacuation; and
the importance of correct seat allocation with reference to aircraft mass and balance. Particular emphasis should also be given on the seating of special categories of passengers.

Discipline and responsibilities, for operations where no cabin crew is required

Emphasis should be placed on discipline and an individual’s responsibilities in relation to:

1. his/her ongoing competence and fitness to operate as a crew member with special regard to flight and duty time limitation (FTL) requirements; and

2. security procedures.

Passenger briefing/safety demonstrations, for operations where no cabin crew is required

Training should be given in the preparation of passengers for normal and emergency situations.

AMC2 AOCR.FC.220 Operator conversion training and checking

OPERATOR CONVERSION TRAINING SYLLABUS – FLIGHT ENGINEERS

(a) Operator conversion training for flight engineers should approximate to that of pilots.

(b) If the flight crew includes a pilot with the duties of a flight engineer, he/she should, after training and the initial check in these duties, operate a minimum number of flight sectors under the supervision of a nominated additional flight crew member. The minimum figures should be specified in the operations manual and should be selected after due note has been taken of the complexity of the aircraft and the experience of the flight crew member.

GM1 AOCR.FC.220 (b) Operator conversion training and checking

COMPLETION OF AN OPERATOR’S CONVERSION COURSE

(a) The operator conversion course is deemed to have started when the flight training has begun. The theoretical element of the course may be undertaken ahead of the practical element.

(b) Under certain circumstances the course may have started and reached a stage where, for unforeseen reasons, it is not possible to complete it
without a delay. In these circumstances the operator may allow the pilot to revert to the original type.

(c) Before the resumption of the operator conversion course, the operator should evaluate how much of the course needs to be repeated before continuing with the remainder of the course.

GM1 AOCR.FC.220 (d) Operator conversion training and checking

LINE FLYING UNDER SUPERVISION

(a) Line flying under supervision provides the opportunity for a flight crew member to carry into practice the procedures and techniques he/she has been made familiar with during the ground and flight training of an operator conversion course. This is accomplished under the supervision of a flight crew member specifically nominated and trained for the task. At the end of line flying under supervision the respective crew member should be able to perform a safe and efficient flight conducted within the tasks of his/her crew member station.

(b) A variety of reasonable combinations may exist with respect to:

(1) a flight crew member’s previous experience;

(2) the complexity of the aircraft concerned; and

(3) the type of route/role/area operations.

(c) Aeroplanes.

The following minimum figures for details to be flown under supervision are guidelines for operators to use when establishing their individual requirements:

(1) turbo-jet aircraft

(i) co-pilot undertaking first operator conversion course:

(A) total accumulated 100 hours or minimum 40 flight sectors;

(ii) co-pilot upgrading to commander:

(A) minimum 20 flight sectors when converting to a new type;

(B) minimum 10 flight sectors when already qualified on the aeroplane type.
AOCR.FC.230  Recurrent training and checking

(a) Each flight crew member shall complete recurrent training and checking relevant to the type or variant of aircraft on which they operate.

(b) Operator proficiency check

(1) Each flight crew member shall complete operator proficiency checks as part of the normal crew complement to demonstrate competence in carrying out normal, abnormal and emergency procedures.

(2) When the flight crew member will be required to operate under IFR, the operator proficiency check shall be conducted without external visual reference, as appropriate.

(3) The validity period of the operator proficiency check shall be six calendar months. For operations under VFR by day of performance class B aeroplanes conducted during seasons not longer than eight consecutive months, one operator proficiency check shall be sufficient. The proficiency check shall be undertaken before commencing commercial air transport operations.

(4) The flight crew member involved in operations by day and over routes navigated by reference to visual landmarks with an other-than-complex motor-powered helicopter may complete the operator proficiency check in only one of the relevant types held. The operator proficiency check shall be performed each time on the type least recently used for the proficiency check. The relevant helicopter types that may be grouped for the purpose of the operator proficiency check shall be contained in the operations manual.

(5) Notwithstanding AOCR.FC.145 (a) (2), for operations of other-than-complex motor-powered helicopters by day and over routes navigated by reference to visual landmarks and performance class B aeroplanes, the check may be conducted by a suitably qualified commander nominated by the operator, trained in CRM concepts and the assessment of CRM skills. The operator shall inform the Authority about the persons nominated.

(c) Line check

(1) Each flight crew member shall complete a line check on the aircraft to demonstrate competence in carrying out normal line
operations described in the operations manual. The validity period of the line check shall be 12 calendar months.

(2) Notwithstanding AOCR.FC.145 (a) (2), line checks may be conducted by a suitably qualified commander nominated by the operator, trained in CRM concepts and the assessment of CRM skills.

(d) Emergency and safety equipment training and checking

Each flight crew member shall complete training and checking on the location and use of all emergency and safety equipment carried. The validity period of an emergency and safety equipment check shall be 12 calendar months.

(e) CRM training

(1) Elements of CRM shall be integrated into all appropriate phases of the recurrent training.

(2) Each flight crew member shall undergo specific modular CRM training. All major topics of CRM training shall be covered by distributing modular training sessions as evenly as possible over each three-year period.

(f) Each flight crew member shall undergo ground training and flight training in an FSTD or an aircraft, or a combination of FSTD and aircraft training, at least every 12 calendar months.

(g) The validity periods mentioned in (b) (3), (c) and (d) shall be counted from the end of the month when the check was taken.

(h) When the training or checks required above are undertaken within the last three months of the validity period, the new validity period shall be counted from the original expiry date.

AMC1 AOCR.FC.230 Recurrent training and checking

RECURRENT TRAINING SYLLABUS

(a) Recurrent training

Recurrent training should comprise the following:

(1) Ground training

(i) The ground training programme should include:
(A) aircraft systems;

(B) operational procedures and requirements including ground de-icing/anti-icing and pilot incapacitation; and

(C) accident/incident and occurrence review.

(ii) Knowledge of the ground training should be verified by a questionnaire or other suitable methods.

(iii) When the ground training is conducted within 3 calendar months prior to the expiry of the 12 calendar months period, the next ground and refresher training should be completed within 12 calendar months of the original expiry date of the previous training.

(2) Emergency and safety equipment training

(i) Emergency and safety equipment training may be combined with emergency and safety equipment checking and should be conducted in an aircraft or a suitable alternative training device.

(ii) Every year the emergency and safety equipment training programme should include the following:

(A) actual donning of a life-jacket, where fitted;

(B) actual donning of protective breathing equipment, where fitted;

(C) actual handling of fire extinguishers of the type used;

(D) instruction on the location and use of all emergency and safety equipment carried on the aircraft;

(E) instruction on the location and use of all types of exits;

(F) security procedures.

(iii) Every 3 years the programme of training should include the following:

(A) actual operation of all types of exits;
(B) demonstration of the method used to operate a slide where fitted;

(C) actual fire-fighting using equipment representative of that carried in the aircraft on an actual or simulated fire except that, with Halon extinguishers, an alternative extinguisher may be used;

(D) the effects of smoke in an enclosed area and actual use of all relevant equipment in a simulated smoke-filled environment;

(E) actual handling of pyrotechnics, real or simulated, where applicable;

(F) demonstration in the use of the life-rafts where fitted. In the case of helicopters involved in extended over water operations, demonstration and use of the life-rafts.

Helicopter water survival training

Where life-rafts are fitted for helicopter extended overwater operations (such as sea pilot transfer, offshore operations, regular, or scheduled, coast-to-coast overwater operations), a comprehensive wet drill to cover all ditching procedures should be practised by aircraft crew. This wet drill should include, as appropriate, practice of the actual donning and inflation of a life-jacket, together with a demonstration or audio-visual presentation of the inflation of life-rafts. Crews should board the same (or similar) life-rafts from the water whilst wearing a life-jacket. Training should include the use of all survival equipment carried on board life-rafts and any additional survival equipment carried separately on board the aircraft;

- consideration should be given to the provision of further specialist training such as underwater escape training. Where operations are predominately conducted offshore, operators should conduct 3-yearly helicopter underwater escape training at an appropriate facility;

- wet practice drill should always be given in initial training unless the crew member
concerned has received similar training provided by another operator;

(G) particularly in the case where no cabin crew is required, first-aid, appropriate to the aircraft type, the kind of operation and crew complement.

(iv) The successful resolution of aircraft emergencies requires interaction between flight crew and cabin/technical crew and emphasis should be placed on the importance of effective coordination and two-way communication between all crew members in various emergency situations.

(v) Emergency and safety equipment training should include joint practice in aircraft evacuations so that all who are involved are aware of the duties other crew members should perform. When such practice is not possible, combined flight crew and cabin/technical crew training should include joint discussion of emergency scenarios.

(vi) Emergency and safety equipment training should, as far as practicable, take place in conjunction with cabin/technical crew undergoing similar training with emphasis on coordinated procedures and two-way communication between the flight crew compartment and the cabin.

(3) CRM

(i) Elements of CRM should be integrated into all appropriate phases of recurrent training.

(ii) A specific modular CRM training programme should be established such that all major topics of CRM training are covered over a period not exceeding 3 years, as follows:

(A) human error and reliability, error chain, error prevention and detection;

(B) operator safety culture, standard operating procedures (SOPs), organisational factors;

(C) stress, stress management, fatigue and vigilance;

(D) information acquisition and processing, situation awareness, workload management;

(E) decision making;
communication and coordination inside and outside the flight crew compartment;

leadership and team behaviour, synergy;

automation and philosophy of the use of automation (if relevant to the type);

specific type-related differences;

case studies;

additional areas which warrant extra attention, as identified by the safety management system.

(iii) Operators should establish procedures to update their CRM recurrent training programme. Revision of the programme should be conducted over a period not exceeding 3 years. The revision of the programme should take into account the de-identified results of the CRM assessments of crews, and information identified by the safety management system.

(4) Aircraft/FSTD training

(i) General

(A) The aircraft/FSTD training programme should be established in a way that all major failures of aircraft systems and associated procedures will have been covered in the preceding 3 year period.

(B) When engine-out manoeuvres are carried out in an aircraft, the engine failure should be simulated.

(C) Aircraft/FSTD training may be combined with the operator proficiency check.

(D) When the aircraft/FSTD training is conducted within 3 calendar months prior to the expiry of the 12 calendar months period, the next aircraft/FSTD training should be completed within 12 calendar months of the original expiry date of the previous training.

(ii) Helicopters

(A) Where a suitable FSTD is available it should be used for the aircraft/FSTD training programme. If
the operator is able to demonstrate, on the basis of a compliance and risk assessment, that using an aircraft for this training provides equivalent standards of training with safety levels similar to those achieved using an FSTD, the aircraft may be used for this training to the extent necessary.

(B) The recurrent training should include the following additional items, which should be completed in an FSTD:

- settling with power and vortex ring;
- loss of tail rotor effectiveness.

(5) For operations with other-than-complex motor-powered aeroplanes, all training and checking should be relevant to the type of operation and class of aeroplane on which the flight crew member operates with due account taken of any specialised equipment used.

(b) Recurrent checking

Recurrent checking should comprise the following:

(1) Operator proficiency checks

(i) Aeroplanes

Where applicable, operator proficiency checks should include the following manoeuvres as pilot flying:

(A) rejected take-off when an FSTD is available to represent that specific aeroplane, otherwise touch drills only;

(B) take-off with engine failure between V1 and V2 (take-off safety speed) or, if carried out in an aeroplane, at a safe speed above V2;

(C) precision instrument approach to minima with, in the case of multi-engine aeroplanes, one-engine-inoperative;

(D) non-precision approach to minima;
missed approach on instruments from minima with, in the case of multi-engined aeroplanes, one-engine-inoperative;

landing with one-engine-inoperative. For single-engine aeroplanes a practice forced landing is required.

(ii) Helicopters

Where applicable, operator proficiency checks should include the following abnormal/emergency procedures:

- engine fire;
- fuselage fire;
- emergency operation of under carriage;
- fuel dumping;
- engine failure and relight;
- hydraulic failure;
- electrical failure;
- engine failure during take-off before decision point;
- engine failure during take-off after decision point;
- engine failure during landing before decision point;
- engine failure during landing after decision point;
- flight and engine control system malfunctions;
- recovery from unusual attitudes;
- landing with one or more engine(s) inoperative;
- instrument meteorological conditions (IMC) autorotation techniques;
(B) For pilots required to engage in IFR operations, proficiency checks include the following additional abnormal/emergency procedures:

- precision instrument approach to minima;
- go-around on instruments from minima with, in the case of multi-engined helicopters, a simulated failure of one engine;
- non-precision approach to minima;
- in the case of multi-engined helicopters, a simulated failure of one engine to be included in either the precision or non-precision approach to minima;
- landing with a simulated failure of one or more engines;
- where appropriate to the helicopter type, approach with flight control system/flight director system malfunctions, flight instrument and navigation equipment failures.

(C) Before a flight crew member without a valid instrument rating is allowed to operate in VMC at night, he/she should be required to undergo a proficiency check at night. Thereafter, each second proficiency check should be conducted at night.

(iii) Once every 12 months the checks prescribed in (b) (1) (ii) (A) may be combined with the proficiency check for revalidation or renewal of the aircraft type rating.

(iv) Operator proficiency checks should be conducted by a type rating examiner (TRE) or a synthetic flight examiner (SFE), as applicable.

(2) Emergency and safety equipment checks. The items to be checked should be those for which training has been carried out in accordance with (a) (2).
(3) Line checks

(i) Line checks should establish the ability to perform satisfactorily a complete line operation including pre-flight and post-flight procedures and use of the equipment provided, as specified in the operations manual. The route chosen should be such as to give adequate representation of the scope of a pilot’s normal operations. When weather conditions preclude a manual landing, an automatic landing is acceptable. The commander, or any pilot who may be required to relieve the commander, should also demonstrate his/her ability to ‘manage’ the operation and take appropriate command decisions.

(ii) The flight crew should be assessed on their CRM skills in accordance with a methodology described in the operations manual. The purpose of such assessment is to:

(A) provide feedback to the crew collectively and individually and serve to identify retraining; and

(B) be used to improve the CRM training system.

(iii) CRM assessment alone should not be used as a reason for a failure of the line check.

(iv) When pilots are assigned duties as pilot flying and pilot monitoring they should be checked in both functions.

(v) Line checks should be conducted by a commander nominated by the operator. The operator should inform the Authority about the persons nominated. The person conducting the line check, who is described in (d) (5) (ii), should occupy an observer’s seat where installed. His/her CRM assessments should solely be based on observations made during the initial briefing, cabin briefing, flight crew compartment briefing and those phases where he/she occupies the observer’s seat.

(A) For aeroplanes, in the case of long haul operations where additional operating flight crew are carried, the person may fulfil the function of a cruise relief pilot and should not occupy either pilot’s seat during take-off, departure, initial cruise, descent, approach and landing.
(vi) Where a pilot is required to operate as pilot flying and pilot monitoring, he/she should be checked on one flight sector as pilot flying and on another flight sector as pilot monitoring. However, where the operator’s procedures require integrated flight preparation, integrated cockpit initialisation and that each pilot performs both flying and monitoring duties on the same sector, then the line check may be performed on a single flight sector.

(4) When the operator proficiency check, line check or emergency and safety equipment check are undertaken within the final 3 calendar months of validity of a previous check, the period of validity of the subsequent check should be counted from the expiry date of the previous check.

(5) In the case of single-pilot operations with helicopters, the recurrent checks referred to in (b) (1), (2) and (3) should be performed in the single-pilot role on a particular helicopter type in an environment representative of the operation.

(c) Flight crew incapacitation training, except single-pilot operations

(1) Procedures should be established to train flight crew to recognise and handle flight crew incapacitation. This training should be conducted every year and can form part of other recurrent training. It should take the form of classroom instruction, discussion, audio-visual presentation or other similar means.

(2) If an FSTD is available for the type of aircraft operated, practical training on flight crew incapacitation should be carried out at intervals not exceeding 3 years.

(d) Personnel providing training and checking

Training and checking should be provided by the following personnel:

(1) ground and refresher training by suitably qualified personnel;

(2) flight training by a flight instructor (FI), type rating instructor (TRI) or class rating instructor (CRI) or, in the case of the FSTD content, a synthetic flight instructor (SFI), providing that the FI, TRI, CRI or SFI satisfies the operator’s experience and knowledge requirements sufficient to instruct on the items specified in paragraphs (a)(1)(i)(A) and (B);

(3) emergency and safety equipment training by suitably qualified personnel;
DEPARTMENT OF CIVIL AVIATION
HELICOPTER SUPPLEMENT TO AIRCRAFT OPERATOR CERTIFICATE REQUIREMENTS

(4) CRM:

(i) integration of CRM elements into all the phases of the recurrent training by all the personnel conducting recurrent training. The operator should ensure that all personnel conducting recurrent training are suitably qualified to integrate elements of CRM into this training;

(ii) modular CRM training by at least one CRM trainer, who may be assisted by experts in order to address specific areas.

(5) recurrent checking by the following personnel:

(i) operator proficiency check by a type rating examiner (TRE), class rating examiner (CRE) or, if the check is conducted in a FSTD, a TRE, CRE or a synthetic flight examiner (SFE), trained in CRM concepts and the assessment of CRM skills.

(ii) emergency and safety equipment checking by suitably qualified personnel.

(e) Use of FSTD

(1) Training and checking provide an opportunity to practice abnormal/emergency procedures that rarely arise in normal operations and should be part of a structured programme of recurrent training. This should be carried out in an FSTD whenever possible.

(2) The line check should be performed in the aircraft. All other training and checking should be performed in an FSTD, or, if it is not reasonably practicable to gain access to such devices, in an aircraft of the same type or in the case of emergency and safety equipment training, in a representative training device. The type of equipment used for training and checking should be representative of the instrumentation, equipment and layout of the aircraft type operated by the flight crew member.

(3) Because of the unacceptable risk when simulating emergencies such as engine failure, icing problems, certain types of engine(s) (e.g. during continued take-off or go-around, total hydraulic failure), or because of environmental considerations associated with some emergencies (e.g. fuel dumping) these emergencies should preferably be covered in an FSTD. If no FSTD is available these emergencies may be covered in the aircraft using a safe airborne simulation, bearing in mind the effect of any subsequent
failure, and the exercise must be preceded by a comprehensive briefing.

**AMC2 AOCR.FC.230  Recurrent training and checking**

**FLIGHT ENGINEERS**

(a) The recurrent training and checking for flight engineers should meet the requirements for pilots and any additional specific duties, omitting those items that do not apply to flight engineers.

(b) Recurrent training and checking for flight engineers should, whenever possible, take place concurrently with a pilot undergoing recurrent training and checking.

(c) The line check should be conducted by a commander or by a flight engineer nominated by the operator, in accordance with national rules, if applicable.

**GM1 AOCR.FC.230  Recurrent training and checking**

**LINE CHECK AND PROFICIENCY TRAINING AND CHECKING**

(a) Line checks, route and aerodrome knowledge and recent experience requirements are intended to ensure the crew member’s ability to operate efficiently under normal conditions, whereas other checks and emergency and safety equipment training are primarily intended to prepare the crew member for abnormal/emergency procedures.

(b) The line check is considered a particularly important factor in the development, maintenance and refinement of high operating standards, and can provide the operator with a valuable indication of the usefulness of his/her training policy and methods. Line checks are a test of a flight crew member’s ability to perform a complete line operation, including pre-flight and post-flight procedures and use of the equipment provided, and an opportunity for an overall assessment of his/her ability to perform the duties required as specified in the operations manual. The line check is not intended to determine knowledge on any particular route.

(c) Proficiency training and checking

When an FSTD is used, the opportunity should be taken, where possible, to use LOFT.
AOCR.FC.235  Pilot qualification to operate in either pilot’s seat

(a) Commanders whose duties require them to operate in either pilot seat and carry out the duties of a co-pilot, or commanders required to conduct training or checking duties, shall complete additional training and checking as specified in the operations manual. The check may be conducted together with the operator proficiency check prescribed in AOCR.FC.230 (b).

(b) The additional training and checking shall include at least the following:

(1) an engine failure during take-off;

(2) a one-engine-inoperative approach and go-around; and

(3) a one-engine-inoperative landing.

(c) In the case of helicopters, commanders shall also complete their proficiency checks from left- and right-hand seats, on alternate proficiency checks, provided that when the type rating proficiency check is combined with the operator proficiency check the commander completes his/her training or checking from the normally occupied seat.

(d) When engine-out manoeuvres are carried out in an aircraft, the engine failure shall be simulated.

(e) When operating in the co-pilot’s seat, the checks required by AOCR.FC.230 for operating in the commander’s seat shall, in addition, be valid and current.

(f) The pilot relieving the commander shall have demonstrated, concurrent with the operator proficiency checks prescribed in AOCR.FC.230(b), practice of drills and procedures that would not, normally, be his/her responsibility. Where the differences between left- and right-hand seats are not significant, practice may be conducted in either seat.

(g) The pilot other than the commander occupying the commander’s seat shall demonstrate practice of drills and procedures, concurrent with the operator proficiency checks prescribed in AOCR.FC.230(b), which are the commander’s responsibility acting as pilot monitoring. Where the differences between left- and right-hand seats are not significant, practice may be conducted in either seat.
SINGLE-ENGINE HELICOPTERS – AUTOROTATIVE LANDING

In the case of single-engined helicopters, the autorotative landing should be carried out from left- and right-hand seats on alternate proficiency checks.

DIFFERENCES BETWEEN LEFT AND RIGHT-HAND SEATS

The differences between left- and right-hand seats may not be significant in cases where, for example, the autopilot is used.

Operation on more than one type or variant

(a) The procedures or operational restrictions for operation on more than one type or variant established in the operations manual and approved by the Authority shall cover:

(1) the flight crew members’ minimum experience level;
(2) the minimum experience level on one type or variant before beginning training for and operation of another type or variant;
(3) the process whereby flight crew qualified on one type or variant will be trained and qualified on another type or variant; and
(4) all applicable recent experience requirements for each type or variant.

(b) When a flight crew member operates both helicopters and aeroplanes, that flight crew member shall be limited to operations on only one type of aeroplane and one type of helicopter.

(c) Point (a) shall not apply to operations of performance class B aeroplane if they are limited to single-pilot classes of reciprocating engine aeroplanes under VFR by day. Point (b) shall not apply to operations of performance class B aeroplane if they are limited to single-pilot classes of reciprocating engine aeroplanes.

Aeroplanes
(1) When a flight crew member operates more than one aeroplane class, type or variant listed in MCAR-FCL and associated procedures for class-single pilot and/or type-single pilot, but not within a single licence endorsement, the operator should ensure that the flight crew member does not operate more than:

(i) three reciprocating engine aeroplane types or variants;
(ii) three turbo-propeller aeroplane types or variants;
(iii) one turbo-propeller aeroplane type or variant and one reciprocating engine aeroplane type or variant; or
(iv) one turbo-propeller aeroplane type or variant and any aeroplane within a particular class.

(2) When a flight crew member operates more than one aeroplane type or variant within one or more licence endorsement as defined by MCAR-FCL and associated procedures, the operator should ensure that:

(i) the minimum flight crew complement specified in the operations manual is the same for each type or variant to be operated;
(ii) the flight crew member does not operate more than two aeroplane types or variants for which a separate licence endorsement is required, unless credits related to the training, checking, and recent experience requirements are defined in data established in accordance with MCAR-PART-21 for the relevant types or variants; and
(iii) only aeroplanes within one licence endorsement are flown in any one flight duty period, unless the operator has established procedures to ensure adequate time for preparation.

(3) When a flight crew member operates more than one aeroplane type or variant listed in MCAR-FCL and associated procedures for type-single pilot and type-multi pilot, but not within a single licence endorsement, the operator should comply with points (a) (2) and (4).

(4) When a flight crew member operates more than one aeroplane type or variant listed in MCAR-FCL and associated procedures for type multi-pilot, but not within a single licence endorsement, or combinations of aeroplane types or variants listed in MCAR-FCL
and associated procedures for class single-pilot and type multi-
pilot, the operator should comply with the following:

(i) point (a) (2);

(ii) before exercising the privileges of more than one
licence endorsement:

(A) flight crew members should have completed
two consecutive operator proficiency checks
and should have:

- 500 hours in the relevant crew position in CAT
operations with the same operator; or

- for IFR and VFR night operations with
performance class B aeroplanes, 100 hours or
flight sectors in the relevant crew position in
CAT operations with the same operator, if at
least one licence endorsement is related to a
class. A check flight should be completed
before the pilot is released for duties as
commander;

(B) in the case of a pilot having experience with an
operator and exercising the privileges of more
than one licence endorsement, and then being
promoted to command with the same operator
on one of those types, the required minimum
experience as commander is 6 months and 300
hours, and the pilot should have completed two
consecutive operator proficiency checks before
again being eligible to exercise more than one
licence endorsement;

(iii) before commencing training for and operation of
another type or variant, flight crew members should
have completed 3 months and 150 hours flying on
the base aeroplane, which should include at least
one proficiency check, unless credits related to the
training, checking and recent experience
requirements are defined in data established in
accordance with MCAR-PART-21 for the relevant
types or variants;

(iv) after completion of the initial line check on the new
type, 50 hours flying or 20 sectors should be
achieved solely on aeroplanes of the new type rating,
unless credits related to the training, checking and recent experience requirements are defined in data established in accordance with MCAR-PART-21 for the relevant types or variants;

(iv) recent experience requirements established in MCAR-PART-FCL for each type operated;

(vi) the period within which line flying experience is required on each type should be specified in the operations manual;

(vii) when credits are defined in data established in accordance with MCAR-PART-21 for the relevant type or variant, this should be reflected in the training required in AOCR.FC.230 and:

(A) AOCR.FC.230 (b) requires two operator proficiency checks every year. When credits are defined in data established in accordance with MCAR-PART-21 for operator proficiency checks to alternate between the types, each operator proficiency check should revalidate the operator proficiency check for the other type(s). The operator proficiency check may be combined with the proficiency checks for revalidation or renewal of the aeroplane type rating or the instrument rating in accordance with MCAR-PART-FCL

(B) AOCR.FC.230 (c) requires one line check every year. When credits are defined in data established in accordance for MCAR-PART-21 for line checks to alternate between types or variants, each line check should revalidate the line check for the other type or variant.

(C) Annual emergency and safety equipment training and checking should cover all requirements for each type.

(b) Helicopters

(1) If a flight crew member operates more than one type or variant the following provisions should be met:

(i) The recency requirements and the requirements for recurrent training and checking should be met and
confirmed prior to CAT operations on any type, and the minimum number of flights on each type within a 3-month period specified in the operations manual.

(ii) OCR.FC.230 requirements with regard to recurrent training.

(iii) When credits related to the training, checking and recent experience requirements are defined in data established in accordance with MCAR-PART-21 for the relevant types or variants, the requirements of AOCR.FC.230 with regard to proficiency checks may be met by a 6 monthly check on any one type or variant operated. However, a proficiency check on each type or variant operated should be completed every 12 months.

(iv) For helicopters with a maximum certified take-off mass (MCTOM) of more than 5 700 kg, or with a maximum operational passenger seating configuration (MOPSC) of more than 19:

(A) the flight crew member should not fly more than two helicopter types, unless credits related to the training, checking and recent experience requirements are defined in data established in accordance with MCAR-PART-21 for the relevant types or variants;

(B) a minimum of 3 months and 150 hours experience on the type or variant should be achieved before the flight crew member should commence the conversion course onto the new type or variant, unless credits related to the training, checking and recent experience requirements are defined in data established in accordance with MCAR-PART-21 for the relevant types or variants;

(C) 28 days and/or 50 hours flying should then be achieved exclusively on the new type or variant, unless credits related to the training, checking and recent experience requirements are defined in data established in accordance with MCAR-PART-21 for the relevant types or variants; and

(D) a 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.

(v) In the case of all other helicopters, the flight crew member should not operate more than three helicopter types or
significantly different variants, unless credits related to the training, checking and recent experience requirements are defined in data established in accordance with MCAR-PART-21 for the relevant types or variants.

(c) Combination of helicopter and aeroplane

(1) The flight crew member may fly one helicopter type or variant and one aeroplane type irrespective of their MCTOM or MOPSC.

(2) If the helicopter type is covered by paragraph (b) (1) (iv) then (b) (1) (iv) (B), (C) and (D) should also apply in this case.

AMC2 AOCR.FC.240 Operation on more than one type or variant

GENERAL

(a) Terminology

The terms used in the context of the operation of more than one type or variant have the following meaning:

(1) Base aircraft means an aircraft used as a reference to compare differences with another aircraft.

(2) Variant means an aircraft or a group of aircraft within the same pilot type rating that has differences to the base aircraft requiring difference training or familiarisation training.

(3) Credit means the recognition of training, checking or recent experience based on commonalities between aircraft. For substantiation of the credits ODR tables or other appropriate documentation for comparison of the relevant aircraft characteristics may be provided.

(4) Operator difference requirements (ODRs) mean a formal description of differences between types or variants flown by a particular operator.

(b) Philosophy

The concept of operating more than one type or variant depends upon the experience, knowledge and ability of the operator and the flight crew concerned. The first consideration is whether or not aircraft types or variants are sufficiently similar to allow the safe operation of both. The second consideration is whether or not the types or variants are sufficiently similar for the training, checking and recent experience. Unless credits have been established by the operational suitability data
in accordance with Civil Aviation Regulations, all training, checking and recent experience requirements should be completed independently for each type or variant.

(c) Methodology – Use of Operator Difference Requirement (ODR) Tables

(1) Before assigning flight crew members to operate more than one type or variant of aircraft, the operator should conduct a detailed evaluation of the differences or similarities of the aircraft concerned in order to establish appropriate procedures or operational restrictions. This evaluation should be based on the data established in accordance with Civil Aviation Regulations for the relevant types or variants, and should be adapted to the operator’s specific aircraft configurations. This evaluation should take into account of the following:

(i) the level of technology;

(ii) operational procedures; and

(iii) handling characteristics.

The methodology described below should be used as a means of evaluating aeroplane differences and similarities to justify the operation of more than one type or variant, and when credit is sought.

(2) ODR tables

Before requiring flight crew members to operate more than one type or variant, operators should first nominate one aircraft as the base aircraft from which to show differences with the second aircraft type or variant, the ‘difference aircraft’, in terms of technology (systems), procedures, pilot handling and aircraft management. These differences, known as operator difference requirements (ODR), preferably presented in tabular format, constitute part of the justification for operating more than one type or variant and also the basis for the associated differences/familiarisation or reduced type rating training for the flight crew.

(3) The ODR tables should be presented as follows:
### GENERAL OPERATOR DIFFERENCES REQUIREMENTS TABLE

<table>
<thead>
<tr>
<th>BASE AIRCRAFT:</th>
<th>TRAINING</th>
<th>CHKG/ CURR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong> Differences</td>
<td>Flt char</td>
<td>Proc chg</td>
</tr>
<tr>
<td><strong>GENERAL</strong> Range ETOPS Certified</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>DIMENSIONS</strong> Configuration per AFM, FCOM</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

### SYSTEM OPERATOR DIFFERENCES REQUIREMENTS TABLE

<table>
<thead>
<tr>
<th>BASE AIRCRAFT:</th>
<th>TRAINING</th>
<th>CHKG/ CURR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System</strong> Differences</td>
<td>Flt char</td>
<td>Proc chg</td>
</tr>
<tr>
<td><strong>21 – AIR CONDITIONING</strong> CONTROLS AND INDICATORS:</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>— Panel layout</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>21 – AIR CONDITIONING</strong> PACKS:</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>— Switch type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>— Automatically controlled</td>
<td></td>
<td></td>
</tr>
<tr>
<td>— Reset switch for both packs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### MANOEUVRE OPERATOR DIFFERENCES REQUIREMENTS TABLE

<table>
<thead>
<tr>
<th>DIFFERENCE AIRCRAFT:</th>
<th>Compliance Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BASE AIRCRAFT:</strong></td>
<td><strong>TRAINING</strong></td>
</tr>
<tr>
<td>Flt char proc chg</td>
<td>A B C D E</td>
</tr>
<tr>
<td>Exterior Preflight</td>
<td>Minor differences</td>
</tr>
<tr>
<td>Preflight</td>
<td>Differences due to systems, ECL</td>
</tr>
<tr>
<td>Normal takeoff</td>
<td>FBW handling vs Conventional; AFDS TAKEOFF: — Autothrottle engagement FMA indications</td>
</tr>
</tbody>
</table>
(4) Compilation of ODR Tables

(i) ODR 1: General

The general characteristics of the candidate aircraft are compared with the base aircraft with regard to:

(A) general dimensions and aircraft design (number and type of rotors, wing span or category);

(B) flight deck general design;

(C) cabin layout;

(D) engines (number, type and position);

(E) limitations (flight envelope).

(ii) ODR 2: Systems

Consideration is given to differences in design between the candidate aircraft and the base aircraft. For this comparison the Air Transport Association (ATA) 100 index is used. This index establishes a system and subsystem classification and then an analysis performed for each index item with respect to the main architectural, functional and operations elements, including controls and indications on the systems control panel.

(iii) ODR 3: Manoeuvres

Operational differences encompass normal, abnormal and emergency situations and include any change in aircraft handling and flight management. It is necessary to establish a list of operational items for consideration on which an analysis of differences can be made. The operational analysis should take the following into account:

(A) flight deck dimensions (size, cut-off angle and pilot eye height);

(B) differences in controls (design, shape, location and function);

(C) additional or altered function (flight controls) in normal or abnormal conditions;
(D) handling qualities (including inertia) in normal and in abnormal configurations;

(E) aircraft performance in specific manoeuvres;

(F) aircraft status following failure;

(G) management (e.g. ECAM, EICAS, navaid selection, automatic checklists).

(iv) Once the differences for ODR 1, ODR 2 and ODR 3 have been established, the consequences of differences evaluated in terms of flight characteristics (FLT CHAR) and change of procedures (PROC CHNG) should be entered into the appropriate columns.

(v) Difference Levels – crew training, checking and currency

(A) The final stage of an operator’s proposal to operate more than one type or variant is to establish crew training, checking and currency requirements. This may be established by applying the coded difference levels from Table 4 to the compliance method column of the ODR Tables.

(B) Differences items identified in the ODR tables as impacting flight characteristics, or procedures, should be analysed in the corresponding ATA section of the ODR manoeuvres. Normal, abnormal and emergency situations should be addressed accordingly.

(d) Difference Levels

(1) Difference levels — General

Difference levels are used to identify the extent of difference between a base and a candidate aircraft with reference to the elements described in the ODR tables. These levels are proportionate to the differences between a base and a candidate aircraft. A range of five difference levels in order of increasing requirements, identified as A through E, are each specified for training, checking, and currency. Difference levels apply when a difference with the potential to affect flight safety exists between a base and a candidate aircraft. Differences may also affect the knowledge, skills, or abilities required from a pilot. If no differences exist, or if differences exist but do not affect flight safety, or if differences exist but do not affect knowledge, skills, or abilities, then difference levels are neither assigned nor...
applicable to pilot qualification. When difference levels apply, each level is based on a scale of differences related to design features, systems, or manoeuvres. In assessing the effects of differences, both flight characteristics and procedures are considered since flight characteristics address handling qualities and performance, while procedures include normal, non-normal and emergency items. Levels for training, checking, and currency are assigned independently, but are linked depending on the differences between a base and candidate aircraft. Training at level E usually identifies that the candidate aircraft is a different type to the base aircraft.

(2) Difference levels are summarised in the table below regarding training, checking, and currency.

<table>
<thead>
<tr>
<th>DIFFERENCE LEVEL</th>
<th>TRAINING</th>
<th>CHECKING</th>
<th>CURRENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Self-instruction</td>
<td>Not applicable or integrated with next proficiency check</td>
<td>Not applicable</td>
</tr>
<tr>
<td>B</td>
<td>Aided instruction</td>
<td>Task or system check</td>
<td>Self-review</td>
</tr>
<tr>
<td>C</td>
<td>System devices</td>
<td>Partial proficiency check using qualified device</td>
<td>Designated system</td>
</tr>
<tr>
<td>D</td>
<td>Manoeuvre Training Devices1 or aircraft to accomplish specific manoeuvres</td>
<td>Partial proficiency check using qualified device1</td>
<td>Designated manoeuvre(s)</td>
</tr>
<tr>
<td>E</td>
<td>FSTDs2 or aircraft</td>
<td>Proficiency check using FSTDs2 or aircraft</td>
<td>As per regulation, using FSTDs2 or aircraft</td>
</tr>
</tbody>
</table>

Footnote (1):
• Aeroplane: FTD Level 2, or FFS, or aeroplane
• Helicopter: FTD Level 2 and 3, or FFS, or helicopter

Footnote (2):
• Aeroplane: FFS Level C or D, or aeroplane
• Helicopter: FSTD’S having dual qualification: FFS Level B and FTD Level 3, or FFS Level C or D, or helicopter Training Levels A and B require familiarisation training, levels C and D require differences training. Training Level E means that differences are such that type rating training is required.

(3) Difference level — Training
The training differences levels specified represent the minimum requirements. Devices associated with a higher difference level may be used to satisfy a training differences requirement.

(i) Level A training

Level A differences training is applicable to aircraft with differences that can adequately be addressed through self-instruction. Level A training represents a knowledge requirement such that once appropriate information is provided, understanding and compliance can be assumed to be demonstrated.

Training needs not covered by level A training may require level B training, or higher, depending on the outcome of the evaluations described in the aircraft evaluation process (CS FCD.420).

(ii) Level B training

Level B differences training is applicable to aircraft with system or procedure differences that can adequately be addressed through aided instruction.

At level B aided instruction it is appropriate to ensure pilot understanding, emphasise issues, provide a standardised method of presentation of material, or to aid retention of material following training.

(iii) Level C training

Level C differences training can only be accomplished through the use of devices capable of systems training.

Level C differences training is applicable to variants having ‘part task’ differences that affect skills or abilities as well as knowledge. Training objectives focus on mastering individual systems, procedures, or tasks, as opposed to performing highly integrated flight operations and manoeuvres in ‘real time’. Level C may also require self-instruction or aided instruction of a pilot, but cannot be adequately addressed by a knowledge requirement alone. Training devices are required to supplement instruction to ensure attainment or retention of pilot skills and abilities to accomplish the more complex tasks, usually related to operation of particular aircraft systems.

The minimum acceptable training media for level C is interactive computer-based training, cockpit systems simulators, cockpit procedure trainers, part task trainers [such as Inertial Navigation
(iv) **Level D training**

Level D differences training can only be accomplished with devices capable of performing flight manoeuvres and addressing full task differences affecting knowledge, skills, or abilities.

Devices capable of flight manoeuvres address full task performance in a dynamic ‘real time’ environment and enable integration of knowledge, skills and abilities in a simulated flight environment, involving combinations of operationally oriented tasks and realistic task loading for each relevant phase of flight. At level D, knowledge and skills to complete necessary normal, non-normal and emergency procedures are fully addressed for each variant.

Level D differences training requires mastery of interrelated skills that cannot be adequately addressed by separate acquisition of a series of knowledge areas or skills that are interrelated. However, the differences are not so significant, that a full type rating training course is required. If demonstration of interrelationships between the systems was important, the use of a series of separate devices for systems training would not suffice. Training for level D differences requires a training device that has accurate, high fidelity integration of systems and controls and realistic instrument indications. Level D training may also require manoeuvre visual cues, motion cues, dynamics, control loading or specific environmental conditions. Weather phenomena such as low visibility operations or wind shear may or may not be incorporated. Where simplified or generic characteristics of an aircraft type are used in devices to satisfy level D difference training, significant negative training cannot occur as a result of the simplification.

Appropriate devices as described in CS FCD.420 (a), satisfying level D differences training range from those where relevant elements of aircraft flight manoeuvring, performance, and handling qualities are incorporated. The use of a Manoeuvre Training Device or aircraft is limited for the conduct of specific manoeuvres or handling differences, or for specific equipment or procedures.

(v) **Level E training**

Level E differences training is applicable to candidate aircraft having such a significant ‘full task’ differences that a full type
rating training course or a type rating training course with credit for previous experience on similar aircraft types is required to meet the training objectives.

The training requires a ‘high fidelity’ environment to attain or maintain knowledge, skills, or abilities that can only be satisfied by the use of FSTDs or the aircraft itself as mentioned in CS FCD.415 (a). Level E training, if done in an aircraft, should be modified for safety reasons where manoeuvres can result in a high degree of risk.

When level E differences training is assigned, suitable credit or constraints may be applied for knowledge, skills or abilities related to other pertinent aircraft types and specifies the relevant subjects, procedures or manoeuvres.

(4) Difference level — Checking

Differences checking addresses any pertinent pilot testing or checking. Initial and recurrent checking levels are the same unless otherwise specified.

It may be possible to satisfactorily accomplish recurrent checking objectives in devices not meeting initial checking requirements. In such instances the applicant may propose for revalidation checks the use of certain devices not meeting the initial check requirements.

(i) Level A checking

Level A differences checking indicates that no check related to differences is required at the time of differences training. However, a pilot is responsible for knowledge of each variant flown.

(ii) Level B checking

Level B differences checking indicates that a ‘task’ or ‘systems’ check is required following initial and recurring training.

(iii) Level C checking

Level C differences checking requires a partial check using a suitable qualified device. A partial check is conducted relative to particular manoeuvres or systems.

(iv) Level D checking
Level D differences checking indicates that a partial proficiency check is required following both initial and recurrent training. In conducting the partial proficiency check, manoeuvres common to each variant may be credited and need not be repeated. The partial proficiency check covers the specified particular manoeuvres, systems, or devices. Level D checking is performed using scenarios representing a ‘real time’ flight environment and uses qualified devices permitted for level D training or higher.

(v) Level E checking

Level E differences checking requires that a full proficiency check be conducted in FSTDs or in an aircraft as mentioned in CS FCD.415(a), following both initial and recurrent training. If appropriate, alternating Level E checking between relevant aircraft is possible and credit may be defined for procedures or manoeuvres based on commonality.

Assignment of level E checking requirements alone, or in conjunction with level E currency, does not necessarily result in assignment of a separate type rating.

(5) Difference level — Currency

Differences currency addresses any currency and re-currency levels. Initial and recurrent currency levels are the same unless otherwise specified.

(i) Level A currency

Level A currency is common to each aircraft and does not require separate tracking. Maintenance of currency in any aircraft suffices for any other variant within the same type rating.

(ii) Level B currency

Level B currency is ‘knowledge-related’ currency, typically achieved through self-review by individual pilots.

(iii) Level C currency

(A) Level C currency is applicable to one or more designated systems or procedures, and relates to both skill and knowledge requirements. When level C currency applies, any pertinent lower level currency is also to be addressed.

(B) Re-establishing level C currency
When currency is lost, it may be re-established by completing required items using a device equal to or higher than that specified for level C training and checking.

(iv) Level D currency

(A) Level D currency is related to designated manoeuvres and addresses knowledge and skills required for performing aircraft control tasks in real time with integrated use of associated systems and procedures. Level D currency may also address certain differences in flight characteristics including performance of any required manoeuvres and related normal, non-normal and emergency procedures. When level D is necessary, any pertinent lower level currency is also to be addressed.

(B) Re-establishing level D currency

When currency is lost, currency may be re-established by completing pertinent manoeuvres using a device equal to or higher than that specified for level D differences training and checking.

(v) Level E currency

(A) Level E currency requires that recent experience requirements of Part-FCL and operational requirements be complied with in each aircraft separately. Level E currency may also specify other system, procedure, or manoeuvre currency item(s) necessary for safe operations, and requires procedures or manoeuvres to be accomplished in FSTDs or in an aircraft as mentioned in CS FCD.415(a). Provisions are applied in a way which addresses the required system or manoeuvre experience.

When level E is assigned between aircraft of common characteristics, credit may be permitted. Assignment of level E currency requirements does not automatically lead to a determination on same or separate type rating. Level E currency is tracked by a means that is acceptable to the Authority.

When CTLC is permitted, any credit or constraints applicable to using FSTDs, as mentioned in CS FCD.415(a), are also to be determined.

(B) Re-establishing level E currency
When currency is lost, currency may be re-established by completing pertinent manoeuvres using a device specified for level E differences training and checking.

(6) Competency regarding non-normal and emergency procedures — Currency

Competency for non-normal and emergency manoeuvres or procedures is generally addressed by checking requirements. Particular non-normal and emergency manoeuvres or procedures may not be considered mandatory for checking or training. In this situation it may be necessary to periodically practice or demonstrate those manoeuvres or procedures specifying currency requirements for those manoeuvres or procedures.

AOCR.FC.A.245 Alternative training and qualification programme

(a) The aeroplane operator having appropriate experience may substitute one or more of the following training and checking requirements for flight crew by an alternative training and qualification programme (ATQP), approved by the Authority:

(1) SPA.LVO.120 on flight crew training and qualifications;
(2) conversion training and checking;
(3) differences training and familiarisation training course;
(4) recurrent training and checking; and
(5) operation on more than one type or variant.

(b) The ATQP shall contain training and checking that establishes and maintains at least an equivalent level of proficiency achieved by complying with the provisions of AOCR.FC.220 and AOCR.FC.230. The level of flight crew training and qualification proficiency shall be demonstrated prior to being granted the ATQP approval by the Authority.

(c) The operator applying for an ATQP approval shall provide the Authority with an implementation plan, including a description of the level of flight crew training and qualification proficiency to be achieved.

(d) In addition to the checks required by AOCR.FC.230 and MCAR-PART FCL.060, each flight crew member shall complete a line oriented evaluation (LOE) conducted in an FSTD. The validity period of an LOE shall be 12 calendar months. The validity period shall be counted from the end of the month when the check was taken. When the LOE is
undertaken within the last three months of the validity period, the new validity period shall be counted from the original expiry date.

(e) After two years of operating with an approved ATQP, the operator may, with the approval of the Authority, extend the validity periods of the checks in AOCR.FC.230 as follows:

1. Operator proficiency check to 12 calendar months. The validity period shall be counted from the end of the month when the check was taken. When the check is undertaken within the last three months of the validity period, the new validity period shall be counted from the original expiry date.

2. Line check to 24 calendar months. The validity period shall be counted from the end of the month when the check was taken. When the check is undertaken within the last six months of the validity period, the new validity period shall be counted from the original expiry date.

3. Emergency and safety equipment checking to 24 calendar months. The validity period shall be counted from the end of the month when the check was taken. When the check is undertaken within the last six months of the validity period, the new validity period shall be counted from the original expiry date.

AMC1 AOCR.FC.A.245 Alternative training and qualification programme

COMPONENTS AND IMPLEMENTATION

(a) Alternative training and qualification programme (ATQP) components

The ATQP should comprise the following:

1. Documentation that details the scope and requirements of the programme, including the following:

   (i) 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 standards prescribed in AOCR.FC and AOCR.SPA.LVO.

   (ii) The operator’s training needs and established operational and training objectives.

   (iii) A description of the process for designing and gaining approval for the operator’s flight crew qualification programmes. This should include quantified operational
and training objectives identified by the operator’s internal monitoring programmes. External sources may also be used.

(iv) A description of how the programme will:

(A) enhance safety;

(B) improve training and qualification standards of flight crew;

(C) establish attainable training objectives;

(D) integrate CRM in all aspects of training;

(E) develop a support and feedback process to form a self-correcting training system;

(F) institute a system of progressive evaluations of all training to enable consistent and uniform monitoring of the training undertaken by flight crew;

(G) enable the operator to be able to respond to new aeroplane technologies and changes in the operational environment;

(H) foster the use of innovative training methods and technology for flight crew instruction and the evaluation of training systems; and

(I) make efficient use of training resources, specifically to match the use of training media to the training needs.

(2) A task analysis to determine the:

(i) knowledge;

(ii) required skills;

(iii) associated skill-based training; and

(iv) validated behavioural markers, where appropriate.

For each aeroplane type/class to be included within the ATQP the operator should establish a systematic review that determines and defines the various tasks to be undertaken by the flight crew when operating that type/class. Data from other types/classes may also be used. The analysis should determine and describe
the knowledge and skills required to complete the various tasks specific to the aeroplane type/class and/or type of operation. In addition, the analysis should identify the appropriate behavioural markers that should be exhibited. The task analysis should be suitably validated in accordance with (b) (3). The task analysis, in conjunction with the data gathering programme(s) permits the operator to establish a programme of targeted training together with the associated training objectives.

(3) Curricula. The curriculum structure and content should be determined by task analysis, and should include proficiency objectives including when and how these objectives should be met.

(i) The training programme should have the following structure:

(A) Curriculum, specifying the following elements:

(a) Entry requirements: A list of topics and content, describing what training level will be required before start or continuation of training.

(b) Topics: A description of what will be trained during the lesson.

(c) Targets/Objectives

(1) Specific target or set of targets that have to be reached and fulfilled before the training course can be continued.

(2) Each specified target should have an associated objective that is identifiable both by the flight crew and the trainers.

(3) Each qualification event that is required by the programme should specify the training that is required to be undertaken and the required standard to be achieved.

(B) Daily lesson plan

(a) Each lesson/course/training or qualification event should have the same basic structure.
The topics related to the lesson should be listed and the lesson targets should be unambiguous.

(b) Each lesson/course or training event whether classroom, CBT or simulator should specify the required topics with the relevant targets to be achieved.

(4) A specific training programme for:

(i) each aeroplane type/class within the ATQP;

(ii) instructors (class rating instructor rating/synthetic flight instructor authorisation/type rating instructor rating — CRI/SFI/TRI), and other personnel undertaking flight crew instruction; and

(iii) examiners (class rating examiner/synthetic flight examiner/type rating examiner — CRE/SFE/TRE).

This should include a method for the standardisation of instructors and examiners.

Personnel who perform training and checking of flight crew in an operator’s ATQP should receive the following additional training on:

(A) ATQP principles and goals;

(B) knowledge/skills/behaviour as learned from task analysis;

(C) line oriented evaluation (LOE)/ LOFT scenarios to include triggers / markers / event sets / observable behaviour;

(D) qualification standards;

(E) harmonisation of assessment standards;

(F) behavioural markers and the systemic assessment of CRM;

(G) event sets and the corresponding desired knowledge/skills and behaviour of the flight crew;
(H) the processes that the operator has implemented to validate the training and qualification standards and the instructors part in the ATQP quality control; and

(I) line oriented quality evaluation (LOQE).

(5) A feedback loop for the purpose of curriculum validation and refinement, and to ascertain that the programme meets its proficiency objectives.

(i) The feedback should be used as a tool to validate that the curricula are implemented as specified by the ATQP; this enables substantiation of the curriculum, and that proficiency and training objectives have been met. The feedback loop should include data from operations flight data monitoring, the advanced flight data monitoring (FDM) programme and LOE/LOQE programmes. In addition, the evaluation process should describe whether the overall targets/objectives of training are being achieved and should prescribe any corrective action that needs to be undertaken.

(ii) The programme’s established quality control mechanisms should at least review the following:

(A) procedures for approval of recurrent training;
(B) ATQP instructor training approvals;
(C) approval of event set(s) for LOE/LOFT;
(D) procedures for conducting LOE and LOQE.

(6) A method for the assessment of flight crew during conversion and recurrent training and checking. The assessment process should include event-based assessment as part of the LOE. The assessment method should comply with AOCR.FC.230.

(i) The qualification and checking programmes should include at least the following elements:

(A) a specified structure;
(B) elements to be tested/examined;
(C) targets and/or standards to be attained;
(D) the specified technical and procedural knowledge and skills, and behavioural markers to be exhibited.

(ii) An LOE event should comprise tasks and sub-tasks performed by the crew under a specified set of conditions. Each event has one or more specific training targets/objectives, which require the performance of a specific manoeuvre, the application of procedures, or the opportunity to practise cognitive, communication or other complex skills. For each event the proficiency that is required to be achieved should be established. Each event should include a range of circumstances under which the crews’ performance is to be measured and evaluated. The conditions pertaining to each event should also be established and they may include the prevailing meteorological conditions (ceiling, visibility, wind, turbulence etc.), the operational environment (navigation aid inoperable etc.), and the operational contingencies (non-normal operation etc.).

(iii) The markers specified under the operator’s ATQP should form one of the core elements in determining the required qualification standard. A typical set of markers is shown in the table below:

<table>
<thead>
<tr>
<th>EVENT</th>
<th>MARKER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness of Aeroplane Systems:</td>
<td>1. Monitors and reports changes in automation status</td>
</tr>
<tr>
<td></td>
<td>2. Applies closed loop principle in all relevant situations</td>
</tr>
<tr>
<td></td>
<td>3. Uses all channels for updates</td>
</tr>
<tr>
<td></td>
<td>4. Is aware of remaining technical resources</td>
</tr>
</tbody>
</table>

(iv) The topics / targets integrated into the curriculum should be measurable and progression on any training/course is only allowed if the targets are fulfilled.

(7) A data monitoring/analysis programme consisting of the following:

(i) A flight data monitoring (FDM) programme as described in AMC1 AOCR.AOC.130. Data collection should reach a minimum of 60% of all relevant flights conducted by the operator before ATQP approval is granted. This proportion may be increased as determined by the competent authority.
(ii) An advanced FDM when an extension to the ATQP is requested: an advanced FDM programme is determined by the level of integration with other safety initiatives implemented by the operator, such as the operator’s safety management system. The programme should include both systematic evaluations of data from an FDM programme and flight crew training events for the relevant crews. Data collection should reach a minimum of 80% of all relevant flights and training conducted by the operator. This proportion may be varied as determined by the Authority.

The purpose of an FDM or advanced FDM programme for ATQP is to enable the operator to:

(A) provide data to support the programme’s implementation and justify any changes to the ATQP;

(B) establish operational and training objectives based upon an analysis of the operational environment; and

(C) monitor the effectiveness of flight crew training and qualification.

(iii) Data gathering: the data analysis should be made available to the person responsible for ATQP within the organisation. The data gathered should:

(A) include all fleets that are planned to be operated under the ATQP;

(B) include all crews trained and qualified under the ATQP;

(C) be established during the implementation phase of ATQP; and

(D) continue throughout the life of the ATQP.

(iv) Data handling: the operator should establish a procedure to ensure the confidentiality of individual flight crew members, as described by AMC1 AOCR.AOC.130.

(v) The operator that has a flight data monitoring programme prior to the proposed introduction of ATQP may use relevant data from other fleets not part of the proposed ATQP.
(b) Implementation. The operator should develop an evaluation and implementation process including the following stages:

(1) A safety case that demonstrates equivalency of:

(i) the revised training and qualification standards compared to the standards of AOGR.FC and/or SPA.LVO prior to the introduction of ATQP; and

(ii) any new training methods implemented as part of ATQP.

The safety case should encompass each phase of implementation of the programme and be applicable over the lifetime of the programme that is to be overseen. The safety case should:

- demonstrate the required level of safety;
- ensure the required safety is maintained throughout the lifetime of the programme; and
- minimise risk during all phases of the programme’s implementation and operation.

The elements of a safety case include:

- planning: integrated and planned with the operation (ATQP) that is to be justified;
- criteria;
- safety-related documentation including a safety checklist;
- programme of implementation to include controls and validity checks; and
- oversight, including review and audits.

Criteria for the establishment of a safety case. The safety case should:

- be able to demonstrate that the required or equivalent level of safety is maintained throughout all phases of the programme;
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- be valid to the application and the proposed operation;
- be adequately safe and ensure the required regulatory safety standards or approved equivalent safety standards are achieved;
- be applicable over the entire lifetime of the programme;
- demonstrate completeness and credibility of the programme;
- be fully documented;
- ensure integrity of the operation and the maintenance of the operations and training infrastructure;
- ensure robustness to system change;
- address the impact of technological advance, obsolescence and change; and
- address the impact of regulatory change.

(2) A task analysis as required by (a) (2) to establish the operator’s programme of targeted training and the associated training objectives.

(3) A period of operation whilst data is collected and analysed to validate the safety case and task analysis. During this period the operator should continue to operate in accordance with AOCR.FC and/or SPA.LVO, as applicable. The length of this period should be determined by the Authority.

GM1 AOCR.FC.A.245 Alternative training and qualification programme

TERMINOLOGY

(a) ‘Line oriented evaluation (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.

(b) ‘Line oriented quality evaluation (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.

c) ‘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.

d) Event-based assessment’ 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.

e) Safety case means a documented body of evidence that provides a demonstrable and valid justification that the ATQP is adequately safe for the given type of operation.

**AMC1 AOCR.FC.A.245 (a) Alternative training and qualification programme**

**OPERATOR EXPERIENCE**

The appropriate experience should be at least 2 years’ continuous operation.

**AMC1 AOCR.FC.A.245 (d) (e) (2) Alternative training and qualification programme**

**COMBINATION OF CHECKS**

(a) The line orientated evaluation (LOE) may be undertaken with other ATQP training.

(b) The line check may be combined with a line oriented quality evaluation (LOQE).

**AOCR.FC.A.250 Commanders holding a CPL (A)**

(a) The holder of a CPL (A) (aeroplane) shall only act as commander in commercial air transport on a single-pilot aeroplane if:

(1) when carrying passengers under VFR outside a radius of 50 NM (90 km) from an aerodrome of departure, he/she has a
minimum of 500 hours of flight time on aeroplanes or holds a valid instrument rating; or

(2) when operating on a multi-engine type under IFR, he/she has a minimum of 700 hours of flight time on aeroplanes, including 400 hours as pilot-in-command. These hours shall include 100 hours under IFR and 40 hours in multi-engine operations. The 400 hours as pilot-in-command may be substituted by hours operating as co-pilot within an established multi-pilot crew system prescribed in the operations manual, on the basis of two hours of flight time as co-pilot for one hour of flight time as pilot-in-command.

(b) For operations under VFR by day of performance class B aeroplanes (a) (1) shall not apply.

**AOCR.FC.H.250 Commanders holding a CPL (H)**

(a) The holder of a CPL (H) (helicopter) shall only act as commander in commercial air transport on a single-pilot helicopter if:

(1) when operating under IFR, he/she has a minimum of 700 hours total flight time on helicopters, including 300 hours as pilot-in-command. These hours shall include 100 hours under IFR. The 300 hours as pilot-in-command may be substituted by hours operating as co-pilot within an established multi-pilot crew system prescribed in the operations manual on the basis of two hours of flight time as co-pilot for one hour flight time as pilot-in-command;

(2) when operating under visual meteorological conditions (VMC) at night, he/she has:

(i) a valid instrument rating; or

(ii) 300 hours of flight time on helicopters, including 100 hours as pilot-in-command and 10 hours as pilot flying at night.
B TECHNICAL CREW IN HEMS, HHO OR NVIS OPERATIONS

AOCR.TC.100 Scope

This part establishes the requirements to be met by the operator when operating an aircraft with technical crew members in commercial air transport helicopter emergency medical service (HEMS), night vision imaging system (NVIS) operations or helicopter hoist operations (HHO).

AOCR.TC.105 Conditions for assignment to duties

(a) Technical crew members in commercial air transport HEMS, HHO or NVIS operations shall only be assigned duties if they:

1. are at least 18 years of age;
2. are physically and mentally fit to safely discharge assigned duties and responsibilities;
3. have completed all applicable training required by this Subpart to perform the assigned duties;
4. have been checked as proficient to perform all assigned duties in accordance with the procedures specified in the operations manual.

(b) Before assigning to duties technical crew members who are self-employed and/or working on a freelance or part-time basis, the operator shall verify that all applicable requirements of this Subpart are complied with, taking into account all services rendered by the technical crew member to other operator(s) to determine in particular:

1. the total number of aircraft types and variants operated;
2. the applicable flight and duty time limitations and rest requirements.

GM1 AOCR.TC.105 Conditions for assignment to duties

GENERAL

(a) The technical crew member in HEMS, HHO or NVIS operations should undergo an initial medical examination or assessment and, if applicable, a re-assessment before undertaking duties.

(b) Any medical assessment or re-assessment should be carried out according to best aero-medical practice by a medical practitioner who has sufficient detailed knowledge of the applicant’s medical history.
(c) The operator should maintain a record of medical fitness for each technical crew member.

(d) Technical crew members should:

1. be in good health;
2. be free from any physical or mental illness that might lead to incapacitation or inability to perform crew duties;
3. have normal cardio-respiratory function;
4. have normal central nervous system;
5. have adequate visual acuity 6/9 with or without glasses;
6. have adequate hearing; and
7. have normal function of ear, nose and throat.

AOCR.TC.110 Training and checking

(a) The operator shall establish a training programme in accordance with the applicable requirements of this Subpart to cover the duties and responsibilities to be performed by technical crew members.

(b) Following the completion of initial, operator conversion, differences and recurrent training, each technical crew member shall undergo a check to demonstrate their proficiency in carrying out normal and emergency procedures.

(c) Training and checking shall be conducted for each training course by personnel suitably qualified and experienced in the subject to be covered. The operator shall inform the Authority about the personnel conducting the checks.

AMC1 AOCR.TC.110 Training and checking

GENERAL

(a) Elements of training that require individual practice may be combined with practical checks.

(b) The checks should be accomplished by the method appropriate to the type of training including:

1. practical demonstration;
(2) computer-based assessment;

(3) in-flight checks; and/or

(4) oral or written tests.

AOCR.TC.115 Initial training

Before undertaking the operator conversion training, each technical crew member shall complete initial training, including:

(a) general theoretical knowledge on aviation and aviation regulations covering all elements relevant to the duties and responsibilities required of technical crew;

(b) fire and smoke training;

(c) survival training on ground and in water, appropriate to the type and area of operation;

(d) aero-medical aspects and first-aid;

(e) communication and relevant CRM elements of AOCR.FC.115 and AOCR.FC.215.

AMC1 ORO.TC.115 Initial training

ELEMENTS

(a) The elements of initial training mentioned in ORO.TC.115 should include in particular:

(1) General theoretical knowledge on aviation and aviation regulations relevant to duties and responsibilities:

   (i) the importance of crew members performing their duties in accordance with the operations manual;

   (ii) continuing competence and fitness to operate as a crew member with special regard to flight and duty time limitations and rest requirements;

   (iii) an awareness of the aviation regulations relating to crew members and the role of the competent and inspecting authority;
(iv) general knowledge of relevant aviation terminology, theory of flight, passenger distribution, meteorology and areas of operation;

(v) pre-flight briefing of the crew members and the provision of necessary safety information with regard to their specific duties;

(vi) the importance of ensuring that relevant documents and manuals are kept up-to-date with amendments provided by the operator;

(vii) the importance of identifying when crew members have the authority and responsibility to initiate an evacuation and other emergency procedures; and

(viii) the importance of safety duties and responsibilities and the need to respond promptly and effectively to emergency situations.

(2) Fire and smoke training:

(i) reactions to emergencies involving fire and smoke and identification of the fire sources;

(ii) the classification of fires and the appropriate type and techniques of application of extinguishing agents, the consequences of misapplication, and of use in a confined space; and

(iii) the general procedures of ground-based emergency services at aerodromes.

(3) When conducting extended overwater operations, water survival training, including the use of personal flotation equipment.

(4) Before first operating on an aircraft fitted with life rafts or other similar equipment, training on the use of this equipment, including practice in water.

(5) Survival training appropriate to the areas of operation, (e.g. polar, desert, jungle, sea or mountain).

(6) Aero-medical aspects and first aid, including:

(i) instruction on first aid and the use of first-aid kits; and

(ii) the physiological effects of flying.
Effective communication between technical crew members and flight crew members including common language and terminology.

Relevant CRM elements of AMC1 and AMC1.1 ORO.FC.115&.215.

AOCR.TC.120  Operator conversion training

Each technical crew member shall complete:

(a) operator conversion training, including relevant CRM elements,

(1) before being first assigned by the operator as a technical crew member; or

(2) when changing to a different aircraft type or class, if any of the equipment or procedures mentioned in (b) are different.

(b) Operator conversion training shall include:

(1) the location and use of all safety and survival equipment carried on the aircraft;

(2) all normal and emergency procedures;

(3) on-board equipment used to carry out duties in the aircraft or on the ground for the purpose of assisting the pilot during HEMS, HHO or NVIS operations.

AMC1 AOCR.TC.120&.125  Operator conversion training and differences training

ELEMENTS

(a) Operator conversion training mentioned in AOCR.TC.120 (b) and differences training mentioned in AOCR.TC.125 (a) should include the following:

(1) Fire and smoke training, including practical training in the use of all firefighting equipment as well as protective clothing representative of that carried in the aircraft. Each technical crew member should:

(i) extinguish a fire characteristic of an aircraft interior fire except that, in the case of Halon extinguishers, an alternative extinguishing agent may be used; and
(ii) practise the donning and use of protective breathing equipment (when fitted) in an enclosed, simulated smoke-filled environment.

(2) Practical training on operating and opening all normal and emergency exits for passenger evacuation in an aircraft or representative training device and demonstration of the operation of all other exits.

(3) Evacuation procedures and other emergency situations, including:

(i) recognition of planned or unplanned evacuations on land or water - this training should include recognition of unusable exits or unserviceable evacuation equipment;

(ii) in-flight fire and identification of fire source; and

(iii) other in-flight emergencies.

(4) When the flight crew is more than one, training on assisting if a pilot becomes

(i) the pilot’s seat mechanism;

(ii) fastening and unfastening the pilot’s seat restraint system;

(iii) use of the pilot’s oxygen equipment, when applicable; and

(iv) use of pilots’ checklists.

(5) Training on, and demonstration of, the location and use of safety equipment including the following:

(i) life-rafts, including the equipment attached to, and/or carried in, the raft, where applicable;

(ii) life-jackets, infant life-jackets and flotation devices, where applicable;

(iii) fire extinguishers;

(iv) crash axe or crow bar;

(v) emergency lights including portable lights;

(vi) communication equipment, including megaphones;
survival packs, including their contents;

(viii) pyrotechnics (actual or representative devices);

(ix) first-aid kits, their contents and emergency medical equipment; and

(x) other safety equipment or systems, where applicable.

(6) Training on passenger briefing/safety demonstrations and preparation of passengers for normal and emergency situations.

(7) Training on the use of dangerous goods, if applicable.

(8) Task-specific training.

**AMC2 AOCR.TC.120&.125 Operator conversion training and differences training**

**GENERAL**

(a) The operator should determine the content of the conversion or differences training taking account of the technical crew member’s previous training as documented in the technical crew member’s training records.

(b) Aircraft conversion or differences training should be conducted according to a syllabus and include the use of relevant equipment and emergency procedures and practice on a representative training device or on the actual aircraft.

(c) The operator should specify in the operations manual the maximum number of types or variants that can be operated by a technical crew member.

**AOCR.TC.125 Differences training**

(a) Each technical crew member shall complete differences training when changing equipment or procedures on types or variants currently operated.

(b) The operator shall specify in the operations manual when such differences training is required.
Familiarisation flights

Following completion of the operator conversion training, each technical crew member shall undertake familiarisation flights prior to operating as a required technical crew member in HEMS, HHO or NVIS operations.

Recurrent training

(a) Within every 12-month period, each technical crew member shall undergo recurrent training relevant to the type or class of aircraft and equipment that the technical crew member operates. Elements of CRM shall be integrated into all appropriate phases of the recurrent training.

(b) Recurrent training shall include theoretical and practical instruction and practice.

ELEMENTS

(a) The 12-month period mentioned in AOCR.TC.135 (a) should be counted from the last day of the month when the first checking was made. Further training and checking should be undertaken within the last 3 calendar months of that period. The new 12-month period should be counted from the original expiry date.

(b) The recurrent practical training should include every year:

1. emergency procedures including pilot incapacitation;
2. evacuation procedures;
3. touch-drills by each technical crew member for opening normal and emergency exits for (passenger) evacuation;
4. the location and handling of emergency equipment and the donning by each technical crew member of life-jackets and protective breathing equipment (PBE), when applicable;
5. first aid and the contents of the first-aid kit(s);
6. stowage of articles in the cabin;
7. use of dangerous goods, if applicable;
8. incident and accident review; and
crew resource management: all major topics of the initial CRM training should be covered over a period not exceeding 3 years.

(c) Recurrent training should include every 3 years:

(1) practical training on operating and opening all normal and emergency exits for passenger evacuation in an aircraft or representative training device and demonstration of the operation of all other exits;

(2) practical training in the use of all firefighting equipment as well as protective clothing representative of that carried in the aircraft.

Each technical crew member should:

(i) extinguish a fire characteristic of an aircraft interior fire except that, in the case of Halon extinguishers, an alternative extinguishing agent may be used; and

(ii) practise the donning and use of protective breathing equipment (when fitted) in an enclosed, simulated smoke-filled environment;

(3) use of pyrotechnics (actual or representative devices); and

(4) demonstration of the use of the life-raft, where fitted.

AOCR.TC.140 Refresher training

(a) Each technical crew member who has not undertaken duties in the previous six months shall complete the refresher training specified in the operations manual.

(b) The technical crew member who has not performed flying duties on one particular aircraft type or class during the preceding six months shall, before being assigned on that type or class, complete either:

(1) refresher training on the type or class; or

(2) two familiarisation sectors on the aircraft type or class.

AMC1 AOCR.TC.140 Refresher training

ELEMENTS

(a) Refresher training may include familiarisation flights.

(b) Refresher training should include at least the following:
(1) emergency procedures, including pilot incapacitation;

(2) evacuation procedures;

(3) practical training on operating and opening all normal and emergency exits for passenger evacuation in an aircraft or representative training device and demonstration of the operation of all other exits; and

(4) the location and handling of emergency equipment, and the donning of life-jackets and protective breathing equipment, when applicable.
AOCR.GEN.MPA.100  Crew responsibilities

(a)  The crew member shall be responsible for the proper execution of his/her duties that are:

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

(2) specified in the instructions and procedures in the operations manual.

(b)  The crew member shall:

(1) report to the commander any fault, failure, malfunction or defect which the crew member believes may affect the airworthiness or safe operation of the aircraft including emergency systems, if not already reported by another crew member;

(2) report to the commander any incident that endangered, or could have endangered, the safety of the operation, if not already reported by another crew member;

(3) comply with the relevant requirements of the operator’s occurrence reporting schemes;

(4) comply with all flight and duty time limitations (FTL) and rest requirements applicable to their activities;

(5) when undertaking duties for more than one operator:

   (i) maintain his/her individual records regarding flight and duty times and rest periods as referred to in applicable FTL requirements; and

   (ii) provide each operator with the data needed to schedule activities in accordance with the applicable FTL requirements.

(c)  The crew member shall not perform duties on an aircraft:

(1) when under the influence of psychoactive substances or alcohol or when unfit due to injury, fatigue, medication, sickness or other similar causes;
(2) until a reasonable time period has elapsed after deep water diving or following blood donation;

(3) if applicable medical requirements are not fulfilled;

(4) if he/she is in any doubt of being able to accomplish his/her assigned duties; or

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

**AMC1 AOCR.GEN.MPA.100 (b) Crew responsibilities**

**COPIES OF REPORTS**

Where a written report is required, a copy of the report should be communicated to the commander concerned, unless the terms of the operator’s reporting schemes prevent this.

**AMC1 AOCR.GEN.MPA.100(c) (1) Crew responsibilities**

**ALCOHOL CONSUMPTION**

The operator should issue instructions concerning the consumption of alcohol by crew members. The instructions should be not less restrictive than the following:

(a) no alcohol should be consumed less than 8 hours prior to the specified reporting time for a flight duty period or the commencement of standby;

(b) the blood alcohol level should not exceed the lower of the national requirements or 0.2 per thousand at the start of a flight duty period;

(c) no alcohol should be consumed during the flight duty period or whilst on standby.

**GM1 AOCR.GEN.MPA.100(c) (2) Crew responsibilities**

**ELAPSED TIME BEFORE RETURNING TO FLYING DUTY**

24 hours is a suitable minimum length of time to allow after normal blood donation or normal recreational (sport) diving before returning to flying duties. This should be considered by operators when determining a reasonable time period for the guidance of crew members.

**PART-MED**
Information on the effects of medication, drugs, other treatments and alcohol can be found in Part-MED.

AOCR.GEN.MPA.105  Responsibilities of the commander

(a) The commander, in addition to complying with AOCR.GEN.MPA.100, shall:

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

(2) be responsible for the operation and safety of the aircraft:

   (i) for aeroplanes, from the moment the aeroplane is first ready to move for the purpose of taxiing prior to take-off, until the moment it finally comes to rest at the end of the flight and the engine(s) used as primary propulsion unit(s) is(are) shut down;

   (ii) for helicopters, when the rotors are turning;

(3) have authority to give all commands and take any appropriate actions for the purpose of securing the safety of the aircraft and of persons and/or property carried therein.

(4) have authority to disembark any person, or any part of the cargo, that may represent a potential hazard to the safety of the aircraft or its occupants;

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

(6) have the right to refuse transportation of inadmissible passengers, deportees or persons in custody if their carriage increases the risk to the safety of the aircraft or its occupants;

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

(8) ensure that all operational procedures and checklists are complied with in accordance with the operations manual;
(9) not permit any crew member to perform any activity during critical phases of flight, except duties required for the safe operation of the aircraft;

(10) ensure that flight recorders:

(i) are not disabled or switched off during flight; and

(ii) in the event of an accident or an incident that is subject to mandatory reporting:

(A) are not intentionally erased;

(B) are deactivated immediately after the flight is completed; and

(C) are reactivated only with the agreement of the investigating authority;

(11) decide on acceptance of the aircraft with unserviceabilities in accordance with the configuration deviation list (CDL) or the minimum equipment list (MEL);

(12) ensure that the pre-flight inspection has been carried out in accordance with the requirements of Annex I (Part-M);

(13) be satisfied that relevant emergency equipment remains easily accessible for immediate use.

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

(c) Whenever an aircraft in flight has manoeuvred in response to an airborne collision avoidance system (ACAS) resolution advisory (RA), the commander shall submit an ACAS report to the Authority.

(d) Bird hazards and strikes:

(1) Whenever a potential bird hazard is observed, the commander shall inform the air traffic service (ATS) unit as soon as flight crew workload allows.

(2) Whenever an aircraft for which the commander is responsible suffers a bird strike that results in significant damage to the aircraft or the loss or malfunction of any essential service, the
commander shall submit a written bird strike report after landing to the Authority.

**AOCR.GEN.MPA.110 Authority of the commander**

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

**AOCR.GEN.MPA.115 Personnel or crew members other than cabin crew in the passenger compartment**

The operator shall ensure that personnel or crew members, other than operating cabin crew members, carrying out their duties in the passenger compartment of an aircraft:

(a) are not confused by the passengers with operating cabin crew members;

(b) do not occupy required cabin crew assigned stations;

(c) do not impede operating cabin crew members in their duties.

**AMC1 AOCR.GEN.MPA.115(a) Personnel or crew members other than cabin crew in the passenger compartment**

**MEASURES TO PREVENT CONFUSION BY PASSENGERS**

*If personnel or crew members other than operating cabin crew members carry out duties in a passenger compartment, the operator should ensure that they do not perform tasks or wear a uniform in such a way that might lead passengers to identify them as members of the operating cabin crew.*

**AOCR.GEN.MPA.120 Common language**

The operator shall ensure that all crew members can communicate with each other in a common language.

**CAT.GEN.MPA.124 Taxiing of aircraft**

The operator shall establish procedures for taxiing of aircraft in order to ensure safe operation and in order to enhance runway safety.

**AOCR.GEN.MPA.125 Taxiing of aeroplanes**

The operator shall ensure that an aeroplane is only taxied on the movement area of an aerodrome if the person at the controls:
is an appropriately qualified pilot; or

(b) has been designated by the operator and:

(1) is trained to taxi the aircraft;

(2) is trained to use the radio telephone;

(3) has received instruction in respect of aerodrome layout, routes, signs, marking, lights, air traffic control (ATC) signals and instructions, phraseology and procedures;

(4) is able to conform to the operational standards required for safe aeroplane movement at the aerodrome.

**GM1 AOCR.GEN.MPA.125  Taxiing of aeroplanes**

**SKILLS AND KNOWLEDGE**

The following skills and knowledge may be assessed to check if a person can be authorised by the operator to taxi an aeroplane:

(a) positioning of the aeroplane to ensure safety when starting engine;

(b) obtaining automatic terminal information service (ATIS) reports and taxi clearance, where applicable;

(c) interpretation of airfield markings/lights/signals/indicators;

(d) interpretation of marshalling signals, where applicable;

(e) identification of suitable parking area;

(f) maintaining lookout and right-of-way rules and complying with air traffic control (ATC) or marshalling instructions when applicable;

(g) avoidance of adverse effect of propeller slipstream or jet wash on other aeroplanes, aerodrome facilities and personnel;

(h) inspection of taxi path when surface conditions are obscured;

(i) communication with others when controlling an aeroplane on the ground;

(j) interpretation of operational instructions;

(k) reporting of any problem that may occur while taxiing an aeroplane; and
(l) adapting the taxi speed in accordance with prevailing aerodrome, traffic, surface and weather conditions.

**AOCR.GEN.MPA.130  Rotor engagement — helicopters**

A helicopter rotor shall only be turned under power for the purpose of flight with a qualified pilot at the controls.

**GM1 AOCR.GEN.MPA.130  Rotor engagement - helicopters**

**INTENT OF THE RULE**

(a) The following two situations where it is allowed to turn the rotor under power should be distinguished:

(1) for the purpose of flight, this is described in the MCAR-FCL;

(2) for maintenance purposes.

(b) Rotor engagement for the purpose of flight: the pilot should not leave the control when the rotors are turning. For example, the pilot is not allowed to get out of the aircraft in order to welcome passengers and adjust their seat belts with the rotors turning.

(c) Rotor engagement for the purpose of maintenance: the Implementing Rule, however, does not prevent ground runs being conducted by qualified personnel other than pilots for maintenance purposes. The following conditions should be applied:

(1) the operator should ensure that the qualification of personnel, other than pilots, who are authorised to conduct maintenance runs is described in the appropriate manual;

(2) ground runs should not include taxiing the helicopter;

(3) there should be no passengers on board; and

(4) maintenance runs should not include collective increase or autopilot engagement (due to the risk of ground resonance).

**AOCR.GEN.MPA.135  Admission to the flight crew compartment**

(a) The operator shall ensure that no person, other than a flight crew member assigned to a flight, is admitted to, or carried in, the flight crew compartment unless that person is:
(1) an operating crew member;

(2) a representative of the Authority, if required to be there for the performance of his/her official duties;

(3) permitted by and carried in accordance with instructions contained in the operations manual.

(b) The commander shall ensure that:

(1) admission to the flight crew compartment does not cause distraction or interference with the operation of the flight; and

(2) all persons carried in the flight crew compartment are made familiar with the relevant safety procedures.

(c) The commander shall make the final decision regarding the admission to the flight crew compartment.

**AMC1 AOCR.GEN.MPA.135 (a) (3) Admission to the flight crew compartment**

**INSTRUCTIONS FOR SINGLE-PILOT OPERATIONS UNDER VFR BY DAY**

Where an aircraft is used in a single-pilot operation under visual flight rules (VFR) by day but has more than one pilot station, the instructions of the operator may permit passengers to be carried in the unoccupied pilot seat(s), provided that the commander is satisfied that:

(a) it will not cause distraction or interference with the operation of the flight; and

(b) the passenger occupying a pilot seat is familiar with the relevant restrictions and safety procedures.

**AOCR.GEN.MPA.140 Portable electronic devices**

The operator shall not permit any person to use a portable electronic device (PED) on board an aircraft that could adversely affect the performance of the aircraft’s systems and equipment, and shall take all reasonable measures to prevent such use.

**AMC1 AOCR.GEN.MPA.140 Portable electronic devices**

**GENERAL**

(a) *Scope*
This AMC provides means to prevent that portable electronic devices (PEDs) on board aircraft adversely affect the performance of the aircraft’s systems and equipment. This AMC addresses operation of PEDs in the different aircraft zones – passenger compartment, flight compartment, and cargo compartments. Furthermore, it addresses the specific case of PEDs qualified and under configuration control by the operator - controlled PEDs (C-PEDs) - for which the operator gives some credit.

(b) Restrictions on the use of PEDs in the passenger compartment

If an operator permits passengers to use PEDs on board its aircraft, procedures should be in place to control their use. The operator should ensure that all crew members and ground personnel are trained to enforce the restrictions on this equipment in line with these procedures. These procedures should ensure the following:

(1) As the general principle all PEDs (including transmitting PEDs (T-PEDs)) are switched-off at the start of the flight when the passengers have boarded and all doors have been closed, until a passenger door has been opened at the end of the flight.

(2) The following exceptions from the general principle may be granted under the responsibility of the operator:

   (i) Medical equipment necessary to support physiological functions does not need to be switched-off.

   (ii) The use of PEDs, excluding T-PEDs, may be permitted during non-critical phases of flight, excluding taxiing.

   (iii) T-PEDs may be used during non-critical phases of flight, excluding taxiing, if the aircraft is equipped with a system or otherwise certified allowing the operation of such technology during flight. The restrictions coming from the corresponding aircraft certification as documented in the aircraft flight manual (AFM), or equivalent document(s), stay in force.

   (iv) The use of C-PEDs during critical phases of flight, however, may only be permitted if the operator has accounted for this situation in its assessment.

   (v) The commander may permit the use of any kind of PED when the aircraft is stationary during prolonged departure delays, provided that sufficient time is available to check the passenger compartment before the flight proceeds. Similarly, after landing, the commander may authorise the
use of any kind of PED in the event of a prolonged delay for a parking/gate position (even though doors are closed and the engines are running).

(3) Announcements should be made during boarding of the aircraft to inform passengers of the restrictions applicable to PEDs (in particular to T-PEDs) before fastening their seat belts.

(4) Where in-seat electrical power supplies are available for passenger use the following should apply:

(i) information cards giving safety instructions are provided to the passengers;

(ii) PEDs should be disconnected from any in-seat electrical power supply, switched-off and stowed during taxiing, take-off, approach, landing, and during abnormal or emergency conditions; and

(iii) flight crew and cabin crew should be aware of the proper means to switch-off in-seat power supplies used for PEDs.

(5) During boarding and any phase of flight:

(i) appropriate coordination between flight crew and cabin crew is defined to deal with interference or other safety problems associated with PEDs;

(ii) passenger use of equipment during the flight is monitored;

(iii) suspect equipment is switched off; and

(iv) particular attention is given to passenger misuse of equipment that could include a built-in transmitting function.

(6) Thermal runaways of batteries, in particular lithium batteries, and potential resulting fire can be handled properly.

(7) Appropriate coordination between flight crew and cabin crew should be defined to deal with interference or other safety problems associated with PEDs.

(8) The commander may for any reason and during any phase of flight require deactivation and stowage of PEDs.

(9) Occurrences of suspected or confirmed interference that have potential safety implications should be reported to the Authority.
Where possible, to assist follow-up and technical investigation, reports should describe the offending device, identify the brand name and model number, its location in the aircraft at the time of the occurrence, interference symptoms and the results of actions taken by the crew.

The cooperation of the device owner should be sought by obtaining contact details.

(10) Special requests to operate a PED or T-PED during any phase of the flight for specific reasons (e.g. for security measures) should be handled properly.

(c) Restrictions on the use of PEDs in the flight compartment

Due to the higher risk of interference and potential for distracting crew from their duties, PEDs should not be used in the flight compartment. However, the operator may allow the use of PEDs, e.g. to assist the flight crew in their duties, if procedures are in place to ensure the following:

(1) The conditions for the use of PEDs in-flight are specified in the operations manual, otherwise they should be switched off and stowed during all phases of flight.

(2) The PEDs do not pose a loose-item risk or other hazard.

(3) During critical phases of flight only those C-PEDs are operated, for which the operator has demonstrated that the radio frequency (RF) interference levels are below those considered acceptable for the specific aircraft environment. Guidance for such test is provided in (e) below.

(4) During pre-flight procedures, e.g. when loading route information into navigation systems or when monitoring fuel loading, no T-PED should be operated. In all other cases, flight crew and other persons on board the aircraft involved in dispatching the aircraft should observe the same restrictions as applicable to passengers.

(5) These restrictions should not preclude use of a T-PED (specifically a mobile phone) by the flight crew to deal with an emergency. However, reliance should not be predicated on a T-PED for this purpose.

(d) PEDs not accessible during the flight

PEDs should be switched off, when not accessible for deactivation during flight. This should apply especially to PEDs contained in baggage
or transported as part of the cargo. The operator may allow deviation for PEDs for which tests have demonstrated their safe operation. Other precautions, such as transporting in shielded, metal boxes, may also be used to mitigate associated risks.

In case an automated function is used to deactivate a T-PED, the unit should be qualified for safe operation on board the aircraft.

(e) Test methods

The means to demonstrate that the RF radiations (intentional or non-intentional) are tolerated by aircraft systems should be as follows:

(1) The radio frequency (RF) emissions of PEDs should meet the levels as defined by EUROCAE ED-14E/RTCA DO 160E Section 21 Category M for operation in the passenger compartment and EUROCAE ED-14E/RTCA DO 160E Section 21 Category H for operation in the cargo bay. Later revisions of those documents may be used for testing. The assessment of intentional transmissions of T-PEDs is excluded from those test standards and needs to be addressed separately.

(2) When the operator intends to allow the operation of T-PEDs, its assessment should follow the principles set out in EUROCAE ED-130.

**GM1 AOCR.GEN.MPA.140 Portable electronic devices**

**DEFINITIONS**

(a) Definition and categories of PEDs

PEDs are any kind of electronic device, typically but not limited to consumer electronics, brought on board the aircraft by crew members, passengers, or as part of the cargo and that are not included in the approved aircraft configuration. All equipment that is able to consume electrical energy falls under this definition. The electrical energy can be provided from internal sources as batteries (chargeable or non-rechargeable) or the devices may also be connected to specific aircraft power sources.

PEDs fall into three categories:

(1) Non-intentional transmitters can non-intentionally radiate RF transmissions. This category includes, but is not limited to, computing equipment, cameras, radio receivers, audio and video reproducers, electronic games and toys. In addition, portable, non-transmitting devices provided to assist crew members in their
duties are included in this category. The category is identified as PED.

(2) Intentional transmitters can radiate RF transmissions on specific frequencies as part of their intended function. In addition they may radiate non-intentional transmissions like any PED. The term ‘transmitting PED’ (T-PED) is used to identify the transmitting capability of the PED. Intentional transmitters are transmitting devices such as RF based remote control equipment, which may include some toys, two-way radios (sometimes referred to as private mobile radio), mobile phones of any type, satellite phones, computer with mobile phone data connection, wireless fidelity (WIFI) or Bluetooth capability. After deactivation of the transmitting capability, e.g. by activating the so-called ‘flight mode’ or ‘flight safety mode’, the T-PED remains a PED having non-intentional emissions.

(3) A controlled PED (C-PED) is subject to administrative control by the operator. This will include, inter alia, tracking the location of the devices to specific aircraft or persons and ensuring that no unauthorised changes are made to the hardware, software or databases. A controlled PED will also be subject to procedures to ensure that it is maintained to the latest amendment state. C-PEDs can be assigned to the category of non-intentional transmitters (PEDs) or intentional transmitters (T-PEDs).

(b) Definition of the switched-off status

Many PEDs are not completely disconnected from the internal power source when switched off. The switching function may leave some remaining functionality e.g. data storage, timer, clock, etc. These devices can be considered switched off when in the deactivated status. The same applies for devices having no transmit capability and operated by coin cells without further deactivation capability, e.g. wrist watches.

**GM2 AOCR.GEN.MPA.140 Portable electronic devices**

**FIRE CAUSED BY PEDs**

A detailed discussion of fire caused by PEDs can be found in CAA UK CAP 789 edition 2, chapter 31, section 6 Fires in the cabin caused by PEDs2 and CAA PAPER 2003/4, Dealing With In-Flight Lithium Battery Fires in Portable Electronic Devices, M.J. Lain, D.A. Teagle, J. Cullen, V. Dass3.
The operator shall at all times have available for immediate communication to rescue coordination centres (RCCs) lists containing information on the emergency and survival equipment carried on board any of their aircraft.

**AMC1 AOCR.GEN.MPA.145 Information on emergency and survival equipment carried**

**ITEMS FOR COMMUNICATION TO THE RESCUE COORDINATION CENTRE**

The information, compiled in a list, should include, as applicable, the number, colour and type of life rafts and pyrotechnics, details of emergency medical supplies, e.g. first-aid kits, emergency medical kits, water supplies and the type and frequencies of emergency portable radio equipment.

**AOCR.GEN.MPA.155 Carriage of weapons of war and munitions of war**

(a) The operator shall only transport weapons of war or munitions of war by air if an approval to do so has been granted by all States whose airspace is intended to be used for the flight.

(b) Where an approval has been granted, the operator shall ensure that weapons of war and munitions of war are:

(1) stowed in the aircraft in a place that is inaccessible to passengers during flight; and

(2) in the case of firearms, unloaded.

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

**GM1 AOCR.GEN.MPA.155 Carriage of weapons of war and munitions of war**

**WEAPONS OF WAR AND MUNITIONS OF WAR**

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

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

(c) Where weapons of war or munitions of war are also dangerous goods by definition (e.g. torpedoes, bombs, etc.), AOCR.GEN.MPA.200 Transport of dangerous goods also applies.

**AOCR.GEN.MPA.160 Carriage of sporting weapons and ammunition**

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

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

(1) stowed in the aircraft in a place that is inaccessible to passengers during flight; and

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

(c) Ammunition for sporting weapons may be carried in passengers’ checked baggage, subject to certain limitations, in accordance with the technical instructions.

**GM1 AOCR.GEN.MPA.160 Carriage of sporting weapons and ammunition**

**SPORTING WEAPONS**

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

(b) A firearm is any gun, rifle or pistol that fires a projectile.

(c) The following firearms are generally regarded as being sporting weapons:

(1) those designed for shooting game, birds and other animals;

(2) those used for target shooting, clay-pigeon shooting and competition shooting, providing the weapons are not those on standard issue to military forces; and
(3)  airguns, dart guns, starting pistols, etc.

(d)  A firearm, which is not a weapon of war or munitions of war, should be treated as a sporting weapon for the purposes of its carriage on an aircraft.

AOCR.GEN.MPA.161  Carriage of sporting weapons and ammunition — alleviations

Notwithstanding AOCR.GEN.MPA.160(b), for helicopters with a maximum certified take-off mass (MCTOM) of 3 175 kg or less operated by day and over routes navigated by reference to visual landmarks, a sporting weapon may be carried in a place that is accessible during flight, provided that the operator has established appropriate procedures and it is impracticable to stow it in an inaccessible stowage during flight.

AMC1 AOCR.GEN.MPA.161  Carriage of sporting weapons and ammunition alleviations

SPORTING WEAPONS - HELICOPTERS

Procedures for the carriage of sporting weapons may need to be considered if the helicopter does not have a separate compartment in which the weapons can be stowed. These procedures should take into account the nature of the flight, its origin and destination, and the possibility of unlawful interference. As far as possible, the weapons should be stowed so they are not immediately accessible to the passengers, e.g. in locked boxes, in checked baggage that is stowed under other baggage or under fixed netting.

AOCR.GEN.MPA.165  Method of carriage of persons

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

(a)  for the purpose of taking action necessary for the safety of the aircraft or of any person, animal or goods therein; or

(b)  to a part of the aircraft in which cargo or supplies are carried, being a part that is designed to enable a person to have access thereto while the aircraft is in flight.

AOCR.GEN.MPA.170  Alcohol and drugs

The operator shall take all reasonable measures to ensure that no person enters or is in an aircraft when under the influence of alcohol or drugs to
the extent that the safety of the aircraft or its occupants is likely to be endangered.

AOCR.GEN.MPA.175 Endangering safety

The operator shall take all reasonable measures to ensure that no person recklessly or negligently acts or omits to act so as to:

(a) endanger an aircraft or person therein; or

(b) cause or permit an aircraft to endanger any person or property.

AOCR.GEN.MPA.180 Documents, manuals and information to be carried

(a) The following documents, manuals and information shall be carried on each flight, as originals or copies unless otherwise specified:

(1) the aircraft flight manual (AFM), or equivalent document(s);

(2) the original certificate of registration;

(3) the original certificate of airworthiness (CofA);

(4) the noise certificate, including an English translation, where one has been provided by the authority responsible for issuing the noise certificate;

(5) a certified true copy of the air operator certificate (AOC);

(6) the operations specifications relevant to the aircraft type, issued with the AOC;

(7) the original aircraft radio licence, if applicable;

(8) the third party liability insurance certificate(s);

(9) the journey log, or equivalent, for the aircraft;

(10) the aircraft technical log, in accordance with Part-M;

(11) details of the filed ATS flight plan, if applicable;

(12) current and suitable aeronautical charts for the route of the proposed flight and all routes along which it is reasonable to expect that the flight may be diverted;
(13) procedures and visual signals information for use by intercepting and intercepted aircraft;

(14) information concerning search and rescue services for the area of the intended flight, which shall be easily accessible in the flight crew compartment;

(15) the current parts of the operations manual that are relevant to the duties of the crew members, which shall be easily accessible to the crew members;

(16) the MEL;

(17) appropriate notices to airmen (NOTAMs) and aeronautical information service (AIS) briefing documentation;

(18) appropriate meteorological information;

(19) cargo and/or passenger manifests, if applicable;

(20) mass and balance documentation;

(21) the operational flight plan, if applicable;

(22) notification of special categories of passenger (SCPs) and special loads, if applicable; and

(23) any other documentation that may be pertinent to the flight or is required by the States concerned with the flight.

(b) Notwithstanding (a), for operations under visual flight rules (VFR) by day with other-than-complex motor-powered aircraft taking off and landing at the same aerodrome or operating site within 24 hours, or remaining within a local area specified in the operations manual, the following documents and information may be retained at the aerodrome or operating site instead:

(1) noise certificate;

(2) aircraft radio licence;

(3) journey log, or equivalent;

(4) aircraft technical log;

(5) NOTAMs and AIS briefing documentation;

(6) meteorological information;
(7) notification of SCPs and special loads, if applicable; and

(8) mass and balance documentation.

(c) Notwithstanding (a), in case of loss or theft of documents specified in (a) (2) to (a) (8), the operation may continue until the flight reaches its destination or a place where replacement documents can be provided.

**AMC1 AOCR.GEN.MPA.180 Documents, manuals and information to be carried**

**GENERAL**

The documents, manuals and information may be available in a form other than on printed paper. An electronic storage medium is acceptable if accessibility, usability and reliability can be assured.

**GM1 AOCR.GEN.MPA.180 (a) (1) Documents, manuals and information to be carried**

**AIRCRAFT FLIGHT MANUAL OR EQUIVALENT DOCUMENT(S)**

‘Aircraft flight manual, or equivalent document(s)’ means in the context of this rule the flight manual for the aircraft, or other documents containing information required for the operation of the aircraft within the terms of its certificate of airworthiness, unless these data are available in the parts of the operations manual carried on board.

**GM1 AOCR.GEN.MPA.180 (a) (5) (6) Documents, manuals and information to be carried**

(a) Certified true copies may be provided:

(1) directly by the Authority; or

(2) by persons holding privileges for certification of official documents in accordance with applicable legislation, e.g., public notaries, authorised officials in public services.

(b) Translations of the air operator certificate (AOC) including operations specifications do not need to be certified.

**GM1 AOCR.GEN.MPA.180 (a) (9) Documents, manuals and information to be carried**

**JOURNEY LOG OR EQUIVALENT**
‘Journey log, or equivalent’ means in this context that the required information may be recorded in documentation other than a log book, such as the operational flight plan or the aircraft technical log.

**AMC1 AOCR.GEN.MPA.180 (a) (13) Documents, manuals and information to be carried**

**PROCEDURES AND VISUAL SIGNALS FOR USE BY INTERCEPTING AND INTERCEPTED AIRCRAFT**

The procedures and the visual signals for use by intercepting and intercepted aircraft should reflect those contained in the International Civil Aviation Organisation (ICAO) Annex 2. This may be part of the operations manual.

**GM1 AOCR.GEN.MPA.180 (a) (14) Documents, manuals and information to be carried**

**SEARCH AND RESCUE INFORMATION**

This information is usually found in the State’s aeronautical information publication.

**GM1 AOCR.GEN.MPA.180 (a) (23) Documents, manuals and information to be carried**

**DOCUMENTS THAT MAY BE PERTINENT TO THE FLIGHT**

Any other documents that may be pertinent to the flight or required by the States concerned with the flight may include, for example, forms to comply with reporting requirements.

**STATES CONCERNED WITH THE FLIGHT**

The States concerned are those of origin, transit, overflight and destination of the flight.

**AOCR.GEN.MPA.185 Information to be retained on the ground**

(a) The operator shall ensure that at least for the duration of each flight or series of flights:

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

(2) the information is retained until it has been duplicated at the place at which it will be stored; or, if this is impracticable
(3) the same information is carried in a fireproof container in the aircraft.

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

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

(2) copies of the relevant part(s) of the aircraft technical log;

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

(4) mass and balance documentation if required; and

(5) special loads notification.

**AOCR.GEN.MPA.190 Provision of documentation and records**

The commander shall, within a reasonable time of being requested to do so by a person authorised by the Authority, provide to that person the documentation required to be carried on board.

**AOCR.GEN.MPA.195 Preservation, production and use of flight recorder recordings**

(a) Following an accident or an incident that is subject to mandatory reporting, the operator of an aircraft shall preserve the original recorded data for a period of 60 days unless otherwise directed by the investigating authority.

(b) The operator shall conduct operational checks and evaluations of flight data recorder (FDR) recordings, cockpit voice recorder (CVR) recordings and data link recordings to ensure the continued serviceability of the recorders.

(c) The operator shall save the recordings for the period of operating time of the FDR as required by AOCR.IDE.A.190 or AOCR.IDE.H.190, except that, for the purpose of testing and maintaining the FDR, up to one hour of the oldest recorded material at the time of testing may be erased.

(d) The operator shall keep and maintain up-to-date documentation that presents the necessary information to convert FDR raw data into parameters expressed in engineering units.

(e) The operator shall make available any flight recorder recording that has been preserved, if so determined by the Authority.
Without prejudice to Regulations:

(1) CVR recordings shall only be used for purposes other than for the investigation of an accident or an incident subject to mandatory reporting, if all crew members and maintenance personnel concerned consent.

(2) FDR recordings or data link recordings shall only be used for purposes other than for the investigation of an accident or an incident which is subject to mandatory reporting, if such records are:

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

(ii) de-identified; or

(iii) disclosed under secure procedures.

GM1 AOCR.GEN.MPA.195(a)  Preservation, production and use of flight recorder recordings

REMOVAL OF RECORDERS AFTER A REPORTABLE OCCURRENCE

The need for removal of the recorders from the aircraft is determined by the investigating authority with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.

AMC1 AOCR.GEN.MPA.195(b)  Preservation, production and use of flight recorder recordings

OPERATIONAL CHECKS

Whenever a recorder is required to be carried, the operator should:

(a) perform an annual inspection of FDR recording and CVR recording, unless one or more of the following applies:

(1) Where two solid-state FDRs both fitted with internal built-in-test equipment sufficient to monitor reception and recording of data share the same acquisition unit, a comprehensive recording inspection need only be performed for one FDR. For the second FDR, checking its internal built-in-test equipment is sufficient. The inspection should be performed alternately such that each FDR is inspected once every other year.

(2) Where the following conditions are met, the FDR recording inspection is not needed:
(i) the aircraft flight data are collected in the frame of a flight data monitoring (FDM) programme;

(ii) the data acquisition of mandatory flight parameters is the same for the FDR and for the recorder used for the FDM programme;

(iii) the integrity of all mandatory flight parameters is verified by the FDM programme; and

(iv) the FDR is solid-state and is fitted with an internal built-in-test equipment sufficient to monitor reception and recording of data.

(3) Where two solid-state CVRs are both fitted with internal built-in-test equipment sufficient to monitor reception and recording of data, a comprehensive recording inspection need only to be performed for one CVR. For the second CVR, checking its internal built-in-test equipment is sufficient. The inspection should be performed alternately such that each CVR is inspected once every other year.

(b) perform every 5 years an inspection of the data link recording.

(c) check every 5 years, or in accordance with the recommendations of the sensor manufacturer, that the parameters dedicated to the FDR and not monitored by other means are being recorded within the calibration tolerances and that there is no discrepancy in the engineering conversion routines for these parameters.

**GM1 AOCR.GEN.MPA.195 (b) Preservation, production and use of flight recorder recordings**

**INSPECTION OF THE FLIGHT RECORDERS RECORDING**

(a) The inspection of the FDR recording usually consists of the following:

(1) Making a copy of the complete recording file.

(2) Examining a whole flight in engineering units to evaluate the validity of all mandatory parameters - this could reveal defects or noise in the measuring and processing chains and indicate necessary maintenance actions. The following should be considered:

(i) when applicable, each parameter should be expressed in engineering units and checked for different values of its
operational range - for this purpose, some parameters may need to be inspected at different flight phases; and

(ii) if the parameter is delivered by a digital data bus and the same data are utilised for the operation of the aircraft, then a reasonableness check may be sufficient; otherwise a correlation check may need to be performed;

(A) a reasonableness check is understood in this context as a subjective, qualitative evaluation, requiring technical judgement, of the recordings from a complete flight; and

(B) a correlation check is understood in this context as the process of comparing data recorded by the flight data recorder against the corresponding data derived from flight instruments, indicators or the expected values obtained during specified portion(s) of a flight profile or during ground checks that are conducted for that purpose.

(3) Retaining the most recent copy of the complete recording file and the corresponding recording inspection report.

(b) The inspection of the CVR recording usually consists of:

(1) checking that the CVR operates correctly for the nominal duration of the recording;

(2) examining, where practicable and subject to prior approval by the flight crew, a sample of in-flight recording of the CVR for evidence that the signal is acceptable on each channel; and

(3) preparing and retaining an inspection report.

(c) The inspection of the DLR recording usually consists of:

(1) Checking the consistency of the data link recording with other recordings for example, during a designated flight, the flight crew speaks out a few data link messages sent and received. After the flight, the data link recording and the CVR recording are compared for consistency.

(2) Retaining the most recent copy of the complete recording and the corresponding inspection report
Transport of dangerous goods

(a) Unless otherwise permitted by these requirements, the transport of dangerous goods by air shall be conducted in accordance with Annex 18 to the Chicago Convention as last amended and amplified by the Technical instructions for the safe transport of dangerous goods by air (ICAO Doc 9284-AN/905), including its supplements and any other addenda or corrigenda.

(b) Dangerous goods shall only be transported by an operator approved in accordance with these requirements, except when:

(1) they are not subject to the technical instructions in accordance with Part 1 of those instructions; or

(2) they are carried by passengers or crew members, or are in baggage, in accordance with Part 8 of the technical instructions.

(c) An operator shall establish procedures to ensure that all reasonable measures are taken to prevent dangerous goods from being carried on board inadvertently.

(d) The operator shall provide personnel with the necessary information enabling them to carry out their responsibilities, as required by the technical instructions.

(e) The operator shall, in accordance with the technical instructions, report without delay to the Authority and the appropriate authority of the State of occurrence in the event of:

(1) any dangerous goods accidents or incidents;

(2) the discovery of undeclared or misdeclared dangerous goods in cargo or mail; or

(3) the finding of dangerous goods carried by passengers or crew members, or in their baggage, when not in accordance with Part 8 of the technical instructions.

(f) The operator shall ensure that passengers are provided with information about dangerous goods in accordance with the technical instructions.

(g) The operator shall ensure that notices giving information about the transport of dangerous goods are provided at acceptance points for cargo as required by the technical instructions.
DANGEROUS GOODS ACCIDENT AND INCIDENT REPORTING

(a) Any type of dangerous goods accident or incident, or the finding of undeclared or misdeclared dangerous goods should be reported, irrespective of whether the dangerous goods are contained in cargo, mail, passengers’ baggage or crew baggage. For the purposes of the reporting of undeclared and misdeclared dangerous goods found in cargo, the Technical Instructions considers this to include items of operators’ stores that are classified as dangerous goods.

(b) The first report should be dispatched within 72 hours of the event. It may be sent by any means, including e-mail, telephone or fax. This report should include the details that are known at that time, under the headings identified in (c). If necessary, a subsequent report should be made as soon as possible giving all the details that were not known at the time the first report was sent. If a report has been made verbally, written confirmation should be sent as soon as possible.

(c) The first and any subsequent report should be as precise as possible and should contain the following data, where relevant:

1. date of the incident or accident or the finding of undeclared or misdeclared dangerous goods;
2. location, the flight number and flight date;
3. description of the goods and the reference number of the air waybill, pouch, baggage tag, ticket, etc.;
4. proper shipping name (including the technical name, if appropriate) and UN/ID number, when known;
5. class or division and any subsidiary risk;
6. type of packaging, and the packaging specification marking on it;
7. quantity;
8. name and address of the shipper, passenger, etc.;
9. any other relevant details;
10. suspected cause of the incident or accident;
11. action taken;
(12) any other reporting action taken; and

(13) name, title, address and telephone number of the person making the report.

(d) Copies of relevant documents and any photographs taken should be attached to the report.

(e) A dangerous goods accident or incident may also constitute an aircraft accident, serious incident or incident. Reports should be made for both types of occurrences when the criteria for each are met.

(f) The following dangerous goods reporting form should be used, but other forms, including electronic transfer of data, may be used provided that at least the minimum information of this AMC is supplied:

### DANGEROUS GOODS OCCURRENCE FORM

<table>
<thead>
<tr>
<th>1. Operator:</th>
<th>2. Date of occurrence:</th>
<th>3. Local time of occurrence:</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Flight Date:</td>
<td>Flight No:</td>
<td></td>
</tr>
<tr>
<td>6. Departure Aerodrome:</td>
<td>7. Destination Aerodrome:</td>
<td></td>
</tr>
<tr>
<td>8. Aircraft Type:</td>
<td>9. Aircraft Registration No:</td>
<td></td>
</tr>
<tr>
<td>10. Location of occurrence:</td>
<td>11. Origin of the Goods:</td>
<td></td>
</tr>
<tr>
<td>12. Description of the occurrence, including details of injury, damage, etc. (if necessary continue on the reverse of this form):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Proper shipping name (including the technical name):</td>
<td>14. UN/ID No (when known):</td>
<td></td>
</tr>
</tbody>
</table>
### DEPARTMENT OF CIVIL AVIATION
#### HELICOPTER SUPPLEMENT TO AIRCRAFT OPERATOR CERTIFICATE REQUIREMENTS

<table>
<thead>
<tr>
<th>15. Class/Division (when known)</th>
<th>16. Susidiary Risk(s)</th>
<th>17. Packing group:</th>
<th>18. Category (Class 7 only)</th>
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</thead>
<tbody>
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<thead>
<tr>
<th>19. Type of Packaging</th>
<th>20. Packaging specification marking</th>
<th>21. No of packages:</th>
<th>22. Quantity (or transport index, if applicable)</th>
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<table>
<thead>
<tr>
<th>23. Reference No of Airway Bill</th>
</tr>
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<tbody>
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</table>

<table>
<thead>
<tr>
<th>24. Reference No of courier pouch, baggage tag, or passenger ticket</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>25. Name and address of shipper, agent, passenger, etc.</th>
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<table>
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<tr>
<th>26. Other relevant information (including suspected case, any action taken)</th>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>27. Name and title of person making report</th>
<th>28. Telephone Number:</th>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>29. Company:</th>
<th>30. Reporters reference:</th>
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<tbody>
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</table>

<table>
<thead>
<tr>
<th>31. Address:</th>
<th>32. Signature:</th>
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<tr>
<th>33. Date:</th>
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</table>
Description of occurrence (continuation)

Notes for completion of the form:

1 A dangerous goods accident is as defined in the Civil Aviation Regulations. For this purpose serious injury is as defined in the Civil Aviation Regulations.

2 This form should also be used to report any occasion when undeclared or misdeclared dangerous goods are discovered in cargo, mail or unaccompanied baggage or when accompanied baggage contains dangerous goods which passengers or crew are not permitted to take on aircraft.

3 The initial report should be dispatched unless exceptional circumstances prevent this. This occurrence report form, duly completed, should be sent as soon as possible, even if all the information is not available.

4 Copies of all relevant documents and any photographs should be attached to this report.
Any further information, or any information not included in the initial report, should be sent as soon as possible to authorities identified in AOCR.GEN.MPA.200 (e).

Providing it is safe to do so, all dangerous goods, packaging, documents, etc., relating to the occurrence should be retained until after the initial report has been sent to the authorities identified in AOCR.GEN.MPA.200 (e) and they have indicated whether or not these should continue to be retained.

**GM1 AOCR.GEN.MPA.200  Transport of dangerous goods**

**GENERAL**

(a) The requirement to transport dangerous goods by air in accordance with the Technical Instructions is irrespective of whether:

(1) The flight is wholly or partly within or wholly outside the territory of a state; or

(2) an approval to carry dangerous goods in accordance with Part SPA is held.

(b) The Technical Instructions provide that in certain circumstances dangerous goods, which are normally forbidden on an aircraft, may be carried. These circumstances include cases of extreme urgency or when other forms of transport are inappropriate or when full compliance with the prescribed requirements is contrary to the public interest. In these circumstances all the States concerned may grant exemptions from the provisions of the Technical Instructions provided that an overall level of safety which is at least equivalent to that provided by the Technical Instructions is achieved. Although exemptions are most likely to be granted for the carriage of dangerous goods that are not permitted in normal circumstances, they may also be granted in other circumstances, such as when the packaging to be used is not provided for by the appropriate packing method or the quantity in the packaging is greater than that permitted. The Technical Instructions also make provision for some dangerous goods to be carried when an approval has been granted only by the State of Origin and the State of the Operator.

(c) When an exemption is required, the States concerned are those of origin, transit, overflight and destination of the consignment and that of the operator. For the State of overflight, if none of the criteria for granting an exemption are relevant, an exemption may be granted based solely on whether it is believed that an equivalent level of safety in air transport has been achieved.
(d) The Technical Instructions provide that exemptions and approvals are granted by the ‘appropriate national authority’, which is intended to be the authority responsible for the particular aspect against which the exemption or approval is being sought. The Instructions do not specify who should seek exemptions and, depending on the legislation of the particular State, this may mean the operator, the shipper or an agent. If an exemption or approval has been granted to other than the operator, the operator should ensure a copy has been obtained before the relevant flight. The operator should ensure all relevant conditions on an exemption or approval are met.

(e) The exemption or approval referred to in (b) to (d) is in addition to the approval required by Part SPA.
B. OPERATING PROCEDURES

AOCR.OP.MPA.100 Use of air traffic services

(a) The operator shall ensure that:

(1) air traffic services (ATS) appropriate to the airspace and the applicable rules of the air are used for all flights whenever available;

(2) in-flight operational instructions involving a change to the ATS flight plan, when practicable, are coordinated with the appropriate ATS unit before transmission to an aircraft.

(b) Notwithstanding (a), the use of ATS is not required unless mandated by air space requirements for:

(1) operations under VFR by day of other-than-complex motor-powered aeroplanes;

(2) helicopters with an MCTOM of 3 175 kg or less operated by day and over routes navigated by reference to visual landmarks; or

(3) local helicopter operations,

provided that search and rescue service arrangements can be maintained.

GM1 AOCR.OP.MPA.100 (a) (2) Use of air traffic services

IN-FLIGHT OPERATIONAL INSTRUCTIONS

When coordination with an appropriate air traffic service (ATS) unit has not been possible, in-flight operational instructions do not relieve a commander of responsibility for obtaining an appropriate clearance from an ATS unit, if applicable, before making a change in flight plan.

AOCR.OP.MPA.105 Use of aerodromes and operating sites

(a) The operator shall only use aerodromes and operating sites that are adequate for the type(s) of aircraft and operation(s) concerned.

(b) The use of operating sites shall only apply to:

(1) other-than-complex motor-powered aeroplanes; and

(2) helicopters.
DEFINING OPERATING SITES - HELICOPTERS

When defining operating sites (including infrequent or temporary sites) for the type(s) of helicopter(s) and operation(s) concerned, the operator should take account of the following:

(a) An adequate site is a site that the operator considers to be satisfactory, taking account of the applicable performance requirements and site characteristics (guidance on standards and criteria are contained in ICAO Annex 14 Volume 2 and in the ICAO Heliport Manual (Doc 9261-AN/903)).

(b) The operator should have in place a procedure for the survey of sites by a competent person. Such a procedure should take account for possible changes to the site characteristics which may have taken place since last surveyed.

(c) Sites that are pre-surveyed should be specifically specified in the operations manual. The operations manual should contain diagrams or/and ground and aerial photographs, and depiction (pictorial) and description of:

(1) the overall dimensions of the site;
(2) location and height of relevant obstacles to approach and take-off profiles, and in the manoeuvring area;
(3) approach and take-off flight paths;
(4) surface condition (blowing dust/snow/sand);
(5) helicopter types authorised with reference to performance requirements;
(6) provision of control of third parties on the ground (if applicable);
(7) procedure for activating site with land owner or controlling authority;
(8) other usefull information, for example appropriate ATS agency and frequency; and
(9) lighting (if applicable).
(d) For sites that are not pre-surveyed, the operator should have in place a procedure that enables the pilot to make, from the air, a judgment on the suitability of a site. (c)(1) to (c)(6) should be considered.

(e) Operations to non-pre-surveyed sites by night (except in accordance with SPA.HEMS.125 (b)(4)) should not be permitted.

**AMC2 AOCR.OP.MPA.105 Use of aerodromes and operating sites**

**HELIDeCK**

(a) The content of Part C of the operations manual relating to the specific usage of helidecks should contain both the listing of helideck limitations in a helideck limitations list (HLL) and a pictorial representation (template) of each helideck showing all necessary information of a permanent nature. The HLL should show, and be amended as necessary to indicate, the most recent status of each helideck concerning non-compliance with ICAO Annex 14 Volume 2, limitations, warnings, cautions or other comments of operational importance. An example of a typical template is shown in Figure 1 below.

(b) In order to ensure that the safety of flights is not compromised, the operator should obtain relevant information and details for compilation of the HLL, and the pictorial representation, from the owner/operator of the helideck.

(c) When listing helidecks, if more than one name of the helideck exists, the most common name should be used and other names should also be included. After renaming a helideck, the old name should be included in the HLL for the ensuing 6 months.

(d) All helideck limitations should be included in the HLL. Helidecks without limitations should also be listed. With complex installations and combinations of installations (e.g. co-locations), a separate listing in the HLL, accompanied by diagrams where necessary, may be required.

(e) Each helideck should be assessed based on limitations, warnings, cautions or comments to determine its acceptability with respect to the following that, as a minimum, should cover the factors listed below:

1. The physical characteristics of the helideck.
2. The preservation of obstacle-protected surfaces is the most basic safeguard for all flights. These surfaces are:
   1. the minimum $210^\circ$ obstacle-free surface (OFS);
   2. the $150^\circ$ limited obstacle surface (LOS); and
(iii) the minimum 180° falling ‘5:1’ - gradient with respect to significant obstacles. If this is infringed or if an adjacent installation or vessel infringes the obstacle clearance surfaces or criteria related to a helideck, an assessment should be made to determine any possible negative effect that may lead to operating restrictions.

(3) Marking and lighting:

(i) adequate perimeter lighting;

(ii) adequate floodlighting;

(iii) status lights (for night and day operations e.g. signaling lamp);

(iv) dominant obstacle paint schemes and lighting;

(v) helideck markings; and

(vi) general installation lighting levels. Any limitations in this respect should be annotated ‘daylight only operations’ on the HLL.

(4) Deck surface:

(i) surface friction;

(ii) helideck net;

(iii) drainage system;

(iv) deck edge netting;

(v) tie down system; and

(vi) cleaning of all contaminants.

(5) Environment:

(i) foreign object damage;

(ii) physical turbulence generators;

(iii) bird control;
(iv) air quality degradation due to exhaust emissions, hot gas vents or cold gas vents; and

(v) adjacent helideck may need to be included in air quality assessment.

(6) Rescue and firefighting:

(i) primary and complementary media types, quantities, capacity and systems personal protective equipment and clothing, breathing apparatus; and

(ii) crash box.

(7) Communications & navigation:

(i) aeronautical radio(s);

(ii) radio/telephone (R/T) call sign to match helideck name and side identification which should be simple and unique;

(iii) Non-directional beacon (NDB) or equivalent (as appropriate);

(iv) radio log; and

(v) light signal (e.g. signaling lamp).

(8) Fueling facilities:

(i) in accordance with the relevant national guidance and regulations.

(9) Additional operational and handling equipment:

(i) windsock;

(ii) wind recording;

(iii) deck motion recording and reporting where applicable;

(iv) passenger briefing system;

(v) chocks;

(vi) tie downs; and

(vii) weighing scales.

(10) Personnel:
(i) trained helideck staff (e.g. helicopter landing officer/helicopter deck assistant and fire fighters etc.).

(11) Other:

(i) as appropriate.

(f) For helidecks about which there is incomplete information, ‘limited’ usage based on the information available may be specified by the operator prior to the first helicopter visit. During subsequent operations and before any limit on usage is lifted, information should be gathered and the following should apply:

(1) Pictorial (static) representation:

(i) template (see figure 1) blanks should be available, to be filled out during flight preparation on the basis of the information given by the helideck owner/operator and flight crew observations;

(ii) where possible, suitably annotated photographs may be used until the HLL and template have been completed;

(iii) until the HLL and template have been completed, operational restrictions (e.g. performance, routing etc.) may be applied;

(iv) any previous inspection reports should be obtained by the operator; and

(v) an inspection of the helideck should be carried out to verify the content of the completed HLL and template, following which the helideck may be considered as fully adequate for operations.

(2) With reference to the above, the HLL should contain at least the following:

(i) HLL revision date and number;

(ii) generic list of helideck motion limitations;

(iii) name of helideck;

(iv) ‘D’ value; and

(v) limitations, warnings, cautions and comments.
(3) The template should contain at least the following (see example below):

(i) installation/vessel name;

(ii) R/T call sign;

(iii) helideck identification marking;

(iv) side panel identification marking;

(v) helideck elevation;

(vi) maximum installation/vessel height;

(vii) D’ value;

(viii) type of installation/vessel:

- fixed manned
- fixed unmanned
- ship type (e.g. diving support vessel)
- semi-submersible
- jack-up

(ix) name of owner/operator;

(x) geographical position;

(xi) communication and navigation (Com/Nav) frequencies and indent;

(xii) general drawing preferably looking into the helideck with annotations showing location of derrick, masts, cranes, flare stack, turbine and gas exhausts, side identification panels, windsock etc.;

(xiii) plan view drawing, chart orientation from the general drawing, to show the above. The plan view will also show the 210° orientation in degrees true;

(xiv) type of fueling:
- pressure and gravity
- pressure only
- gravity only
- none

(xv) type and nature of firefighting equipment;
(xvi) availability of ground power unit (GPU);
(xvii) deck heading;
(xviii) maximum allowable mass;
(xix) status light (Yes/No); and
(xx) revision date of publication.

<table>
<thead>
<tr>
<th>Figure 1 Helideck template</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helideck elevation: 200 ft</td>
</tr>
<tr>
<td>Maximum height: 350 ft</td>
</tr>
<tr>
<td>Side identification: …</td>
</tr>
<tr>
<td>Type of installation: …</td>
</tr>
<tr>
<td>Position: 2</td>
</tr>
<tr>
<td>Operator: Operator 3</td>
</tr>
<tr>
<td>S …</td>
</tr>
<tr>
<td>W …</td>
</tr>
<tr>
<td>ATIS: VHF 123.45</td>
</tr>
<tr>
<td>Traffic: VHF 123.45</td>
</tr>
<tr>
<td>DME: 123</td>
</tr>
<tr>
<td>Deck: VHF 123.45</td>
</tr>
<tr>
<td>VOR/DME: 123</td>
</tr>
<tr>
<td>VOR: 123</td>
</tr>
<tr>
<td>Fueling: 4</td>
</tr>
<tr>
<td>GPU: 5</td>
</tr>
<tr>
<td>Deck heading:</td>
</tr>
<tr>
<td>MTOM:</td>
</tr>
<tr>
<td>Status Light: 6</td>
</tr>
<tr>
<td>Fire Fighting Equipment: 7</td>
</tr>
</tbody>
</table>
1 Fixed manned, fixed unmanned; ship type (e.g. diving support vessel); semi-submersible; jack-up.

2 WGS84 grid.

3 NAM, AMOCO, etc.

4 Pressure/gravity; pressure; gravity; no.

5 Yes; no; 28V DC.

6 Yes; no.

7 Type (e.g. aqueous film forming foams (AFFF)) and nature (e.g. deck integrated firefighting system (DIFFS)).

**AOCR.OP.MPA.107 Adequate aerodrome**

The operator shall consider an aerodrome as adequate if, at the expected time of use, the aerodrome is available and equipped with necessary
ancillary services such as air traffic services (ATS), sufficient lighting, communications, weather reporting, navigation aids and emergency services.

**AOCR.OP.MPA.110 Aerodrome operating minima**

(a) The operator shall establish aerodrome operating minima for each departure, destination or alternate aerodrome planned to be used. These minima shall not be lower than those established for such aerodromes by the State in which the aerodrome is located, except when specifically approved by that State. Any increment specified by the Authority shall be added to the minima.

(b) The use of a head-up display (HUD), head-up guidance landing system (HUDLS) or enhanced vision system (EVS) may allow operations with lower visibilities than the established aerodrome operating minima if approved in accordance with AOCR.SPA.LVO.

(c) When establishing aerodrome operating minima, the operator shall take the following into account:

1. the type, performance and handling characteristics of the aircraft;
2. the composition, competence and experience of the flight crew;
3. the dimensions and characteristics of the runways/final approach and take-off areas (FATOs) that may be selected for use;
4. the adequacy and performance of the available visual and non-visual ground aids;
5. the equipment available on the aircraft for the purpose of navigation and/or control of the flight path during the take-off, the approach, the flare, the landing, rollout and the missed approach;
6. for the determination of obstacle clearance, the obstacles in the approach, missed approach and the climb-out areas necessary for the execution of contingency procedures;
7. the obstacle clearance altitude/height for the instrument approach procedures;
8. the means to determine and report meteorological conditions; and
(9) the flight technique to be used during the final approach.

(d) The operator shall specify the method of determining aerodrome operating minima in the operations manual.

(e) The minima for a specific approach and landing procedure shall only be used if all the following conditions are met:

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

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

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

(4) the crew is appropriately qualified.

**AMC2 AOCR.OP.MPA.110 Aerodrome operating minima**

**TAKE-OFF OPERATIONS - HELICOPTERS**

(a) General

(1) Take-off minima should be expressed as visibility or runway visual range (RVR) limits, taking into account all relevant factors for each aerodrome planned to be used and aircraft characteristics. Where there is a specific need to see and avoid obstacles on departure and/or for a forced landing, additional conditions, e.g. ceiling, should be specified.

(2) The commander should not commence take-off unless the weather conditions at the aerodrome of departure are equal to or better than applicable minima for landing at that aerodrome unless a weather-permissible take-off alternate aerodrome is available.

(3) When the reported meteorological visibility (VIS) is below that required for take-off and RVR is not reported, a take-off should only be commenced if the commander can determine that the visibility along the take-off runway/area is equal to or better than the required minimum.

(4) When no reported meteorological visibility or RVR is available, a take-off should only be commenced if the commander can determine that the visibility along the take-off runway/area is equal to or better than the required minimum.

(b) Visual reference
(1) The take-off minima should be selected to ensure sufficient guidance to control the aircraft in the event of both a rejected take-off in adverse circumstances and a continued take-off after failure of the critical engine.

(2) For night operations, ground lights should be available to illuminate the runway/final approach and take-off area (FATO) and any obstacles.

(c) Required RVR/VIS – helicopters:

(1) For performance class 1 operations, the operator should specify an RVR/VIS as take-off minima in accordance with Table 1.H.

(2) For performance class 2 operations onshore, the commander should operate to take-off minima of 800 m RVR/VIS and remain clear of cloud during the take-off manoeuvre until reaching performance class 1 capabilities.

(3) For performance class 2 operations offshore, the commander should operate to minima not less than that for performance class 1 and remain clear of cloud during the take-off manoeuvre until reaching performance class 1 capabilities.

(4) Table 8 for converting reported meteorological visibility to RVR should not be used for calculating take-off minima.

Table 1.H: Take-off – helicopters (without LVTO approval) RVR/VIS

<table>
<thead>
<tr>
<th>Onshore aerodromes with instrument flight rules (IFR) departure procedures</th>
<th>RVR/VIS (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No light and no markings (day only)</td>
<td>400 or the rejected take-off distance, whichever is the greater</td>
</tr>
<tr>
<td>No markings (night)</td>
<td>800</td>
</tr>
<tr>
<td>Runway edge/FATO light and centreline marking</td>
<td>400</td>
</tr>
<tr>
<td>Runway edge/FATO light, centreline marking and relevant RVR information</td>
<td>400</td>
</tr>
</tbody>
</table>
**Offshore helideck *\**

<table>
<thead>
<tr>
<th>Two-pilot operations</th>
<th>400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-pilot operations</td>
<td>500</td>
</tr>
</tbody>
</table>

*: The take-off flight path to be free of obstacles.

**AMC3 AOCR.OP.MPA.110  Aerodrome operating minima**

**NPA, APV, CAT I OPERATIONS**

(a) The decision height (DH) to be used for a non-precision approach (NPA) flown with the continuous descent final approach (CDFA) technique, approach procedure with vertical guidance (APV) or CAT I operation should not be lower than the highest of:

1. the minimum height to which the approach aid can be used without the required visual reference;
2. the obstacle clearance height (OCH) for the category of aircraft;
3. the published approach procedure DH where applicable;
4. the system minimum specified in Table 3; or
5. the minimum DH specified in the aircraft flight manual (AFM) or equivalent document, if stated.

(b) The minimum descent height (MDH) for an NPA operation flown without the CDFA technique should not be lower than the highest of:

1. the OCH for the category of aircraft;
2. the system minimum specified in Table 3; or
3. the minimum MDH specified in the AFM, if stated.
### Table 3: System minima

<table>
<thead>
<tr>
<th>Facility</th>
<th>Lowest DH/MDH (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILS/MLS/GLS</td>
<td>200</td>
</tr>
<tr>
<td>GNSS/ SBAS (LPV)</td>
<td>200</td>
</tr>
<tr>
<td>GNSS (LNAV)</td>
<td>250</td>
</tr>
<tr>
<td>GNSS/Baro-VNAV (LNAV/ VNAV)</td>
<td>250</td>
</tr>
<tr>
<td>LOC with or without DME</td>
<td>250</td>
</tr>
<tr>
<td>SRA (terminating at ½ NM)</td>
<td>250</td>
</tr>
<tr>
<td>SRA (terminating at 1 NM)</td>
<td>300</td>
</tr>
<tr>
<td>SRA (terminating at 2 NM or more)</td>
<td>350</td>
</tr>
<tr>
<td>VOR</td>
<td>300</td>
</tr>
<tr>
<td>VOR/DME</td>
<td>250</td>
</tr>
<tr>
<td>NDB</td>
<td>350</td>
</tr>
<tr>
<td>NDB/DME</td>
<td>300</td>
</tr>
<tr>
<td>VDF</td>
<td>350</td>
</tr>
</tbody>
</table>

DME: distance measuring equipment;  
GNSS: global navigation satellite system;  
ILS: Instrument landing system;  
LNAV: lateral navigation;  
LOC: localiser;  
LPV: localiser performance with vertical guidance  
SBAS: satellite-based augmentation system;  
SRA: surveillance radar approach;  
VDF: VHF direction finder;  
VNAV: vertical navigation;  
VOR: VHF omnidirectional radio range.

**AMC4 AOCR.OP.MPA.110 Aerodrome operating minima**

**CRITERIA FOR ESTABLISHING RVR/CMV**

(a) Aeroplanes

The following criteria for establishing RVR/CMV should apply:
In order to qualify for the lowest allowable values of RVR/CMV specified in Table 6.A the instrument approach should meet at least the following facility specifications and associated conditions:

(i) Instrument approaches with designated vertical profile up to and including 4.5° for category A and B aeroplanes, or 3.77° for category C and D aeroplanes where the facilities are:

(A) ILS / microwave landing system (MLS) / GBAS landing system (GLS) / precision approach radar (PAR); or

(B) APV; and where the final approach track is offset by not more than 15° for category A and B aeroplanes or by not more than 5° for category C and D aeroplanes.

(ii) Instrument approach operations flown using the CDFA technique with a nominal vertical profile, up to and including 4.5° for category A and B aeroplanes, or 3.77° for category C and D aeroplanes, where the facilities are NDB, NDB/DME, VOR, VOR/DME, LOC, LOC/DME, VDF, SRA or GNSS/LNAV, with a final approach segment of at least 3 NM, which also fulfil the following criteria:

(A) the final approach track is offset by not more than 15° for category A and B aeroplanes or by not more than 5° for category C and D aeroplanes;

(B) the final approach fix (FAF) or another appropriate fix where descent is initiated is available, or distance to threshold (THR) is available by flight management system / GNSS (FMS/GNSS) or DME; and

(C) if the missed approach point (MAPt) is determined by timing, the distance from FAF or another appropriate fix to THR is ≤ 8 NM.

(iii) Instrument approaches where the facilities are NDB, NDB/DME, VOR, VOR/DME, LOC, LOC/DME, VDF, SRA or GNSS/LNAV, not fulfilling the criteria in (a) (1) (ii), or with an MDH ≥ 1 200 ft.

(2) The missed approach operation, after an approach operation has been flown using the CDFA technique, should be executed when reaching the DA/H or the MAPt, whichever occurs first. The lateral part of the missed approach procedure should be
DEPARTMENT OF CIVIL AVIATION
HELI.CO.PE.E SUPPLEMENT TO AIRCRAFT OPERATOR CERTIFICATE REQUIREMENTS

flown via the MAPt unless otherwise stated on the approach chart.

AMC6 AOCR.OP.MPA:110    Aerodrome operating minima

DETERMINATION OF RVR/CMV/VIS MINIMA FOR NPA, CAT I — HELICOPTERS

(a) Helicopters

The RVR/CMV/VIS minima for NPA, APV and CAT I operations should be determined as follows:

(1) For NPA operations operated in performance class 1 (PC1) or performance class 2 (PC2), the minima specified in Table 6.1.H should apply:

(i) where the missed approach point is within ½ NM of the landing threshold, the approach minima specified for FALS may be used regardless of the length of approach lights available. However, FATO/runway edge lights, threshold lights, end lights and FATO/runway markings are still required;

(ii) for night operations, ground lights should be available to illuminate the FATO/runway and any obstacles; and

(iii) for single-pilot operations, the minimum RVR is 800 m or the minima in Table 6.1.H, whichever is higher.

(2) For CAT I operations operated in PC1 or PC2, the minima specified in Table 6.2.H should apply:

(i) for night operations, ground light should be available to illuminate the FATO/runway and any obstacles;

(ii) for single-pilot operations, the minimum RVR/VIS should be calculated in accordance with the following additional criteria:

(A) an RVR of less than 800 m should not be used except when using a suitable autopilot coupled to an ILS, MLS or GLS, in which case normal minima apply; and

(B) the DH applied should not be less than 1.25 times the minimum use height for the autopilot.

Table 6.1.H: Onshore NPA minima
<table>
<thead>
<tr>
<th>MDH (ft) *</th>
<th>Facilities vs. RVR/CMV (m) **, ***</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FALS</td>
</tr>
<tr>
<td>250 – 299</td>
<td>600</td>
</tr>
<tr>
<td>300 – 449</td>
<td>800</td>
</tr>
<tr>
<td>450 and above</td>
<td>1 000</td>
</tr>
</tbody>
</table>

*: The MDH refers to the initial calculation of MDH. When selecting the associated RVR, there is no need to take account of a rounding up to the nearest 10 ft, which may be done for operational purposes, e.g. conversion to MDA.

**: The tables are only applicable to conventional approaches with a nominal descent slope of not greater than 4°. Greater descent slopes will usually require that visual glide slope guidance (e.g. precision approach path indicator (PAPI)) is also visible at the MDH.

***: FALS comprise FATO/runway markings, 720 m or more of high intensity/medium intensity (HI/MI) approach lights, FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights to be on.

IALS comprise FATO/runway markings, 420 - 719 m of HI/MI approach lights, FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights to be on.

BALS comprise FATO/runway markings, <420 m of HI/MI approach lights, any length of low intensity (LI) approach lights, FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights to be on.

NALS comprise FATO/runway markings, FATO/runway edge lights, threshold lights, FATO/runway end lights or no lights at all.

**AMC8 AOCR.OP.MPA.110 Aerodrome operating minima**

**ONSHORE CIRCLING OPERATIONS — HELICOPTERS**

For circling, the specified MDH should not be less than 250 ft, and the meteorological visibility not less than 800 m.

**GM1 AOCR.OP.MPA.110 Aerodrome operating minima**

**ONSHORE AERODROME DEPARTURE PROCEDURES — HELICOPTERS**

The cloud base and visibility should be such as to allow the helicopter to be clear of cloud at take-off decision point (TDP), and for the pilot flying to remain
in sight of the surface until reaching the minimum speed for flight in instrument meteorological conditions (IMC) given in the AFM.

AOCR.OP.MPA.120 Airborne radar approaches (ARAs) for overwater operations — helicopters

(a) An ARA shall only be undertaken if:

(1) the radar provides course guidance to ensure obstacle clearance; and

(2) either:

(i) the minimum descent height (MDH) is determined from a radio altimeter; or

(ii) the minimum descent altitude (MDA) plus an adequate margin is applied.

(b) ARAs to rigs or vessels under way shall only be conducted in multi-crew operations.

(c) The decision range shall provide adequate obstacle clearance in the missed approach from any destination for which an ARA is planned.

(d) The approach shall only be continued beyond decision range or below MDA/H when visual reference with the destination has been established.

(e) For single-pilot operations, appropriate increments shall be added to the MDA/H and decision range.

AMC1 AOCR.OP.MPA.120 Airborne radar approaches (ARAs) for overwater operations - helicopters

GENERAL

(a) Before commencing the final approach the commander should ensure that a clear path exists on the radar screen for the final and missed approach segments. If lateral clearance from any obstacle will be less than 1 NM, the commander should:

(1) approach to a nearby target structure and thereafter proceed visually to the destination structure; or

(2) make the approach from another direction leading to a circling manoeuvre.
(b) The cloud ceiling should be sufficiently clear above the helideck to permit a safe landing.

(c) MDH should not be less than 50 ft above the elevation of the helideck.

(1) The MDH for an airborne radar approach should not be lower than:

   (i) 200 ft by day; or

   (ii) 300 ft by night.

(2) The MDH for an approach leading to a circling manoeuvre should not be lower than:

   (i) 300 ft by day; or

   (ii) 500 ft by night.

(d) MDA may only be used if the radio altimeter is unserviceable. The MDA should be a minimum of MDH +200 ft and should be based on a calibrated barometer at the destination or on the lowest forecast QNH for the region.

(e) The decision range should not be less than ¾ NM.

(f) The MDA/H for a single-pilot ARA should be 100 ft higher than that calculated using (c) and (d) above. The decision range should not be less than 1 NM.

GM1 AOGR.OP.MPA.120 Airborne radar approaches (ARAs) for overwater operations - helicopters

GENERAL

(a) General

(1) The helicopter ARA procedure may have as many as five separate segments. These are the arrival, initial, intermediate, final and missed approach segments. In addition, the specifications of the circling manoeuvre to a landing under visual conditions should be considered. The individual approach segments can begin and end at designated fixes. However, the segments of an ARA may often begin at specified points where no fixes are available.

(2) The fixes, or points, are named to coincide with the associated segment. For example, the intermediate segment begins at the intermediate fix (IF) and ends at the final approach fix (FAF).
Where no fix is available or appropriate, the segments begin and end at specified points; for example, intermediate point (IP) and final approach point (FAP). The order in which this GM discusses the segments is the order in which the pilot would fly them in a complete procedure: that is, from the arrival through initial and intermediate to a final approach and, if necessary, the missed approach.

(3) Only those segments that are required by local conditions applying at the time of the approach need be included in a procedure. In constructing the procedure, the final approach track, which should be orientated so as to be substantially into wind should be identified first as it is the least flexible and most critical of all the segments. When the origin and the orientation of the final approach have been determined, the other necessary segments should be integrated with it to produce an orderly manoeuvring pattern that does not generate an unacceptably high work-load for the flight crew.

(4) Examples of ARA procedures, vertical profile and missed approach procedures are contained in Figures 1 to 5.

(b) Obstacle environment

(1) Each segment of the ARA is located in an overwater area that has a flat surface at sea level. However, due to the passage of large vessels which are not required to notify their presence, the exact obstacle environment cannot be determined. As the largest vessels and structures are known to reach elevations exceeding 500 ft above mean sea level (AMSL), the uncontrolled offshore obstacle environment applying to the arrival, initial and intermediate approach segments can reasonably be assumed to be capable of reaching to at least 500 ft AMSL. But, in the case of the final approach and missed approach segments, specific areas are involved within which no radar returns are allowed. In these areas the height of wave crests and the possibility that small obstacles may be present that are not visible on radar results in an uncontrolled surface environment that extends to an elevation of 50 ft AMSL.

(2) Under normal circumstances, the relationship between the approach procedure and the obstacle environment is governed according to the concept that vertical separation is very easy to apply during the arrival, initial and intermediate segments, while horizontal separation, which is much more difficult to guarantee in an uncontrolled environment, is applied only in the final and missed approach segments.
(c) Arrival segment

The arrival segment commences at the last en-route navigation fix, where the aircraft leaves the helicopter route, and it ends either at the initial approach fix (IAF) or, if no course reversal, or similar manoeuvre is required, it ends at the IF. Standard en-route obstacle clearance criteria should be applied to the arrival segment.

(d) Initial approach segment

The initial approach segment is only required if a course reversal, race track, or arc procedure is necessary to join the intermediate approach track. The segment commences at the IAF and on completion of the manoeuvre ends at the IP. The minimum obstacle clearance (MOC) assigned to the initial approach segment is 1 000 ft.

(e) Intermediate approach segment

The intermediate approach segment commences at the IP, or in the case of straight-in approaches, where there is no initial approach segment, it commences at the IF. The segment ends at the FAP and should not be less than 2 NM in length. The purpose of the intermediate segment is to align and prepare the helicopter for the final approach. During the intermediate segment the helicopter should be lined up with the final approach track, the speed should be stabilised, the destination should be identified on the radar, and the final approach and missed approach areas should be identified and verified to be clear of radar returns. The MOC assigned to the intermediate segment is 500 ft.

(f) Final approach segment

(1) The final approach segment commences at the FAP and ends at the missed approach point (MAPt). The final approach area, which should be identified on radar, takes the form of a corridor between the FAP and the radar return of the destination. This corridor should not be less than 2 NM wide in order that the projected track of the helicopter does not pass closer than 1 NM to the obstacles lying outside the area.

(2) On passing the FAP, the helicopter will descend below the intermediate approach altitude, and follow a descent gradient which should not be steeper than 6.5 %. At this stage vertical separation from the offshore obstacle environment will be lost. However, within the final approach area the MDA/H will provide separation from the surface environment. Descent from 1 000 ft AMSL to 200 ft AMSL at a constant 6.5 % gradient will involve a horizontal distance of 2 NM. In order to follow the guideline that the procedure should not generate an unacceptably high work-
load for the flight crew, the required actions of levelling at MDH, changing heading at the offset initiation point (OIP), and turning away at MAPt should not be planned to occur at the same NM time from the destination.

(3) During the final approach, compensation for drift should be applied and the heading which, if maintained, would take the helicopter directly to the destination, should be identified. It follows that, at an OIP located at a range of 1.5 NM, a heading change of 10° is likely to result in a track offset of 15° at 1 NM, and the extended centreline of the new track can be expected to have a mean position lying some 300 - 400 m to one side of the destination structure. The safety margin built in to the 0.75 NM decision range (DR) is dependent upon the rate of closure with the destination. Although the airspeed should be in the range 60 - 90 kt during the final approach, the ground speed, after due allowance for wind velocity, should be no greater than 70 kt.

(g) Missed approach segment

(1) The missed approach segment commences at the MAPt and ends when the helicopter reaches minimum en-route altitude. The missed approach manoeuvre is a ‘turning missed approach’ which should be of not less than 30° and should not, normally, be greater than 45°. A turn away of more than 45° does not reduce the collision risk factor any further, nor will it permit a closer DR. However, turns of more than 45° may increase the risk of pilot disorientation and, by inhibiting the rate of climb (especially in the case of an OEI missed approach procedure), may keep the helicopter at an extremely low level for longer than is desirable.

(2) The missed approach area to be used should be identified and verified as a clear area on the radar screen during the intermediate approach segment. The base of the missed approach area is a sloping surface at 2.5 % gradient starting from MDH at the MAPt. The concept is that a helicopter executing a turning missed approach will be protected by the horizontal boundaries of the missed approach area until vertical separation of more than 130 ft is achieved between the base of the area, and the offshore obstacle environment of 500 ft AMSL which prevails outside the area.

(3) A missed approach area, taking the form of a 45° sector orientated left or right of the final approach track, originating from a point 5 NM short of the destination, and terminating on an arc 3 NM beyond the destination, will normally satisfy the specifications of a 30° turning missed approach.
(h) The required visual reference

The visual reference required is that the destination should be in view in order that a safe landing may be carried out.

(i) Radar equipment

During the ARA procedure, colour mapping radar equipment with a 120° sector scan and 2.5 NM range scale selected, may result in dynamic errors of the following order:

1. bearing/tracking error ±4.5° with 95 % accuracy;
2. mean ranging error -250 m; or
3. random ranging error ±250 m with 95 % accuracy.

Figure 1: Arc procedure
**Figure 2: Base turn procedure – direct approach**

![Diagram](image1)

**Figure 3: Holding pattern & race track procedure**

![Diagram](image2)

**Figure 4: Vertical profile**

![Diagram](image3)
**AOCR.OP.MPA.125 Instrument departure and approach procedures**

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

(b) Notwithstanding (a), the commander may accept an ATC clearance to deviate from a published departure or arrival route, provided obstacle clearance criteria are observed and full account is taken of the operating conditions. In any case, the final approach shall be flown visually or in accordance with the established instrument approach procedures.

(c) Notwithstanding (a), the operator may use procedures other than those referred to in (a) provided they have been approved by the State in which the aerodrome is located and are specified in the operations manual.

**AOCR.OP.MPA.131 Noise abatement procedures — helicopters**

(a) The operator shall ensure that take-off and landing procedures take into account the need to minimise the effect of helicopter noise.

(b) The procedures shall:

1. ensure that safety has priority over noise abatement; and
2. be simple and safe to operate with no significant increase in crew workload during critical phases of flight.
AOCR.OP.MPA.135  Routes and areas of operation — general

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

(1) ground facilities and services, including meteorological services, adequate for the planned operation are provided;

(2) the performance of the aircraft is adequate to comply with minimum flight altitude requirements;

(3) the equipment of the aircraft meets the minimum requirements for the planned operation; and

(4) appropriate maps and charts are available.

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

(c) (a) (1) shall not apply to operations under VFR by day of other-than-complex motor-powered aircraft on flights that depart from and arrive at the same aerodrome or operating site.

AOCR.OP.MPA.137  Routes and areas of operation — helicopters

The operator shall ensure that:

(a) for helicopters operated in performance class 3, surfaces are available that permit a safe forced landing to be executed, except when the helicopter has an approval to operate in accordance with AOCR.POL.H.420;

(b) for helicopters operated in performance class 3 and conducting ‘coastal transit’ operations, the operations manual contains procedures to ensure that the width of the coastal corridor, and the equipment carried, is consistent with the conditions prevailing at the time.

GM1 AOCR.OP.MPA.137 (b) Routes and areas of operation — helicopters

COASTAL TRANSIT

(a) General
(1) Helicopters operating overwater in performance class 3 have to have certain equipment fitted. This equipment varies with the distance from land that the helicopter is expected to operate. The aim of this GM is to discuss that distance, bring into focus what fit is required and to clarify the operator's responsibility, when a decision is made to conduct coastal transit operations.

(2) In the case of operations north of 45N or south of 45S, the coastal corridor facility may or may not be available in a particular state, as it is related to the State definition of open sea area as described in the definition of hostile environment.

(3) Where the term ‘coastal transit’ is used, it means the conduct of operations overwater within the coastal corridor in conditions where there is reasonable expectation that:

(i) the flight can be conducted safely in the conditions prevailing;

(ii) following an engine failure, a safe forced landing and successful evacuation can be achieved; and

(iii) survival of the crew and passengers can be assured until rescue is effected.

(4) Coastal corridor is a variable distance from the coastline to a maximum distance corresponding to three minutes’ flying at normal cruising speed.

(b) Establishing the width of the coastal corridor

(1) The maximum distance from land of coastal transit, is defined as the boundary of a corridor that extends from the land, to a maximum distance of up to 3 minutes at normal cruising speed (approximately 5 - 6 NM). Land in this context includes sustainable ice (see (i) to (iii) below) and, where the coastal region includes islands, the surrounding waters may be included in the corridor and aggregated with the coast and each other. Coastal transit need not be applied to inland waterways, estuary crossing or river transit.

(i) in some areas, the formation of ice is such that it can be possible to land, or force land, without hazard to the helicopter or occupants. Unless the Authority considers that operating to, or over, such ice fields is unacceptable, the operator may regard the definition of the ‘land’ extends to these areas.
(ii) The interpretation of the following rules may be conditional on (i) above:

- CAT.OP.MPA.137 (a) (2)
- CAT.IDE.H.290
- CAT.IDE.H.295
- CAT.IDE.H.300
- CAT.IDE.H.320.

(iii) In view of the fact that such featureless and flat white surfaces could present a hazard and could lead to white-out conditions, the definition of land does not extend to flights over ice fields in the following rules:

- CAT.IDE.H.125 (d)
- CAT.IDE.H.145.

(2) The width of the corridor is variable from not safe to conduct operations in the conditions prevailing, to the maximum of 3 minutes wide. A number of factors will, on the day, indicate if it can be used - and how wide it can be. These factors will include but not be restricted to the following:

(i) meteorological conditions prevailing in the corridor;
(ii) instrument fit of the aircraft;
(iii) certification of the aircraft - particularly with regard to floats;
(iv) sea state;
(v) temperature of the water;
(vi) time to rescue; and
(vii) survival equipment carried.

(3) These can be broadly divided into three functional groups:

(i) those that meet the provisions for safe flying;
(ii) those that meet the provisions for a safe forced landing and evacuation; and

(iii) those that meet the provisions for survival following a forced landing and successful evacuation.

(c) Provision for safe flying

(1) It is generally recognised that when flying out of sight of land in certain meteorological conditions, such as occur in high pressure weather patterns (goldfish bowl - no horizon, light winds and low visibility), the absence of a basic panel (and training) can lead to disorientation. In addition, lack of depth perception in these conditions demands the use of a radio altimeter with an audio voice warning as an added safety benefit - particularly when autorotation to the surface of the water may be required.

(2) In these conditions the helicopter, without the required instruments and radio altimeter, should be confined to a corridor in which the pilot can maintain reference using the visual cues on the land.

(d) Provision for a safe forced landing and evacuation

(1) Weather and sea state both affect the outcome of an autorotation following an engine failure. It is recognised that the measurement of sea state is problematical and when assessing such conditions, good judgement has to be exercised by the operator and the commander.

(2) Where floats have been certificated only for emergency use (and not for ditching), operations should be limited to those sea states that meet the provisions for such use - where a safe evacuation is possible.

Ditching certification requires compliance with a comprehensive number of requirements relating to rotorcraft water entry, flotation and trim, occupant egress and occupant survival. Emergency flotation systems, generally fitted to smaller CS-27 rotorcraft, are approved against a broad specification that the equipment should perform its intended function and not hazard the rotorcraft or its occupants. In practice, the most significant difference between ditching and emergency flotation systems is substantiation of the water entry phase. Ditching rules call for water entry procedures and techniques to be established and promulgated in the AFM. The fuselage/flotation equipment should thereafter be shown to be able to withstand loads under defined water entry conditions which relate to these procedures. For emergency flotation
equipment, there is no specification to define the water entry technique and no specific conditions defined for the structural substantiation.

(e) Provisions for survival

(1) Survival of crew members and passengers, following a successful autorotation and evacuation, is dependent on the clothing worn, the equipment carried and worn, the temperature of the sea and the sea state. Search and rescue (SAR) response/capability consistent with the anticipated exposure should be available before the conditions in the corridor can be considered non-hostile.

(2) Coastal transit can be conducted (including north of 45N and south of 45S - when the definition of open sea areas allows) providing the provisions of (c) and (d) are met, and the conditions for a non-hostile coastal corridor are satisfied.

AOCR.OP.MPA.145 Establishment of minimum flight altitudes

(a) The operator shall establish for all route segments to be flown:

(1) minimum flight altitudes that provide the required terrain clearance, taking into account the requirements of Subpart C; and

(2) a method for the flight crew to determine those altitudes.

(b) The method for establishing minimum flight altitudes shall be approved by the Authority.

(c) Where the minimum flight altitudes established by the operator and a State overflown differ, the higher values shall apply.

AOCR.OP.MPA.150 Fuel policy

(a) The operator shall establish a fuel policy for the purpose of flight planning and in-flight replanning to ensure that every flight carries sufficient fuel for the planned operation and reserves to cover deviations from the planned operation. The fuel policy and any change to it require prior approval by the Authority.

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

(1) procedures contained in the operations manual and:
(i) data provided by the aircraft manufacturer; or

(ii) current aircraft-specific data derived from a fuel consumption monitoring system; and

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

(i) aircraft fuel consumption data;

(ii) anticipated masses;

(iii) expected meteorological conditions; and

(iv) air navigation services provider(s) procedures and restrictions.

(c) The operator shall ensure that the pre-flight calculation of usable fuel required for a flight includes:

(1) taxi fuel;

(2) trip fuel;

(3) reserve fuel consisting of:

(i) contingency fuel;

(ii) alternate fuel, if a destination alternate aerodrome is required;

(iii) final reserve fuel; and

(iv) additional fuel, if required by the type of operation; and

(4) extra fuel if required by the commander.

(d) The operator shall ensure that in-flight replanning procedures for calculating usable fuel required when a flight has to proceed along a route or to a destination aerodrome other than originally planned includes:

(1) trip fuel for the remainder of the flight; and

(2) reserve fuel consisting of:

(i) contingency fuel;
DEPARTMENT OF CIVIL AVIATION
HELICOPTER SUPPLEMENT TO AIRCRAFT OPERATOR
CERTIFICATE REQUIREMENTS

(ii) alternate fuel, if a destination alternate aerodrome is required;

(iii) final reserve fuel; and

(iv) additional fuel, if required by the type of operation; and

(3) extra fuel if required by the commander.

AMC3 AOCR.OP.MPA.150(b) Fuel policy

PLANNING CRITERIA - HELICOPTERS

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

(a) The amount of:

(1) taxi fuel, which should not be less than the amount expected to be used prior to take-off. Local conditions at the departure site and APU consumption should be taken into account;

(2) trip fuel, which should include fuel:

(i) for take-off and climb from aerodrome elevation to initial cruising level/altitude, taking into account the expected departure routing;

(ii) from top of climb to top of descent, including any step climb/descent;

(iii) from top of descent to the point where the approach procedure is initiated, taking into account the expected arrival procedure; and

(iv) for approach and landing at the destination site;

(3) contingency fuel, which should be:

(i) for IFR flights, or for VFR flights in a hostile environment, 10% of the planned trip fuel; or

(ii) for VFR flights in a non-hostile environment, 5% of the planned trip fuel;

(4) alternate fuel, which should be:
(i) fuel for a missed approach from the applicable MDA/DH at the destination aerodrome to missed approach altitude, taking into account the complete missed approach procedure;

(ii) fuel for a climb from missed approach altitude to cruising level/altitude;

(iii) fuel for the cruise from top of climb to top of descent;

(iv) fuel for descent from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure;

(v) fuel for executing an approach and landing at the destination alternate selected in accordance with AOCR.OP.MPA.181; and

(vi) or for helicopters operating to or from helidecks located in a hostile environment, 10% of (a) (4) (i) to (v);

(5) final reserve fuel, which should be:

(i) for VFR flights navigating by day with reference to visual landmarks, 20 minutes’ fuel at best range speed; or

(ii) for IFR flights or when flying VFR and navigating by means other than by reference to visual landmarks or at night, fuel to fly for 30 minutes at holding speed at 1 500 ft (450 m) above the destination aerodrome in standard conditions calculated with the estimated mass on arrival above the alternate, or the destination, when no alternate is required; and

(6) extra fuel, which should be at the discretion of the commander.

(b) Isolated aerodrome IFR procedure

If the operator’s fuel policy includes planning to an isolated aerodrome flying IFR, or when flying VFR and navigating by means other than by reference to visual landmarks, for which a destination alternate does not exist, the amount of fuel at departure should include:

(1) taxi fuel;

(2) trip fuel;

(3) contingency fuel calculated in accordance with (a) (3);
(4) additional fuel to fly for 2 hours at holding speed, including final reserve fuel; and

(5) extra fuel at the discretion of the commander.

(c) Sufficient fuel should be carried at all times to ensure that following the failure of an engine occurring at the most critical point along the route, the helicopter is able to:

(1) descend as necessary and proceed to an adequate aerodrome;

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

(3) make an approach and landing.

AOCR.OP.MPA.151 Fuel policy — alleviations

Notwithstanding AOCR.OP.MPA.150(b) to (d), for helicopters with an MCTOM of 3 175 kg or less, by day and over routes navigated by reference to visual landmarks or local helicopter operations, the fuel policy shall ensure that, on completion of the flight, or series of flights the final reserve fuel is not less than an amount sufficient for:

(1) 30 minutes flying time at normal cruising speed; or

(2) 20 minutes flying time at normal cruising speed when operating within an area providing continuous and suitable precautionary landing sites.

AOCR.OP.MPA.155 Carriage of special categories of passengers (SCPs)

(a) Persons requiring special conditions, assistance and/or devices when carried on a flight shall be considered as SCPs including at least:

(1) persons with reduced mobility (PRMs) who, without prejudice to any national regulations are understood to be any person whose mobility is reduced due to any physical disability, sensory or locomotory, permanent or temporary, intellectual disability or impairment, any other cause of disability, or age;

(2) infants and unaccompanied children; and

(3) deportees, inadmissible passengers or prisoners in custody.
(b) SCPs shall be carried under conditions that ensure the safety of the aircraft and its occupants according to procedures established by the operator.

(c) SCPs shall not be allocated, nor occupy, seats that permit direct access to emergency exits or where their presence could:
   (1) impede crew members in their duties;
   (2) obstruct access to emergency equipment; or
   (3) impede the emergency evacuation of the aircraft.

(d) The commander shall be notified in advance when SCPs are to be carried on board.

**AOCR.OP.MPA.160   Stowage of baggage and cargo**

The operator shall establish procedures to ensure that:

(a) only hand baggage that can be adequately and securely stowed is taken into the passenger compartment; and

(b) all baggage and cargo on board that might cause injury or damage, or obstruct aisles and exits if displaced, is stowed so as to prevent movement.

**AOCR.OP.MPA.165   Passenger seating**

The operator shall establish procedures to ensure that passengers are seated where, in the event that an emergency evacuation is required, they are able to assist and not hinder evacuation of the aircraft.

**AOCR.OP.MPA.170   Passenger briefing**

The operator shall ensure that passengers are:

(a) given briefings and demonstrations relating to safety in a form that facilitates the application of the procedures applicable in the event of an emergency; and

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

(a) An operational flight plan shall be completed for each intended flight based on considerations of aircraft performance, other operating limitations and relevant expected conditions on the route to be followed and at the aerodromes/operating sites concerned.

(b) The flight shall not be commenced unless the commander is satisfied that:

1. all items stipulated in MCAR-PART-AIRWORTHINESS concerning the airworthiness and registration of the aircraft, instrument and equipment, mass and centre of gravity (CG) location, baggage and cargo and aircraft operating limitations can be complied with;

2. the aircraft is not operated contrary to the provisions of the configuration deviation list (CDL);

3. the parts of the operations manual that are required for the conduct of the flight are available;

4. the documents, additional information and forms required to be available by AOCR.GEN.MPA.180 are on board;

5. current maps, charts and associated documentation or equivalent data are available to cover the intended operation of the aircraft including any diversion that may reasonably be expected;

6. ground facilities and services required for the planned flight are available and adequate;

7. the provisions specified in the operations manual in respect of fuel, oil, oxygen, minimum safe altitudes, aerodrome operating minima and availability of alternate aerodromes, where required, can be complied with for the planned flight; and

8. any additional operational limitation can be complied with.

(c) Notwithstanding (a), an operational flight plan is not required for operations under VFR of:

1. other-than-complex motor-powered aeroplane taking off and landing at the same aerodrome or operating site; or
(2) helicopters with an MCTOM of 3 175 kg or less, by day and over routes navigated by reference to visual landmarks in a local area as specified in the operations manual.

**AOCR.OP.MPA.181 Selection of aerodromes and operating sites — helicopters**

(a) For flights under instrument meteorological conditions (IMC), the commander shall select a take-off alternate aerodrome within one hour flying time at normal cruising speed if it would not be possible to return to the site of departure due to meteorological reasons.

(b) For IFR flights or when flying under VFR and navigating by means other than by reference to visual landmarks, the commander shall specify at least one destination alternate aerodrome in the operational flight plan unless:

(1) the destination is a coastal aerodrome and the helicopter is routing from offshore;

(2) for a flight to any other land destination, the duration of the flight and the meteorological conditions prevailing are such that, at the estimated time of arrival at the site of intended landing, an approach and landing is possible under visual meteorological conditions (VMC); or

(3) the site of intended landing is isolated and no alternate is available; in this case, a point of no return (PNR) shall be determined.

(c) The operator shall select two destination alternate aerodromes when:

(1) the appropriate weather reports and/or forecasts for the destination aerodrome 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 the applicable planning minima; or

(2) no meteorological information is available for the destination aerodrome.

(d) The operator may select off-shore destination alternate aerodromes when the following criteria are applied:

(1) an off-shore destination alternate aerodrome shall be used only after a PNR. Prior to the PNR, on-shore alternate aerodromes shall be used;
(2) OEI landing capability shall be attainable at the alternate aerodrome;

(3) to the extent possible, 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 aerodrome by each helicopter type proposed to be used;

(4) weather minima shall be established taking accuracy and reliability of meteorological information into account;

(5) the MEL shall contain specific provisions for this type of operation; and

(6) an off-shore alternate aerodrome shall only be selected if the operator has established a procedure in the operations manual.

(e) The operator shall specify any required alternate aerodrome(s) in the operational flight plan.

AMC1 AOCR.OP.MPA.181 (b) (1) Selection of aerodromes and operating sites - helicopters

COASTAL AERODROME

(a) Any alleviation from the requirement to select an alternate aerodrome for a flight to a coastal aerodrome under IFR routing from offshore should be based on an individual safety case assessment.

(b) The following should be taken into account:

(1) suitability of the weather based on the landing forecast for the destination;

(2) the fuel required to meet the IFR requirements of AOCR.OP.MPA.150 less alternate fuel;

(3) where the destination coastal aerodrome is not directly on the coast it should be:

   (i) within a distance that, with the fuel specified in (b)(2), the helicopter can, at any time after crossing the coastline, return to the coast, descend safely and carry out a visual approach and landing with VFR fuel reserves intact; and

   (ii) geographically sited so that the helicopter can, within the rules of the air, and within the landing forecast:
(A) proceed inbound from the coast at 500 ft AGL and carry out a visual approach and landing; or

(B) proceed inbound from the coast on an agreed route and carry out a visual approach and landing;

(4) procedures for coastal aerodromes should be based on a landing forecast no worse than:

(i) by day, a cloud base of DH/MDH +400 ft, and a visibility of 4 km, or, if descent over the sea is intended, a cloud base of 600 ft and a visibility of 4 km; or

(ii) by night, a cloud base of 1 000 ft and a visibility of 5 km;

(5) the descent to establish visual contact with the surface should take place over the sea or as part of the instrument approach;

(6) routings and procedures for coastal aerodromes nominated as such should be included in the operations manual, Part C;

(7) the MEL should reflect the requirement for airborne radar and radio altimeter for this type of operation; and

(8) operational limitations for each coastal aerodrome should be specified in the operations manual.

GM1 AOCR.OP.MPA.181 Selection of aerodromes and operating sites - helicopters

OFFSHORE ALTERNATES

When operating offshore, any spare payload capacity should be used to carry additional fuel if it would facilitate the use of an onshore alternate aerodrome.

LANDING FORECAST

(a) Meteorological data have been specified that conform to the standards contained in the Regional Air Navigation Plan and ICAO Annex 3. As the following meteorological data is point-specific, caution should be exercised when associating it with nearby aerodromes (or helidecks).

(b) Meteorological reports (METARs)

(1) Routine and special meteorological observations at offshore installations should be made during periods and at a frequency agreed between the meteorological authority and the operator
concerned. They should comply with the provisions contained in the meteorological section of the ICAO Regional Air Navigation Plan, and should conform to the standards and recommended practices, including the desirable accuracy of observations, promulgated in ICAO Annex 3.

(2) Routine and selected special reports are exchanged between meteorological offices in the METAR or SPECI (aviation selected special weather report) code forms prescribed by the World Meteorological Organisation.

(c) Aerodrome forecasts (TAFs)

(1) The aerodrome forecast consists of a concise statement of the mean or average meteorological conditions expected at an aerodrome or aerodrome during a specified period of validity, which is normally not less than 9 hours, or more than 24 hours in duration. The forecast includes surface wind, visibility, weather and cloud, and expected changes of one or more of these elements during the period. Additional elements may be included as agreed between the meteorological authority and the operators concerned. Where these forecasts relate to offshore installations, barometric pressure and temperature should be included to facilitate the planning of helicopter landing and take-off performance.

(2) Aerodrome forecasts are most commonly exchanged in the TAF code form, and the detailed description of an aerodrome forecast is promulgated in the ICAO Regional Air Navigation Plan and also in ICAO Annex 3, together with the operationally desirable accuracy elements. In particular, the observed cloud height should remain within ±30 % of the forecast value in 70 % of cases, and the observed visibility should remain within ±30 % of the forecast value in 80 % of cases.

(d) Landing forecasts (TRENDS)

(1) The landing forecast consists of a concise statement of the mean or average meteorological conditions expected at an aerodrome or aerodrome during the two-hour period immediately following the time of issue. It contains surface wind, visibility, significant weather and cloud elements and other significant information, such as barometric pressure and temperature, as may be agreed between the meteorological authority and the operators concerned.

(2) The detailed description of the landing forecast is promulgated in the ICAO Regional Air Navigation Plan and also in ICAO Annex 3,
together with the operationally desirable accuracy of the forecast elements. In particular, the value of the observed cloud height and visibility elements should remain within ±30 % of the forecast values in 90 % of the cases.

(3) Landing forecasts most commonly take the form of routine or special selected meteorological reports in the METAR code, to which either the code words ‘NOSIG’, i.e. no significant change expected; ‘BECMG’ (becoming), or ‘TEMPO’ (temporarily), followed by the expected change, are added. The 2-hour period of validity commences at the time of the meteorological report.

AMC1 AOCA.OP.MPA.181 (d) Selection of aerodromes and operating sites - helicopters

OFFSHORE ALTERNATES

(a) Offshore alternate helideck landing environment

The landing environment of a helideck that is proposed for use as an offshore alternate should be pre-surveyed and, as well as the physical characteristics, the effect of wind direction and strength, and turbulence established. This information, which should be available to the commander at the planning stage and in flight, should be published in an appropriate form in the operations manual Part C (including the orientation of the helideck) such that the suitability of the helideck for use as an offshore alternate aerodrome 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.

(b) Performance considerations

The use of an offshore alternate is restricted to helicopters which can achieve OEI in ground effect (IGE) hover at an appropriate power rating at the offshore alternate aerodrome. Where the surface of the offshore alternate helideck, or prevailing conditions (especially wind velocity), precludes an OEI IGE, 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 that have an adverse effect on performance. The planned landing mass of the helicopter including crew, passengers, baggage, cargo plus 30 minutes final reserve fuel, should not exceed the OEI landing mass at the time of approach to the offshore alternate aerodrome.
(c) Weather considerations

(1) Meteorological observations

When the use of an offshore alternate helideck is planned, the meteorological observations at the destination and alternate aerodrome should be taken by an observer acceptable to the authority responsible for the provision of meteorological services. Automatic meteorological observations stations may be used.

(2) Weather minima

When the use of an offshore alternate helideck is planned, the operator should not select a helideck as a destination or offshore alternate helideck unless the aerodrome forecast indicates that, during a period commencing 1 hour before and ending 1 hour after the expected time of arrival at the destination and offshore alternate aerodrome, the weather conditions will be at or above the planning minima shown in Table 1 below.

Table 1: Planning minima

<table>
<thead>
<tr>
<th></th>
<th>Day</th>
<th>Night</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloud Base</td>
<td>600ft</td>
<td>800ft</td>
</tr>
<tr>
<td>Visibility</td>
<td>4km</td>
<td>5km</td>
</tr>
</tbody>
</table>

(3) Conditions of fog

Where fog is forecast, or has been observed within the last 2 hours within 60 NM of the destination or alternate aerodrome, offshore alternate aerodromes should not be used.

(d) Actions at point of no return

Before passing the point of no return - which should not be more that 30 minutes from the destination - the following actions should have been completed:

(1) confirmation that navigation to the destination and offshore alternate helideck can be assured;

(2) radio contact with the destination and offshore alternate helideck (or master station) has been established;

(3) the landing forecast at the destination and offshore alternate helideck have been obtained and confirmed to be at or above the required minima;
(4) the requirements for OEI landing (see (b)) have been checked in the light of the latest reported weather conditions to ensure that they can be met; and

(5) to the extent possible, having regard to information on current and forecast use of the offshore alternate helideck and on conditions prevailing, the availability of the offshore alternate helideck should be guaranteed by the duty holder (the rig operator in the case of fixed installations and the owner in the case of mobiles) until the landing at the destination, or the offshore alternate aerodrome, has been achieved or until offshore shuttling has been completed.

(e) Offshore shuttling

Provided that the actions in (d) have been completed, offshore shuttling, using an offshore alternate aerodrome, may be carried out.

AOCR.OP.MPA.186 Planning minima for IFR flights — helicopters

(a) Planning minima for take-off alternate aerodrome(s)

The operator shall only select an aerodrome or landing site as a take-off alternate aerodrome when the appropriate weather reports and/or forecasts indicate that, during a period commencing one hour before and ending one hour after the estimated time of arrival at the take-off alternate aerodrome, the weather conditions will be at or above the applicable landing minima specified in accordance with AOCR.OP.MPA.110. The ceiling shall be taken into account when the only approach operations available are NPA operations. Any limitation related to OEI operations shall be taken into account.

(b) Planning minima for destination aerodrome and destination alternate aerodrome(s)

The operator shall only select the destination and/or destination alternate aerodrome(s) when the appropriate weather reports and/or forecasts indicate that, during a period commencing one hour before and ending one hour after the estimated time of arrival at the aerodrome or operating site, the weather conditions will be at or above the applicable planning minima as follows:

(1) Except as provided in AOCR.OP.MPA.181 (d), planning minima for a destination aerodrome shall be:

   (i) RVR/VIS specified in accordance with AOCR.OP.MPA.110; and
(ii) for NPA operations, the ceiling at or above MDH;

(2) planning minima for destination alternate aerodrome(s) are as shown in Table 1.

Table 1
Planning minima destination alternate aerodrome

<table>
<thead>
<tr>
<th>Type of approach</th>
<th>Planning minima</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAT II and III</td>
<td>CAT I RVR</td>
</tr>
<tr>
<td>CAT I</td>
<td>CAT I + 200 ft/400 m visibility</td>
</tr>
<tr>
<td>NPA</td>
<td>NPA RVR/VIS + 400 m Ceiling shall be at or above MDH + 200 ft</td>
</tr>
</tbody>
</table>

GM1 AOCR.OP.MPA.186 Planning minima for IFR flights - helicopters

PLANNING MINIMA FOR ALTERNATE AERODROMES
Non-precision minima (NPA) in Table 1 of AOCR.OP.MPA.186 mean the next highest minima that apply in the prevailing wind and serviceability conditions. Localiser only approaches, if published, are considered to be non-precision in this context. It is recommended that operators wishing to publish tables of planning minima choose values that are likely to be appropriate on the majority of occasions (e.g. regardless of wind direction). Unsuitable altitudes should, however, be fully taken into account.

As Table 1 does not include planning minima requirements for APV, LTS CAT I and OTS CAT II operations, the operator may use the following minima:

(a) for APV operations – NPA or CAT I minima, depending on the DH/MDH;

(b) for LTS CAT I operations – CAT I minima; and

(c) for OTS CAT II operations – CAT II minima.

AOCR.OP.MPA.190 Submission of the ATS flight plan

(a) If an ATS flight plan is not submitted because it is not required by the rules of the air, adequate information shall be deposited in order to permit alerting services to be activated if required.

(b) When operating from a site where it is impossible to submit an ATS flight plan, the ATS flight plan shall be transmitted as soon as possible after take-off by the commander or the operator.
FLIGHTS WITHOUT ATS FLIGHT PLAN

(a) When unable to submit or to close the ATS flight plan due to lack of ATS facilities or any other means of communications to ATS, the operator should establish procedures, instructions and a list of nominated persons to be responsible for alerting search and rescue services.

(b) To ensure that each flight is located at all times, these instructions should:

(1) provide the nominated person with at least the information required to be included in a VFR flight plan, and the location, date and estimated time for re-establishing communications;

(2) if an aircraft is overdue or missing, provide for notification to the appropriate ATS or search and rescue facility; and

(3) provide that the information will be retained at a designated place until the completion of the flight.

AOCR.OP.MPA.195 Refuelling/defueling with passengers embarking, on board or disembarking

(a) An aircraft shall not be refuelled/defueled with Avgas (aviation gasoline) or wide-cut type fuel or a mixture of these types of fuel, when passengers are embarking, on board or disembarking.

(b) For all other types of fuel, necessary precautions shall be taken and the aircraft shall be properly manned by qualified personnel ready to initiate and direct an evacuation of the aircraft by the most practical and expeditious means available.

AMC1 AOCR.OP.MPA.195 Refueling/defueling with passengers embarking, on board or disembarking

OPERATIONAL PROCEDURES - GENERAL

(a) When refueling/defueling with passengers on board, ground servicing activities and work inside the aircraft, such as catering and cleaning, should be conducted in such a manner that they do not create a hazard and allow emergency evacuation to take place through those aisles and exits intended for emergency evacuation.

(b) The deployment of integral aircraft stairs or the opening of emergency exits as a prerequisite to refueling is not necessarily required.
OPERATIONAL PROCEDURES - HELICOPTERS

(c) Operational procedures should specify that at least the following precautions are taken:

1. door(s) on the refueling side of the helicopter remain closed;

2. door(s) on the non-refueling side of the helicopter remain open, weather permitting;

3. fire-fighting facilities of the appropriate scale be positioned so as to be immediately available in the event of a fire;

4. sufficient personnel be immediately available to move passengers clear of the helicopter in the event of a fire;

5. sufficient qualified personnel be on board and be prepared for an immediate emergency evacuation;

6. if the presence of fuel vapour is detected inside the helicopter, or any other hazard arises during refueling/defueling, fueling be stopped immediately;

7. the ground area beneath the exits intended for emergency evacuation be kept clear; and

8. provision is made for a safe and rapid evacuation.

AOCR.OP.MPA.200 Refuelling/defueling with wide-cut fuel

Refuelling/defueling with wide-cut fuel shall only be conducted if the operator has established appropriate procedures taking into account the high risk of using wide-cut fuel types.

GM1 AOCR.OP.MPA.200 Refueling/defueling with wide-cut fuel

PROCEDURES

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

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

(c) Wide-cut fuel is considered to be ‘involved’ when it is being supplied or when it is already present in aircraft fuel tanks.

(d) When wide-cut fuel has been used, this should be recorded in the technical log. The next two uplifts of fuel should be treated as though they too involved the use of wide-cut fuel.

(e) When refueling/defueling with turbine fuels not containing a static dissipator, and where wide-cut fuels are involved, a substantial reduction on fueling flow rate is advisable. Reduced flow rate, as recommended by fuel suppliers and/or aeroplane manufacturers, has the following benefits:

(1) it allows more time for any static charge build-up in the fueling equipment to dissipate before the fuel enters the tank;

(2) it reduces any charge which may build up due to splashing; and

(3) until the fuel inlet point is immersed, it reduces misting in the tank and consequently the extension of the flammable range of the fuel.

(f) The flow rate reduction necessary is dependent upon the fueling equipment in use and the type of filtration employed on the aeroplane fueling distribution system. It is difficult, therefore, to quote precise flow rates. Reduction in flow rate is advisable whether pressure fueling or over-wing fueling is employed.

(g) With over-wing fuelling, splashing should be avoided by making sure that the delivery nozzle extends as far as practicable into the tank. Caution should be exercised to avoid damaging bag tanks with the nozzle.

AOCR.OP.MPA.210 Crew members at stations

(a) Flight crew members
(1) During take-off and landing each flight crew member required to be on duty in the flight crew compartment shall be at the assigned station.

(2) During all other phases of flight each flight crew member required to be on duty in the flight crew compartment shall remain at the assigned station, unless absence is necessary for the performance of duties in connection with the operation or for physiological needs, provided at least one suitably qualified pilot remains at the controls of the aircraft at all times.

(3) During all phases of flight each flight crew member required to be on duty in the flight crew compartment shall remain alert. If a lack of alertness is encountered, appropriate countermeasures shall be used. If unexpected fatigue is experienced, a controlled rest procedure, organised by the commander, may be used if workload permits. Controlled rest taken in this way shall not be considered to be part of a rest period for purposes of calculating flight time limitations nor used to justify any extension of the duty period.

(b) Cabin crew members

During critical phases of flight, each cabin crew member shall be seated at the assigned station and shall not perform any activities other than those required for the safe operation of the aircraft.

AMC1 AOCR.OP.MPA.210 (b) Crew members at stations

CABIN CREW SEATING POSITIONS

(a) When determining cabin crew seating positions, the operator should ensure that they are:

(1) close to a floor level door/exit;

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

(3) evenly distributed throughout the cabin, in the above order of priority.

(b) Item (a) should not be taken as implying that, in the event of there being more cabin crew stations than required cabin crew, the number of cabin crew members should be increased.
AOCR.OP.MPA.216 Use of headset — helicopters

Each flight crew member required to be on duty in the flight crew compartment shall wear a headset with boom microphone, or equivalent, and use it as the primary device to communicate with ATS.

AOCR.OP.MPA.220 Assisting means for emergency evacuation

The operator shall establish procedures to ensure that before taxiing, take-off and landing and when safe and practicable to do so, all means of assistance for emergency evacuation that deploy automatically are armed.

AOCR.OP.MPA.225 Seats, safety belts and restraint systems

(a) Crew members

(1) During take-off and landing, and whenever decided by the commander in the interest of safety, each crew member shall be properly secured by all safety belts and restraint systems provided.

(2) During other phases of the flight, each flight crew member in the flight crew compartment shall keep the assigned station safety belt fastened while at his/her station.

(b) Passengers

(1) Before take-off and landing, and during taxiing, and whenever deemed necessary in the interest of safety, the commander shall be satisfied that each passenger on board occupies a seat or berth with his/her safety belt or restraint system properly secured.

(2) The operator shall make provisions for multiple occupancy of aircraft seats that is only allowed on specified seats. The commander shall be satisfied that multiple occupancy does not occur other than by one adult and one infant who is properly secured by a supplementary loop belt or other restraint device.

AOCR.OP.MPA.230 Securing of passenger compartment and galley(s)

(a) The operator shall establish procedures to ensure that before taxiing, take-off and landing all exits and escape paths are unobstructed.

(b) The commander shall ensure that before take-off and landing, and whenever deemed necessary in the interest of safety, all equipment and baggage are properly secured.
The operator shall establish procedures to ensure that, when operating a helicopter over water in performance class 3, account is taken of the duration of the flight and conditions to be encountered when deciding if life-jackets are to be worn by all occupants.

**AOCR.OP.MPA.240 Smoking on board**

The commander shall not allow smoking on board:

(a) whenever considered necessary in the interest of safety;

(b) during refuelling and defueling of the aircraft;

(c) while the aircraft is on the surface unless the operator has determined procedures to mitigate the risks during ground operations;

(d) outside designated smoking areas, in the aisle(s) and lavatory (ies);

(e) in cargo compartments and/or other areas where cargo is carried that is not stored in flame-resistant containers or covered by flame-resistant canvas; and

(f) in those areas of the passenger compartment where oxygen is being supplied.

**AOCR.OP.MPA.245 Meteorological conditions — all aircraft**

(a) On IFR flights the commander shall only:

(1) commence take-off; or

(2) continue beyond the point from which a revised ATS flight plan applies in the event of in-flight replanning, when information is available indicating that the expected weather conditions, at the time of arrival, at the destination and/or required alternate aerodrome(s) are at or above the planning minima.

(b) On IFR flights, the commander shall only continue towards the planned destination aerodrome when the latest information available indicates that, at the expected time of arrival, the weather conditions at the destination, or at least one destination alternate aerodrome, are at or above the applicable aerodrome operating minima.

(c) On VFR flights, the commander shall only commence take-off when the appropriate weather reports and/or forecasts indicate that the
meteorological conditions along the part of the route to be flown under VFR will, at the appropriate time, be at or above the VFR limits.

AOCR.OP.MPA.247 Meteorological conditions — helicopters

In addition to AOCR.OP.MPA.245:

(a) On VFR flights overwater out of sight of land with helicopters, the commander shall only commence take-off when the appropriate weather reports and/or forecasts indicate that the cloud ceiling will be above 600 ft by day or 1 200 ft by night.

(b) Notwithstanding (a), when flying between helidecks located in class G airspace where the overwater sector is less than 10 NM, VFR flights may be conducted when the limits are at, or better than, the following:

Table 1

<table>
<thead>
<tr>
<th></th>
<th>Day</th>
<th>Night</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Height(*)</td>
<td>Visibility</td>
</tr>
<tr>
<td>Single-pilot</td>
<td>300ft</td>
<td>3km</td>
</tr>
</tbody>
</table>
| Two Pilots       | 300ft     | 2km(**)   | 500ft     | 5km(***)

(*) The cloud base shall be such as to allow flight at the specified height, below and clear of cloud.

(**) Helicopters may be operated in flight visibility down to 800 m provided the destination or an intermediate structure is continuously visible.

(***) Helicopters may be operated in flight visibility down to 1 500 m provided the destination or an intermediate structure is continuously visible.

(c) Flight with helicopters to a helideck or elevated FATO shall only be operated when the mean wind speed at the helideck or elevated FATO is reported to be less than 60 kt.

AOCR.OP.MPA.250 Ice and other contaminants — ground procedures

(a) The operator shall establish procedures to be followed when ground de-icing and anti-icing and related inspections of the aircraft are necessary to allow the safe operation of the aircraft.
The commander shall only commence take-off if the aircraft is clear of any deposit that might adversely affect the performance or controllability of the aircraft, except as permitted under (a) and in accordance with the AFM.

**GM1 AOCR.OP.MPA.250 Ice and other contaminants – ground procedures**

**TERMINOLOGY**

Terms used in the context of de-icing/anti-icing have the meaning defined in the following subparagraphs.

(a) ‘Anti-icing fluid’ includes, but is not limited to, the following:

1. Type I fluid if heated to min 60 °C at the nozzle;
2. mixture of water and Type I fluid if heated to min 60 °C at the nozzle;
3. Type II fluid;
4. mixture of water and Type II fluid;
5. Type III fluid;
6. mixture of water and Type III fluid;
7. Type IV fluid;
8. mixture of water and Type IV fluid.

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

(b) ‘Clear ice’: a coating of ice, generally clear and smooth, but with some air pockets. It forms on exposed objects, the temperatures of which are at, below or slightly above the freezing temperature, by the freezing of super-cooled drizzle, droplets or raindrops.

(c) Conditions conducive to aircraft icing on the ground (e.g. freezing fog, freezing precipitation, frost, rain or high humidity (on cold soaked wings), snow or mixed rain and snow).

(d) ‘Contamination’, in this context, is understood as being all forms of frozen or semi-frozen moisture, such as frost, snow, slush or ice.
(e) ‘Contamination check’: a check of aircraft for contamination to establish the need for de-icing.

(f) ‘De-icing fluid’: such fluid includes, but is not limited to, the following:

1. heated water;
2. Type I fluid;
3. mixture of water and Type I fluid;
4. Type II fluid;
5. mixture of water and Type II fluid;
6. Type III fluid;
7. mixture of water and Type III fluid;
8. Type IV fluid;
9. mixture of water and Type IV fluid.

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

(g) ‘De-icing/anti-icing’: this is the combination of de-icing and anti-icing performed in either one or two steps.

(h) ‘Ground ice detection system (GIDS)’: system used during aircraft ground operations to inform the personnel involved in the operation and/or the flight crew about the presence of frost, ice, snow or slush on the aircraft surfaces.

(i) ‘Lowest operational use temperature (LOUT)’: the lowest temperature at which a fluid has been tested and certified as acceptable in accordance with the appropriate aerodynamic acceptance test whilst still maintaining a freezing point buffer of not less than:

1. 10°C for a Type I de-icing/anti-icing fluid; or
2. 7°C for Type II, III or IV de-icing/anti-icing fluids.

(j) ‘Post-treatment check’: an external check of the aircraft after de-icing and/or anti-icing treatment accomplished from suitably elevated observation points (e.g. from the de-icing/anti-icing equipment itself or other elevated equipment) to ensure that the aircraft is free from any frost, ice, snow, or slush.
(k) ‘Pre take-off check’: an assessment normally performed by the flight crew, to validate the applied HoT.

(l) ‘Pre take-off contamination check’: a check of the treated surfaces for contamination, performed when the HoT has been exceeded or if any doubt exists regarding the continued effectiveness of the applied anti-icing treatment. It is normally accomplished externally, just before commencement of the take-off run.

ANTI-ICING CODES

(m) The following are examples of anti-icing codes:

1. ‘Type I’ at (start time) – to be used if anti-icing treatment has been performed with a Type I fluid;

2. ‘Type II/100’ at (start time) – to be used if anti-icing treatment has been performed with undiluted Type II fluid;

3. ‘Type II/75’ at (start time) – to be used if anti-icing treatment has been performed with a mixture of 75 % Type II fluid and 25 % water;

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

(n) When a two-step de-icing/anti-icing operation has been carried out, the anti-icing code should be determined by the second step fluid. Fluid brand names may be included, if desired.

GM2 AOCR.OP.MPA.250 Ice and other contaminants – ground procedures

DE-ICING/ANTI-ICING - PROCEDURES

(a) De-icing and/or anti-icing procedures should take into account manufacturer’s recommendations, including those that are type-specific and cover:

1. contamination checks, including detection of clear ice and under-wing frost; limits on the thickness/area of contamination published in the AFM or other manufacturers’ documentation should be followed;

2. procedures to be followed if de-icing and/or anti-icing procedures are interrupted or unsuccessful;
(3) post-treatment checks;

(4) pre-take-off checks;

(5) pre-take-off contamination checks;

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

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

(b) Operator’s procedures should ensure the following:

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

(2) Account is taken of the wing skin temperature versus outside air temperature (OAT), as this may affect:

(i) the need to carry out aircraft de-icing and/or anti-icing; and/or

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

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

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

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

(7) The required entry is made in the technical log.

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

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

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

(11) When a ground ice detection system (GIDS) is used to perform an aircraft surfaces check prior to and/or after a treatment, the use of GIDS by suitably trained personnel should be part of the procedure.

(c) Special operational considerations
(1) When using thickened de-icing/anti-icing fluids, the operator should consider a two-step de-icing/anti-icing procedure, the first step preferably with hot water and/or un-thickened fluids.

(2) The use of de-icing/anti-icing fluids should be in accordance with the aircraft manufacturer’s documentation. This is particularly important for thickened fluids to assure sufficient flow-off during take-off.

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

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

(5) The limitations or handling procedures resulting from (c) (3) and/or (c) (4) above should be part of the flight crew pre take-off briefing.

(d) Communications

(1) Before aircraft treatment. When the aircraft is to be treated with the flight crew on board, the flight and personnel involved in the operation should confirm the fluid to be used, the extent of treatment required and any aircraft type-specific procedure(s) to be used. Any other information needed to apply the HoT tables should be exchanged.

(2) Anti-icing code. The operator’s procedures should include an anti-icing code, which indicates the treatment the aircraft has received. This code provides the flight crew with the minimum details necessary to estimate a HoT and confirms that the aircraft is free of contamination.

(3) After treatment. Before reconfiguring or moving the aircraft, the flight crew should receive a confirmation from the personnel involved in the operation that all de-icing and/or anti-icing operations are complete and that all personnel and equipment are clear of the aircraft.

(e) Hold-over protection

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

(f) Training

The operator’s initial and recurrent de-icing and/or anti-icing training programmes (including communication training) for flight crew and those of its personnel involved in the operation who are involved in de-icing and/or anti-icing should include additional training if any of the following is introduced:

(1) a new method, procedure and/or technique;

(2) a new type of fluid and/or equipment; or

(3) a new type of aircraft.

(g) Contracting

When the operator contracts training on de-icing/anti-icing, the operator should ensure that the contractor complies with the operator’s training/qualification procedures, together with any specific procedures in respect of:

(1) de-icing and/or anti-icing methods and procedures;

(2) fluids to be used, including precautions for storage and preparation for use;

(3) specific aircraft provisions (e.g. no-spray areas, propeller/engine de-icing, APU operation etc.); and

(4) checking and communications procedures.

(h) Special maintenance considerations

(1) General

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

(2) Special considerations regarding residues of dried fluids

The operator should establish procedures to prevent or detect and remove residues of dried fluid. If necessary the operator should
establish appropriate inspection intervals based on the recommendations of the airframe manufacturers and/or the operator’s own experience:

(i) Dried fluid residues

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

(ii) Re-hydrated fluid residues

Repetitive application of thickened de-icing/anti-icing fluids may lead to the subsequent formation/build-up of a dried residue in aerodynamically quiet areas, such as cavities and gaps. This residue may re-hydrate if exposed to high humidity conditions, precipitation, washing, etc., and increase to many times its original size/volume. This residue will freeze if exposed to conditions at or below 0 °C. This may cause moving parts, such as elevators, ailerons, and flap actuating mechanisms to stiffen or jam in-flight. Re-hydrated residues may also form on exterior surfaces, which can reduce lift, increase drag and stall speed. Re-hydrated residues may also collect inside control surface structures and cause clogging of drain holes or imbalances to flight controls. Residues may also collect in hidden areas, such as around flight control hinges, pulleys, grommets, on cables and in gaps.

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

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

**GM3 AOCR.OP.MPA.250  Ice and other contaminants – ground procedures**

**DE-ICING/ANTI-ICING BACKGROUND INFORMATION**

(a) General

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

(2) Procedures established by the operator for de-icing and/or anti-icing are intended to ensure that the aircraft is clear of contamination so that degradation of aerodynamic characteristics or mechanical interference will not occur and, following anti-icing, to maintain the airframe in that condition during the appropriate HoT.

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

(4) Material for establishing operational procedures can be found, for example, in:

(i) ICAO Annex 3, Meteorological Service for International Air Navigation;

(ii) ICAO Manual of Aircraft Ground De-icing/Anti-icing Operations;

(iii) ISO 11075 Aircraft - De-icing/anti-icing fluids - ISO type I;

(iv) ISO 11076 Aircraft - De-icing/anti-icing methods with fluids;

(v) ISO 11077 Aerospace - Self-propelled de-icing/anti-icing vehicles - Functional requirements;
(vi) ISO 11078 Aircraft - De-icing/anti-icing fluids -- ISO types II, III and IV;

(vii) AEA ‘Recommendations for de-icing/anti-icing of aircraft on the ground’;

(viii) AEA ‘Training recommendations and background information for de-icing/anti-icing of aircraft on the ground’;

(ix) EUROCAE ED-104A Minimum Operational Performance Specification for Ground Ice Detection Systems;

(x) SAE AS5681 Minimum Operational Performance Specification for Remote On-Ground Ice Detection Systems;

(xi) SAE ARP4737 Aircraft - De-icing/anti-icing methods;

(xii) SAE AMS1424 De-icing/anti-Icing Fluid, Aircraft, SAE Type I;

(xiii) SAE AMS1428 Fluid, Aircraft De-icing/anti-Icing, Non-Newtonian, (Pseudo plastic), SAE Types II, III, and IV;

(xiv) SAE ARP1971 Aircraft De-icing Vehicle - Self-Propelled, Large and Small Capacity;

(xv) SAE ARP5149 Training Programme Guidelines for De-icing/anti-icing of Aircraft on Ground; and

(xvi) SAE ARP5646 Quality Program Guidelines for De-icing/anti-icing of Aircraft on the Ground.

(b) Fluids

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

(2) Type II and Type IV fluids contain thickeners which enable the fluid to form a thicker liquid-wetting film on surfaces to which it is applied. Generally, this fluid provides a longer HoT than Type I fluids in similar conditions. With this type of fluid, the HoT can be extended by increasing the ratio of fluid in the fluid/water mix.
(3) Type III fluid is a thickened fluid especially intended for use on aircraft with low rotation speeds.

(4) Fluids used for de-icing and/or anti-icing should be acceptable to the operator and the aircraft manufacturer. These fluids normally conform to specifications such as SAE AMS1424, SAE AMS1428 or equivalent. Use of non-conforming fluids is not recommended due to their characteristics being unknown. The anti-icing and aerodynamic properties of thickened fluids may be seriously degraded by, for example, inappropriate storage, treatment, application, application equipment and age.

(c) Hold-over protection

(1) Hold-over protection is achieved by a layer of anti-icing fluid remaining on and protecting aircraft surfaces for a period of time. With a one-step de-icing/anti-icing procedure, the HoT begins at the commencement of de-icing/anti-icing. With a two-step procedure, the HoT begins at the commencement of the second (anti-icing) step. The hold-over protection runs out:

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

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

(2) The duration of hold-over protection may vary depending on the influence of factors other than those specified in the HoT tables. Guidance should be provided by the operator to take account of such factors, which may include:

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

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

(3) HoTs are not meant to imply that flight is safe in the prevailing conditions if the specified HoT has not been exceeded. Certain meteorological conditions, such as freezing drizzle or freezing rain, may be beyond the certification envelope of the aircraft.
AOCR.OP.MPA.255  Ice and other contaminants — flight procedures

(a) The operator shall establish procedures for flights in expected or actual icing conditions.

(b) The commander shall only commence a flight or intentionally fly into expected or actual icing conditions if the aircraft is certified and equipped to cope with such conditions.

(c) If icing exceeds the intensity of icing for which the aircraft is certified or if an aircraft not certified for flight in known icing conditions encounters icing, the commander shall exit the icing conditions without delay, by a change of level and/or route, if necessary by declaring an emergency to ATC.

AMC2 AOCR.OP.MPA.255  Ice and other contaminants — flight procedures

FLIGHT IN EXPECTED OR ACTUAL ICING CONDITIONS - HELICOPTERS

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

(b) For the required entries in the operations manual, the procedural principles that apply to flight in icing conditions are referred to under Subpart MLR of Annex III (AOCR.MLR) and should be cross-referenced, where necessary, to supplementary, type-specific data.

(c) Technical content of the procedures

The operator should ensure that the procedures take account of the following:

(1) AOCR.IDE.H.165;

(2) the equipment and instruments that should be serviceable for flight in icing conditions;
(3) the limitations on flight in icing conditions for each phase of flight. These limitations may be specified by the helicopter’s de-icing or anti-icing equipment or the necessary performance corrections which have to be made;

(4) the criteria the flight crew should use to assess the effect of icing on the performance and/or controllability of the helicopter;

(5) the means by which the flight crew detects, by visual cues or the use of the helicopter’s ice detection system, that the flight is entering icing conditions; and

(6) the action to be taken by the flight crew in a deteriorating situation (which may develop rapidly) resulting in an adverse effect on the performance and/or controllability of the helicopter, due to either:

(i) the failure of the helicopter’s anti-icing or de-icing equipment to control a build-up of ice; and/or

(ii) ice build-up on unprotected areas.

(d) Training for dispatch and flight in expected or actual icing conditions

The content of the operations manual, Part D, should reflect the training, both conversion and recurrent, which flight crew, and all other relevant operational personnel will require in order to comply with the procedures for dispatch and flight in icing conditions.

(1) For the flight crew, the training should include:

(i) instruction on how to recognise, from weather reports or forecasts that are available before flight commences or during flight, the risks of encountering icing conditions along the planned route and on how to modify, as necessary, the departure and in-flight routes or profiles;

(ii) instruction on the operational and performance limitations or margins;

(iii) the use of in-flight ice detection, anti-icing and de-icing systems in both normal and abnormal operation; and

(iv) instruction on the differing intensities and forms of ice accretion and the consequent action which should be taken.

(2) For crew members other than flight crew, the training should include;
(i) awareness of the conditions likely to produce surface contamination; and

(ii) the need to inform the flight crew of significant ice accretion.

**AOCR.OP.MPA.260 Fuel and oil supply**

The commander shall only commence a flight or continue in the event of in-flight replanning when satisfied that the aircraft carries at least the planned amount of usable fuel and oil to complete the flight safely, taking into account the expected operating conditions.

**AOCR.OP.MPA.265 Take-off conditions**

Before commencing take-off, the commander shall be satisfied that:

(a) according to the information available to him/her, the weather at the aerodrome or operating site and the condition of the runway or FATO intended to be used would not prevent a safe take-off and departure; and

(b) established aerodrome operating minima will be complied with.

**AOCR.OP.MPA.270 Minimum flight altitudes**

The commander or the pilot to whom conduct of the flight has been delegated shall not fly below specified minimum altitudes except when:

(a) necessary for take-off or landing; or

(b) descending in accordance with procedures approved by the Authority.

**AOCR.OP.MPA.275 Simulated abnormal situations in flight**

The operator shall ensure that when carrying passengers or cargo the following are not simulated:

(a) abnormal or emergency situations that require the application of abnormal or emergency procedures; or

(b) flight in IMC by artificial means.

**AOCR.OP.MPA.281 In-flight fuel management — helicopters**

(a) The operator shall establish a procedure to ensure that in-flight fuel checks and fuel management are carried out.
(b) The commander shall ensure that the amount of usable fuel remaining in flight is not less than the fuel required to proceed to an aerodrome or operating site where a safe landing can be made, with final reserve fuel remaining.

(c) The commander shall declare an emergency when the actual usable fuel on board is less than final reserve fuel.

AMC1 AOCR.OP.MPA.281  In-flight fuel management - helicopters

COMPLEX MOTOR-POWERED HELICOPTERS, OTHER THAN LOCAL OPERATIONS

The operator should base in-flight fuel management procedures on the following criteria:

(a) In-flight fuel checks

(1) The commander should ensure that fuel checks are carried out in-flight at regular intervals. The remaining fuel should be recorded and evaluated to:

   (i) compare actual consumption with planned consumption;

   (ii) check that the remaining fuel is sufficient to complete the flight; and

   (iii) determine the expected fuel remaining on arrival at the destination.

(2) The relevant fuel data should be recorded.

(b) In-flight fuel management

(1) If, as a result of an in-flight fuel check, the expected fuel remaining on arrival at the destination is less than the required alternate fuel plus final reserve fuel, the commander should:

   (i) divert; or

   (ii) replan the flight in accordance with AOCR.OP.MPA.181 (d) (1) unless he/she considers it safer to continue to the destination.

(2) At an onshore destination, when two suitable, separate touchdown and lift-off areas are available and the weather conditions at the destination comply with those specified for
planning in AOCR.OP.MPA.245 (a) (2), the commander may permit alternate fuel to be used before landing at the destination.

(c) If, as a result of an in-flight fuel check on a flight to an isolated destination, planned in accordance with (b), the expected fuel remaining at the point of last possible diversion is less than the sum of:

(1) fuel to divert to an operating site selected in accordance with AOCR.OP.MPA.181 (a);

(2) contingency fuel; and

(3) final reserve fuel,

the commander should:

(i) divert; or

(ii) proceed to the destination provided that at onshore destinations, two suitable, separate touchdown and lift-off areas are available at the destination and the expected weather conditions at the destination comply with those specified for planning in AOCR.OP.MPA.245 (a)(2).

AOCR.OP.MPA.285 Use of supplemental oxygen

The commander shall ensure that flight crew members engaged in performing duties essential to the safe operation of an aircraft in flight use supplemental oxygen continuously whenever the cabin altitude exceeds 10 000 ft for a period of more than 30 minutes and whenever the cabin altitude exceeds 13 000 ft.

AOCR.OP.MPA.290 Ground proximity detection

When undue proximity to the ground is detected by a flight crew member or by a ground proximity warning system, the pilot flying shall take corrective action immediately to establish safe flight conditions.

GM1 AOCR.OP.MPA.290 Ground proximity detection

TERRAIN AWARENESS WARNING SYSTEM (TAWS) FLIGHT CREW TRAINING PROGRAMMES

(a) Introduction

(1) This GM contains performance-based training objectives for TAWS flight crew training.
(2) The training objectives cover five areas: theory of operation; pre-flight operations; general in-flight operations; response to TAWS cautions; and response to TAWS warnings.

(3) The term ‘TAWS’ in this GM means a ground proximity warning system (GPWS) enhanced by a forward-looking terrain avoidance function. Alerts include both cautions and warnings.

(4) The content of this GM is intended to assist operators who are producing training programmes. The information it contains has not been tailored to any specific aircraft or TAWS equipment, but highlights features which are typically available where such systems are installed. It is the responsibility of the individual operator to determine the applicability of the content of this guidance material to each aircraft and TAWS equipment installed and their operation. Operators should refer to the AFM and/or aircraft/flight crew operating manual (A/FCOM), or similar documents, for information applicable to specific configurations. If there should be any conflict between the content of this guidance material and that published in the other documents described above, then information contained in the AFM or A/FCOM will take precedence.

(b) Scope

(1) The scope of this GM is designed to identify training objectives in the areas of: academic training; manoeuvre training; initial evaluation; and recurrent qualification. Under each of these four areas, the training material has been separated into those items which are considered essential training items and those that are considered to be desirable. In each area, objectives and acceptable performance criteria are defined.

(2) No attempt is made to define how the training programme should be implemented. Instead, objectives are established to define the knowledge that a pilot operating a TAWS is expected to possess and the performance expected from a pilot who has completed TAWS training. However, the guidelines do indicate those areas in which the pilot receiving the training should demonstrate his/her understanding, or performance, using a real-time, interactive training device, i.e. a flight simulator. Where appropriate, notes are included within the performance criteria which amplify or clarify the material addressed by the training objective.

(c) Performance-based training objectives

(1) TAWS academic training
(i) This training is typically conducted in a classroom environment. The knowledge demonstrations specified in this section may be completed through the successful completion of written tests or by providing correct responses to non-real-time computer-based training (CBT) questions.

(ii) Theory of operation. The pilot should demonstrate an understanding of TAWS operation and the criteria used for issuing cautions and warnings. This training should address system operation. Objective: To demonstrate knowledge of how a TAWS functions. Criteria: The pilot should demonstrate an understanding of the following functions:

(A) Surveillance

(a) The GPWS computer processes data supplied from an air data computer, a radio altimeter, an instrument landing system (ILS)/microwave landing system (MLS)/multi-mode (MM) receiver, a roll attitude sensor, and actual position of the surfaces and of the landing gear.

(b) The forward looking terrain avoidance function utilises an accurate source of known aircraft position, such as that which may be provided by a flight management system (FMS) or GPS, or an electronic terrain database. The source and scope of the terrain, obstacle and airport data, and features such as the terrain clearance floor, the runway picker, and geometric altitude (where provided) should all be described.

(c) Displays required to deliver TAWS outputs include a loudspeaker for voice announcements, visual alerts (typically amber and red lights), and a terrain awareness display (that may be combined with other displays). In addition, means should be provided for indicating the status of the TAWS and any partial or total failures that may occur.

(B) Terrain avoidance. Outputs from the TAWS computer provide visual and audio synthetic voice cautions and
warnings to alert the flight crew about potential conflicts with terrain and obstacles.

(C) Alert thresholds. Objective: To demonstrate knowledge of the criteria for issuing cautions and warnings. Criteria: The pilot should be able to demonstrate an understanding of the methodology used by a TAWS to issue cautions and alerts and the general criteria for the issuance of these alerts, including:

(a) basic GPWS alerting modes specified in the ICAO Standard:

- Mode 1: excessive sink rate;
- Mode 2: excessive terrain closure rate;
- Mode 3: descent after take-off or go-around;
- Mode 4: unsafe proximity to terrain;
- Mode 5: descent below ILS glide slope (caution only); and

(b) an additional, optional alert mode- Mode 6: radio altitude call-out (information only); TAWS cautions and warnings which alert the flight crew to obstacles and terrain ahead of the aircraft in line with or adjacent to its projected flight path (forward-looking terrain avoidance (FLTA) and premature descent alert (PDA) functions).

(D) TAWS limitations. Objective: To verify that the pilot is aware of the limitations of TAWS. Criteria: The pilot should demonstrate knowledge and an understanding of TAWS limitations identified by the manufacturer for the equipment model installed, such as:

(a) navigation should not be predicated on the use of the terrain display;

(b) unless geometric altitude data is provided, use of predictive TAWS functions is prohibited
when altimeter subscale settings display ‘QFE’;

(c) nuisance alerts can be issued if the aerodrome of intended landing is not included in the TAWS airport database;

(d) in cold weather operations, corrective procedures should be implemented by the pilot unless the TAWS has in-built compensation, such as geometric altitude data;

(e) loss of input data to the TAWS computer could result in partial or total loss of functionality. Where means exist to inform the flight crew that functionality has been degraded, this should be known and the consequences understood;

(f) radio signals not associated with the intended flight profile (e.g. ILS glide path transmissions from an adjacent runway) may cause false alerts;

(g) inaccurate or low accuracy aircraft position data could lead to false or non-annunciation of terrain or obstacles ahead of the aircraft; and

(h) minimum equipment list (MEL) restrictions should be applied in the event of the TAWS becoming partially or completely unserviceable. (It should be noted that basic GPWS has no forward-looking capability.)

(E) TAWS inhibits. Objective: To verify that the pilot is aware of the conditions under which certain functions of a TAWS are inhibited. Criteria: The pilot should demonstrate knowledge and an understanding of the various TAWS inhibits, including the following means of:

(a) silencing voice alerts;

(b) inhibiting ILS glide path signals (as may be required when executing an ILS back beam approach);
(c) inhibiting flap position sensors (as may be required when executing an approach with the flaps not in a normal position for landing);

(d) inhibiting the FLTA and PDA functions; and

(e) selecting or deselecting the display of terrain information, together with appropriate annunciation of the status of each selection.

(2) Operating procedures. The pilot should demonstrate the knowledge required to operate TAWS avionics and to interpret the information presented by a TAWS. This training should address the following topics:

(i) Use of controls. Objective: To verify that the pilot can properly operate all TAWS controls and inhibits. Criteria: The pilot should demonstrate the proper use of controls, including the following means by which:

(A) before flight, any equipment self-test functions can be initiated;

(B) TAWS information can be selected for display; and

(C) all TAWS inhibits can be operated and what the consequent annunciations mean with regard to loss of functionality.

(ii) Display interpretation. Objective: To verify that the pilot understands the meaning of all information that can be annunciated or displayed by a TAWS. Criteria: The pilot should demonstrate the ability to properly interpret information annunciated or displayed by a TAWS, including the following:

(A) knowledge of all visual and aural indications that may be seen or heard;

(B) response required on receipt of a caution;

(C) response required on receipt of a warning; and

(D) response required on receipt of a notification that partial or total failure of the TAWS has occurred (including annunciation that the present aircraft position is of low accuracy).
(iii) Use of basic GPWS or use of the FLTA function only. Objective: To verify that the pilot understands what functionality will remain following loss of the GPWS or of the FLTA function. Criteria: The pilot should demonstrate knowledge of how to recognise the following:

(A) un-commanded loss of the GPWS function, or how to isolate this function and how to recognise the level of the remaining controlled flight into terrain (CFIT) protection (essentially, this is the FLTA function); and

(B) un-commanded loss of the FLTA function, or how to isolate this function and how to recognise the level of the remaining CFIT protection (essentially, this is the basic GPWS).

(iv) Crew coordination. Objective: To verify that the pilot adequately briefs other flight crew members on how TAWS alerts will be handled. Criteria: The pilot should demonstrate that the pre-flight briefing addresses procedures that will be used in preparation for responding to TAWS cautions and warnings, including the following:

(A) the action to be taken, and by whom, in the event that a TAWS caution and/or warning is issued; and

(B) how multi-function displays will be used to depict TAWS information at take-off, in the cruise and for the descent, approach, landing (and any go-around). This will be in accordance with procedures specified by the operator, who will recognise that it may be more desirable that other data is displayed at certain phases of flight and that the terrain display has an automatic ‘pop-up’ mode in the event that an alert is issued.

(v) Reporting rules. Objective: To verify that the pilot is aware of the rules for reporting alerts to the controller and other authorities. Criteria: The pilot should demonstrate knowledge of the following:

(A) when, following recovery from a TAWS alert or caution, a transmission of information should be made to the appropriate ATC unit; and
(B) the type of written report that is required, how it is to be compiled, and whether any cross reference should be made in the aircraft technical log and/or voyage report (in accordance with procedures specified by the operator), following a flight in which the aircraft flight path has been modified in response to a TAWS alert, or if any part of the equipment appears not to have functioned correctly.

(vi) Alert thresholds. Objective: To demonstrate knowledge of the criteria for issuing cautions and warnings. Criteria: The pilot should be able to demonstrate an understanding of the methodology used by a TAWS to issue cautions and warnings and the general criteria for the issuance of these alerts, including awareness of the following:

(A) modes associated with basic GPWS, including the input data associated with each; and

(B) visual and aural annunciations that can be issued by TAWS and how to identify which are cautions and which are warnings.

(3) TAWS manoeuvre training. The pilot should demonstrate the knowledge required to respond correctly to TAWS cautions and warnings. This training should address the following topics:

(i) Response to cautions:

(A) Objective: To verify that the pilot properly interprets and responds to cautions. Criteria: The pilot should demonstrate an understanding of the need, without delay:

(a) to initiate action required to correct the condition which has caused the TAWS to issue the caution and to be prepared to respond to a warning, if this should follow; and

(b) if a warning does not follow the caution, to notify the controller of the new position, heading and/or altitude/flight level of the aircraft, and what the commander intends to do next.

(B) The correct response to a caution might require the pilot to: (a) reduce a rate of descent and/or to initiate a climb;
(b) regain an ILS glide path from below, or to inhibit a glide path signal if an ILS is not being flown;

(c) select more flap, or to inhibit a flap sensor if the landing is being conducted with the intent that the normal flap setting will not be used;

(d) select gear down; and/or

(e) initiate a turn away from the terrain or obstacle ahead and towards an area free of such obstructions if a forward-looking terrain display indicates that this would be a good solution and the entire manoeuvre can be carried out in clear visual conditions.

(ii) Response to warnings. Objective: To verify that the pilot properly interprets and responds to warnings. Criteria: The pilot should demonstrate an understanding of the following:

(A) The need, without delay, to initiate a climb in the manner specified by the operator.

(B) The need, without delay, to maintain the climb until visual verification can be made that the aircraft will clear the terrain or obstacle ahead or until above the appropriate sector safe altitude (if certain about the location of the aircraft with respect to terrain) even if the TAWS warning stops. If, subsequently, the aircraft climbs up through the sector safe altitude, but the visibility does not allow the flight crew to confirm that the terrain hazard has ended, checks should be made to verify the location of the aircraft and to confirm that the altimeter subscale settings are correct.

(C) When the workload permits, that the flight crew should notify the air traffic controller of the new position and altitude/flight level, and what the commander intends to do next.

(D) That the manner in which the climb is made should reflect the type of aircraft and the method specified by the aircraft manufacturer (which should be reflected in the operations manual) for performing the escape manoeuvre. Essential aspects will include the
need for an increase in pitch attitude, selection of maximum thrust, confirmation that external sources of drag (e.g. spoilers/speed brakes) are retracted, and respect of the stick shaker or other indication of eroded stall margin.

(E) That TAWS warnings should never be ignored. However, the pilot’s response may be limited to that which is appropriate for a caution, only if:

(a) the aircraft is being operated by day in clear, visual conditions; and

(b) it is immediately clear to the pilot that the aircraft is in no danger in respect of its configuration, proximity to terrain or current flight path.

(4) TAWS initial evaluation:

(i) The flight crew member’s understanding of the academic training items should be assessed by means of a written test.

(ii) The flight crew member’s understanding of the manoeuvre training items should be assessed in a FSTD equipped with TAWS visual and aural displays and inhibit selectors similar in appearance and operation to those in the aircraft which the pilot will fly. The results should be assessed by a synthetic flight instructor, synthetic flight examiner, type rating instructor or type rating examiner.

(iii) The range of scenarios should be designed to give confidence that proper and timely responses to TAWS cautions and warnings will result in the aircraft avoiding a CFIT accident. To achieve this objective, the pilot should demonstrate taking the correct action to prevent a caution developing into a warning and, separately, the escape manoeuvre needed in response to a warning. These demonstrations should take place when the external visibility is zero, though there is much to be learnt if, initially, the training is given in ‘mountainous’ or ‘hilly’ terrain with clear visibility. This training should comprise a sequence of scenarios, rather than be included in line oriented flight training (LOFT).

(iv) A record should be made, after the pilot has demonstrated competence, of the scenarios that were practised.
(5) **TAWS recurrent training:**

(i) TAWS recurrent training ensures that pilots maintain the appropriate TAWS knowledge and skills. In particular, it reminds pilots of the need to act promptly in response to cautions and warnings, and of the unusual attitude associated with flying the escape manoeuvre.

(ii) An essential item of recurrent training is the discussion of any significant issues and operational concerns that have been identified by the operator. Recurrent training should also address changes to TAWS logic, parameters or procedures and to any unique TAWS characteristics of which pilots should be aware.

(6) **Reporting procedures:**

(i) **Verbal reports.** Verbal reports should be made promptly to the appropriate air traffic control unit:

(A) whenever any manoeuvre has caused the aircraft to deviate from an air traffic clearance;

(B) when, following a manoeuvre which has caused the aircraft to deviate from an air traffic clearance, the aircraft has returned to a flight path which complies with the clearance; and/or

(C) when an air traffic control unit issues instructions which, if followed, would cause the pilot to manoeuvre the aircraft towards terrain or obstacle or it would appear from the display that a potential CFIT occurrence is likely to result.

(ii) **Written reports.** Written reports should be submitted in accordance with the operator’s occurrence reporting scheme and they also should be recorded in the aircraft technical log:

(A) whenever the aircraft flight path has been modified in response to a TAWS alert (false, nuisance or genuine);

(B) whenever a TAWS alert has been issued and is believed to have been false; and/or
(C) if it is believed that a TAWS alert should have been issued, but was not.

(iii) Within this GM and with regard to reports:

(A) the term 'false' means that the TAWS issued an alert which could not possibly be justified by the position of the aircraft in respect to terrain and it is probable that a fault or failure in the system (equipment and/or input data) was the cause;

(B) the term 'nuisance' means that the TAWS issued an alert which was appropriate, but was not needed because the flight crew could determine by independent means that the flight path was, at that time, safe;

(C) the term 'genuine' means that the TAWS issued an alert which was both appropriate and necessary; and

(D) the report terms described in (c) (6) (iii) are only meant to be assessed after the occurrence is over, to facilitate subsequent analysis, the adequacy of the equipment and the programmes it contains. The intention is not for the flight crew to attempt to classify an alert into any of these three categories when visual and/or aural cautions or warnings are annunciated.

**AOCR.OP.MPA.295 Use of airborne collision avoidance system (ACAS)**

The operator shall establish operational procedures and training programmes when ACAS is installed and serviceable. When ACAS II is used, such procedures and training shall be in accordance with Commission the Civil Aviation Regulations.

**GM1 AOCR.OP.MPA.295 Use of airborne collision avoidance system (ACAS)**

**GENERAL**

(a) The ACAS operational procedures and training programmes established by the operator should take into account this GM. It incorporates advice contained in:

(1) ICAO Annex 10, Volume IV;
(2) ICAO PANS-OPS, Volume 1;
(3) ICAO PANS-ATM; and
(4) ICAO guidance material ‘ACAS Performance-Based Training Objectives’ (published under Attachment E of State Letter AN 7/1.3.7.2-97/77).

(b) Additional guidance material on ACAS may be referred to, including information available from such sources as EUROCONTROL.

ACAS FLIGHT CREW TRAINING PROGRAMMES

(c) During the implementation of ACAS, several operational issues were identified which had been attributed to deficiencies in flight crew training programmes. As a result, the issue of flight crew training has been discussed within the ICAO, which has developed guidelines for operators to use when designing training programmes.

(d) This GM contains performance-based training objectives for ACAS II flight crew training. Information contained in this paper related to traffic advisories (TAs) is also applicable to ACAS I and ACAS II users. The training objectives cover five areas: theory of operation; pre-flight operations; general in-flight operations; response to TAs; and response to resolution advisories (RAs).

(e) The information provided is valid for version 7 and 7.1 (ACAS II). Where differences arise, these are identified.

(f) The performance-based training objectives are further divided into the areas of: academic training; manoeuvre training; initial evaluation and recurrent qualification. Under each of these four areas, the training material has been separated into those items which are considered essential training items and those which are considered desirable. In each area, objectives and acceptable performance criteria are defined.

(g) ACAS academic training

(1) This training is typically conducted in a classroom environment. The knowledge demonstrations specified in this section may be completed through the successful completion of written tests or through providing correct responses to non-real-time computer-based training (CBT) questions.

(2) Essential items

(i) Theory of operation. The flight crew member should demonstrate an understanding of ACAS II operation and
the criteria used for issuing TAs and RAs. This training should address the following topics:

(A) System operation

Objective: to demonstrate knowledge of how ACAS functions.

Criteria: the flight crew member should demonstrate an understanding of the following functions:

(a) Surveillance

(1) ACAS interrogates other transponder-equipped aircraft within a nominal range of 14 NM.

(2) ACAS surveillance range can be reduced in geographic areas with a large number of ground interrogators and/or ACAS II-equipped aircraft.

(3) If the operator’s ACAS implementation provides for the use of the Mode S extended squitter, the normal surveillance range may be increased beyond the nominal 14 NM. However, this information is not used for collision avoidance purposes.

(b) Collision avoidance

(1) TAs can be issued against any transponder-equipped aircraft which responds to the ICAO Mode C interrogations, even if the aircraft does not have altitude reporting capability.

(2) RAs can be issued only against aircraft that are reporting altitude and in the vertical plane only.

(3) RAs issued against an ACAS-equipped intruder are coordinated to ensure complementary RAs are issued.
(4) Failure to respond to an RA deprives own aircraft of the collision protection provided by own ACAS.

(5) Additionally, in ACAS-ACAS encounters, failure to respond to an RA also restricts the choices available to the other aircraft's ACAS and thus renders the other aircraft's ACAS less effective than if own aircraft were not ACAS equipped.

(B) Advisory thresholds

Objective: to demonstrate knowledge of the criteria for issuing TAs and RAs.

Criteria: the flight crew member should demonstrate an understanding of the methodology used by ACAS to issue TAs and RAs and the general criteria for the issuance of these advisories, including the following:

(a) ACAS advisories are based on time to closest point of approach (CPA) rather than distance. The time should be short and vertical separation should be small, or projected to be small, before an advisory can be issued. The separation standards provided by ATS are different from the miss distances against which ACAS issues alerts.

(b) Thresholds for issuing a TA or an RA vary with altitude. The thresholds are larger at higher altitudes.

(c) A TA occurs from 15 to 48 seconds and an RA from 15 to 35 seconds before the projected CPA.

(d) RAs are chosen to provide the desired vertical miss distance at CPA. As a result, RAs can instruct a climb or descent through the intruder aircraft's altitude.

(C) ACAS limitations
Objective: to verify that the flight crew member is aware of the limitations of ACAS.

Criteria: the flight crew member should demonstrate knowledge and understanding of ACAS limitations, including the following:

(a) ACAS will neither track nor display non-transponder-equipped aircraft, nor aircraft not responding to ACAS Mode C interrogations.

(b) ACAS will automatically fail if the input from the aircraft’s barometric altimeter, radio altimeter or transponder is lost.

(1) In some installations, the loss of information from other on board systems such as an inertial reference system (IRS) or attitude heading reference system (AHRS) may result in an ACAS failure. Individual operators should ensure that their flight crews are aware of the types of failure that will result in an ACAS failure.

(2) ACAS may react in an improper manner when false altitude information is provided to own ACAS or transmitted by another aircraft. Individual operators should ensure that their flight crew are aware of the types of unsafe conditions that can arise. Flight crew members should ensure that when they are advised, if their own aircraft is transmitting false altitude reports, an alternative altitude reporting source is selected, or altitude reporting is switched off.

(c) Some aeroplanes within 380 ft above ground level (AGL) (nominal value) are deemed to be ‘on ground’ and will not be displayed. If ACAS is able to determine an aircraft below this altitude is airborne, it will be displayed.

(d) ACAS may not display all proximate transponder-equipped aircraft in areas of high density traffic.
(e) The bearing displayed by ACAS is not sufficiently accurate to support the initiation of horizontal manoeuvres based solely on the traffic display.

(f) ACAS will neither track nor display intruders with a vertical speed in excess of 10 000 ft/min. In addition, the design implementation may result in some short-term errors in the tracked vertical speed of an intruder during periods of high vertical acceleration by the intruder.

(g) Ground proximity warning systems/ground collision avoidance systems (GPWSs/GCASs) warnings and wind shear warnings take precedence over ACAS advisories. When either a GPWS/GCAS or wind shear warning is active, ACAS aural annunciations will be inhibited and ACAS will automatically switch to the 'TA only' mode of operation.

(D) ACAS inhibits

Objective: to verify that the flight crew member is aware of the conditions under which certain functions of ACAS are inhibited.

Criteria: the flight crew member should demonstrate knowledge and understanding of the various ACAS inhibits, including the following:

(a) ‘Increase Descent’ RAs are inhibited below 1 450 ft AGL;

(b) ‘Descend’ RAs are inhibited below 1 100 ft AGL;

(c) all RAs are inhibited below 1 000 ft AGL;

(d) all TA aural annunciations are inhibited below 500 ft AGL; and

(e) altitude and configuration under which ‘Climb’ and ‘Increase Climb’ RAs are inhibited. ACAS can still issue ‘Climb’ and ‘Increase Climb’ RAs when operating at the aeroplane’s certified
(ii) Operating procedures The flight crew member should demonstrate the knowledge required to operate the ACAS avionics and interpret the information presented by ACAS. This training should address the following:

(A) Use of controls

Objective: to verify that the pilot can properly operate all ACAS and display controls.
Criteria: demonstrate the proper use of controls including:

(a) aircraft configuration required to initiate a self-test;
(b) steps required to initiate a self-test;
(c) recognising when the self-test was successful and when it was unsuccessful. When the self-test is unsuccessful, recognising the reason for the failure and, if possible, correcting the problem;
(d) recommended usage of range selection. Low ranges are used in the terminal area and the higher display ranges are used in the en-route environment and in the transition between the terminal and en-route environment;
(e) recognising that the configuration of the display does not affect the ACAS surveillance volume;
(f) selection of lower ranges when an advisory is issued, to increase display resolution;
(g) proper configuration to display the appropriate ACAS information without eliminating the display of other needed information;
(h) if available, recommended usage of the above/below mode selector. The above mode should be used during climb and the below mode should be used during descent; and
(i) if available, proper selection of the display of absolute or relative altitude and the limitations of using this display if a barometric correction is not provided to ACAS.

(B) Display interpretation

Objective: to verify that the flight crew member understands the meaning of all information that can be displayed by ACAS. The wide variety of display implementations require the tailoring of some criteria. When the training programme is developed, these criteria should be expanded to cover details for the operator’s specific display implementation.

Criteria: the flight crew member should demonstrate the ability to properly interpret information displayed by ACAS, including the following:

(a) other traffic, i.e. traffic within the selected display range that is not proximate traffic, or causing a TA or RA to be issued;

(b) proximate traffic, i.e. traffic that is within 6 NM and ±1 200 ft;

(c) non-altitude reporting traffic;

(d) no bearing TAs and RAs;

(e) off-scale TAs and RAs: the selected range should be changed to ensure that all available information on the intruder is displayed;

(f) TAs: the minimum available display range which allows the traffic to be displayed should be selected, to provide the maximum display resolution;

(g) RAs (traffic display): the minimum available display range of the traffic display which allows the traffic to be displayed should be selected, to provide the maximum display resolution;

(h) RAs (RA display): flight crew members should demonstrate knowledge of the meaning of the red and green areas or the meaning of pitch or
flight path angle cues displayed on the RA display. Flight crew members should also demonstrate 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 2500 ft/min, an increase rate RA cannot be properly displayed; and

(i) if appropriate, awareness that navigation displays oriented on ‘Track-Up’ may require a flight crew member to make a mental adjustment for drift angle when assessing the bearing of proximate traffic.

(C) Use of the TA only mode

Objective: to verify that a flight crew member understands the appropriate times to select the TA only mode of operation and the limitations associated with using this mode.

Criteria: the flight crew member should demonstrate the following:

(a) Knowledge of the operator’s guidance for the use of TA only.

(b) Reasons for using this mode. If TA only is not selected when an airport is conducting simultaneous operations from parallel runways separated by less than 1200 ft, and to some intersecting runways, RAs can be expected. If for any reason TA only is not selected and an RA is received in these situations, the response should comply with the operator’s approved procedures.

(c) All TA aural annunciations are inhibited below 500 ft AGL. As a result, TAs issued below 500 ft AGL may not be noticed unless the TA display is included in the routine instrument scan.

(D) Crew coordination

Objective: to verify that the flight crew member understands how ACAS advisories will be handled.
Criteria: the flight crew member should demonstrate knowledge of the crew procedures that should be used when responding to TAs and RAs, including the following:

(a) task sharing between the pilot flying and the pilot monitoring;
(b) expected call-outs; and
(c) communications with ATC.

(E) Phraseology rules

Objective: to verify that the flight crew member is aware of the rules for reporting RAs to the controller.

Criteria: the flight crew member should demonstrate the following:

(a) the use of the phraseology contained in ICAO PANS-OPS;
(b) an understanding of the procedures contained in ICAO PANS-ATM and ICAO Annex 2; and
(c) the understanding that verbal reports should be made promptly to the appropriate ATC unit:

(1) whenever any manoeuvre has caused the aeroplane to deviate from an air traffic clearance;

(2) when, subsequent to a manoeuvre that has caused the aeroplane to deviate from an air traffic clearance, the aeroplane has returned to a flight path that complies with the clearance; and/or

(3) when air traffic issue instructions that, if followed, would cause the crew to manoeuvre the aircraft contrary to an RA with which they are complying.

(F) Reporting rules Objective: to verify that the flight crew member is aware of the rules for reporting RAs to the operator.
Criteria: the flight crew member should demonstrate knowledge of where information can be obtained regarding the need for making written reports to various states when an RA is issued. Various States have different reporting rules and the material available to the flight crew member should be tailored to the operator’s operating environment. For operators involved in commercial operations, this responsibility is satisfied by the flight crew member reporting to the operator according to the applicable reporting rules.

(3) Non-essential items: advisory thresholds

Objective: to demonstrate knowledge of the criteria for issuing TAs and RAs.

Criteria: the flight crew member should demonstrate an understanding of the methodology used by ACAS to issue TAs and RAs and the general criteria for the issuance of these advisories, including the following:

(i) the minimum and maximum altitudes below/above which TAs will not be issued;

(ii) when the vertical separation at CPA is projected to be less than the ACAS-desired separation, a corrective RA which requires a change to the existing vertical speed will be issued. This separation varies from 300 ft at low altitude to a maximum of 700 ft at high altitude;

(iii) when the vertical separation at CPA is projected to be just outside the ACAS-desired separation, a preventive RA that does not require a change to the existing vertical speed will be issued. This separation varies from 600 to 800 ft; and

(iv) RA fixed range thresholds vary between 0.2 and 1.1 NM.

(h) ACAS manoeuvre training

(1) Demonstration of the flight crew member’s ability to use ACAS displayed information to properly respond to TAs and RAs should be carried out in a full flight simulator equipped with an ACAS display and controls similar in appearance and operation to those in the aircraft. If a full flight simulator is utilised, CRM should be practised during this training.

(2) Alternatively, the required demonstrations can be carried out by means of an interactive CBT with an ACAS display and controls
similar in appearance and operation to those in the aircraft. This interactive CBT should depict scenarios in which real-time responses should be made. The flight crew member should be informed whether or not the responses made were correct. If the response was incorrect or inappropriate, the CBT should show what the correct response should be.

(3) The scenarios included in the manoeuvre training should include: corrective RAs; initial preventive RAs; maintain rate RAs; altitude crossing RAs; increase rate RAs; RA reversals; weakening RAs; and multi-aircraft encounters. The consequences of failure to respond correctly should be demonstrated by reference to actual incidents such as those publicised in EUROCONTROL ACAS II Bulletins (available on the EUROCONTROL website).

(i) TA responses

Objective: to verify that the pilot properly interprets and responds to TAs.

Criteria: the pilot should demonstrate the following:

(A) Proper division of responsibilities between the pilot flying and the pilot monitoring. The pilot flying should fly the aircraft using any type-specific procedures and be prepared to respond to any RA that might follow. For aircraft without an RA pitch display, the pilot flying should consider the likely magnitude of an appropriate pitch change. The pilot monitoring should provide updates on the traffic location shown on the ACAS display, using this information to help visually acquire the intruder.

(B) Proper interpretation of the displayed information. Flight crew members should confirm that the aircraft they have visually acquired is that which has caused the TA to be issued. Use should be made of all information shown on the display, note being taken of the bearing and range of the intruder (amber circle), whether it is above or below (data tag) and its vertical speed direction (trend arrow).

(C) Other available information should be used to assist in visual acquisition, including ATC ‘party-line’ information, traffic flow in use, etc.

(D) Because of the limitations described, the pilot flying should not manoeuvre the aircraft based solely on the
information shown on the ACAS display. No attempt should be made to adjust the current flight path in anticipation of what an RA would advise, except that if own aircraft is approaching its cleared level at a high vertical rate with a TA present, vertical rate should be reduced to less than 1 500 ft/min.

(E) When visual acquisition is attained, and as long as no RA is received, normal right of way rules should be used to maintain or attain safe separation. No unnecessary manoeuvres should be initiated. The limitations of making manoeuvres based solely on visual acquisition, especially at high altitude or at night, or without a definite horizon should be demonstrated as being understood.

(ii) RA responses

Objective: to verify that the pilot properly interprets and responds to RAs.

Criteria: the pilot should demonstrate the following:

(A) Proper response to the RA, even if it is in conflict with an ATC instruction and even if the pilot believes that there is no threat present.

(B) Proper task sharing between the pilot flying and the pilot monitoring. The pilot flying should respond to a corrective RA with appropriate control inputs. The pilot monitoring should monitor the response to the RA and should provide updates on the traffic location by checking the traffic display. Proper crew resource management (CRM) should be used.

(C) Proper interpretation of the displayed information. The pilot should recognise the intruder causing the RA to be issued (red square on display). The pilot should respond appropriately.

(D) For corrective RAs, the response should be initiated in the proper direction within five seconds of the RA being displayed. The change in vertical speed should be accomplished with an acceleration of approximately ¼ g (gravitational acceleration of 9.81 m/sec²).
(E) Recognition of the initially displayed RA being modified. Response to the modified RA should be properly accomplished, as follows:

(a) For increase rate RAs, the vertical speed change should be started within two and a half seconds of the RA being displayed. The change in vertical speed should be accomplished with an acceleration of approximately $\frac{1}{3} g$.

(b) For RA reversals, the vertical speed reversal should be started within two and a half seconds of the RA being displayed. The change in vertical speed should be accomplished with an acceleration of approximately $\frac{1}{3} g$.

(c) For RA weakenings, the vertical speed should be modified to initiate a return towards the original clearance.

(d) An acceleration of approximately $\frac{1}{4} g$ will be achieved if the change in pitch attitude corresponding to a change in vertical speed of $1\,500$ ft/min is accomplished in approximately 5 seconds, and of $\frac{1}{3} g$ if the change is accomplished in approximately three seconds. The change in pitch attitude required to establish a rate of climb or descent of $1\,500$ ft/min from level flight will be approximately $6^\circ$ when the true airspeed (TAS) is $150$ kt, $4^\circ$ at $250$ kt, and $2^\circ$ at $500$ kt. (These angles are derived from the formula: $1\,000$ divided by TAS.).

(F) Recognition of altitude crossing encounters and the proper response to these RAs.

(G) For preventive RAs, the vertical speed needle or pitch attitude indication should remain outside the red area on the RA display.

(H) For maintain rate RAs, the vertical speed should not be reduced. Pilots should recognise that a maintain rate RA may result in crossing through the intruder’s altitude.
(I) When the RA weakens, or when the green ‘fly to’ indicator changes position, the pilot should initiate a return towards the original clearance and when ‘clear of conflict’ is annunciated, the pilot should complete the return to the original clearance.

(J) The controller should be informed of the RA as soon as time and workload permit, using the standard phraseology.

(K) When possible, an ATC clearance should be complied with while responding to an RA. For example, if the aircraft can level at the assigned altitude while responding to RA (an ‘adjust vertical speed’ RA (version 7) or ‘level off’ (version 7.1)) it should be done; the horizontal (turn) element of an ATC instruction should be followed.

(L) Knowledge of the ACAS multi-aircraft logic and its limitations, and that ACAS can optimise separations from two aircraft by climbing or descending towards one of them. For example, ACAS only considers intruders that it considers to be a threat when selecting an RA. As such, it is possible for ACAS to issue an RA against one intruder that results in a manoeuvre towards another intruder which is not classified as a threat. If the second intruder becomes a threat, the RA will be modified to provide separation from that intruder.

(i) ACAS initial evaluation

(1) The flight crew member’s understanding of the academic training items should be assessed by means of a written test or interactive CBT that records correct and incorrect responses to phrased questions.

(2) The flight crew member’s understanding of the manoeuvre training items should be assessed in a full flight simulator equipped with an ACAS display and controls similar in appearance and operation to those in the aircraft the flight crew member will fly, and the results assessed by a qualified instructor, inspector, or check airman. The range of scenarios should include: corrective RAs; initial preventive RAs; maintain rate RAs; altitude crossing RAs; increase rate RAs; RA reversals; weakening RAs; and multi-threat encounters. The scenarios should also include demonstrations of the consequences of not
responding to RAs, slow or late responses, and manoeuvring opposite to the direction called for by the displayed RA.

(3) Alternatively, exposure to these scenarios can be conducted by means of an interactive CBT with an ACAS display and controls similar in appearance and operation to those in the aircraft the pilot will fly. This interactive CBT should depict scenarios in which real-time responses should be made and a record made of whether or not each response was correct.

(j) ACAS recurrent training

(1) ACAS recurrent training ensures that flight crew members maintain the appropriate ACAS knowledge and skills. ACAS recurrent training should be integrated into and/or conducted in conjunction with other established recurrent training programmes. An essential item of recurrent training is the discussion of any significant issues and operational concerns that have been identified by the operator. Recurrent training should also address changes to ACAS logic, parameters or procedures and to any unique ACAS characteristics which flight crew members should be made aware of.

(2) It is recommended that the operator's recurrent training programmes using full flight simulators include encounters with conflicting traffic when these simulators are equipped with ACAS. The full range of likely scenarios may be spread over a 2-year period. If a full flight simulator, as described above, is not available, use should be made of interactive CBT that is capable of presenting scenarios to which pilot responses should be made in real-time.

AOCR.OP.MPA.300 Approach and landing conditions

Before commencing an approach to land, the commander shall be satisfied that, according to the information available to him/her, the weather at the aerodrome and the condition of the runway or 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.

AMC1 AOCR.OP.MPA.300 Approach and landing conditions

IN-FLIGHT DETERMINATION OF THE LANDING DISTANCE

The in-flight determination of the landing distance should be based on the latest available meteorological or runway state report, preferably not more than 30 minutes before the expected landing time.
AOCR.OP.MPA.305 Commencement and continuation of approach

(a) The commander or the pilot to whom conduct of the flight has been delegated may commence an instrument approach regardless of the reported RVR/VIS.

(b) If the reported RVR/VIS is less than the applicable minimum the approach shall not be continued:

1. below 1 000 ft above the aerodrome; or

2. into the final approach segment in the case where the DA/H or MDA/H is more than 1 000 ft above the aerodrome.

(c) Where the RVR is not available, RVR values may be derived by converting the reported visibility.

(d) If, after passing 1 000 ft above the aerodrome, the reported RVR/VIS falls below the applicable minimum, the approach may be continued to DA/H or MDA/H.

(e) The approach may be continued below DA/H or MDA/H and the landing may be completed provided that the visual reference adequate for the type of approach operation and for the intended runway is established at the DA/H or MDA/H and is maintained.

(f) The touchdown zone RVR shall always be controlling. If reported and relevant, the midpoint and stopend RVR shall also be controlling. The minimum RVR value for the midpoint shall be 125 m or the RVR required for the touchdown zone if less, and 75 m for the stopend. For aircraft equipped with a rollout guidance or control system, the minimum RVR value for the midpoint shall be 75 m.

AMC1 AOCR.OP.MPA.305 (e) Commencement and continuation of approach

VISUAL REFERENCES FOR INSTRUMENT APPROACH OPERATIONS

(a) NPA, APV and CAT I operations

At DH or MDH, at least one of the visual references specified below should be distinctly visible and identifiable to the pilot:

1. elements of the approach lighting system;

2. the threshold;

3. the threshold markings;
(4) the threshold lights;
(5) the threshold identification lights;
(6) the visual glide slope indicator;
(7) the touchdown zone or touchdown zone markings;
(8) the touchdown zone lights;
(9) FATO/runway edge lights; or
(10) other visual references specified in the operations manual.

(b) Lower than standard category I (LTS CAT I) operations
At DH, the visual references specified below should be distinctly visible and identifiable to the pilot:

(1) a segment of at least three consecutive lights, being the centreline of the approach lights, or touchdown zone lights, or runway centreline lights, or runway edge lights, or a combination of these;

(2) this visual reference should include a lateral element of the ground pattern, such as an approach light crossbar or the landing threshold or a barrette of the touchdown zone light unless the operation is conducted utilising an approved HUDLS usable to at least 150 ft.

(c) CAT II or OTS CAT II operations
At DH, the visual references specified below should be distinctly visible and identifiable to the pilot:

(1) a segment of at least three consecutive lights being the centreline of the approach lights, or touchdown zone lights, or runway centreline lights, or runway edge lights, or a combination of these;

(2) this visual reference should include a lateral element of the ground pattern, such as an approach light crossbar or the landing threshold or a barrette of the touchdown zone light unless the operation is conducted utilising an approved HUDLS to touchdown.

(d) CAT III operations

(1) For CAT IIIA operations and for CAT IIIIB operations conducted either with fail-passive flight control systems or with the use of an
Approved HUDLS: at DH, a segment of at least three consecutive lights being the centreline of the approach lights, or touchdown zone lights, or runway centreline lights, or runway edge lights, or a combination of these is attained and can be maintained by the pilot.

(2) For CAT IIIB operations conducted either with fail-operational flight control systems or with a fail-operational hybrid landing system using a DH: at DH, at least one centreline light is attained and can be maintained by the pilot.

(3) For CAT IIIB operations with no DH there is no specification for visual reference with the runway prior to touchdown.

(e) Approach operations utilising EVS – CAT I operations

(1) At DH, the following visual references should be displayed and identifiable to the pilot on the EVS image:

(i) elements of the approach light; or

(ii) the runway threshold, identified by at least one of the following:

(A) the beginning of the runway landing surface,

(B) the threshold lights, the threshold identification lights; or

(C) the touchdown zone, identified by at least one of the following: the runway touchdown zone landing surface, the touchdown zone lights, the touchdown zone markings or the runway lights.

(2) At 100 ft above runway threshold elevation at least one of the visual references specified below should be distinctly visible and identifiable to the pilot without reliance on the EVS:

(i) the lights or markings of the threshold; or

(ii) the lights or markings of the touchdown zone.

(f) Approach operations utilising EVS – APV and NPA operations flown with the CDFA technique

(1) At DH/MDH, visual references should be displayed and identifiable to the pilot on the EVS image as specified under (a).
(2) At 200 ft above runway threshold elevation, at least one of the visual references specified under (a) should be distinctly visible and identifiable to the pilot without reliance on the EVS.

**AOCR.OP.MPA.315 Flight hours reporting — helicopters**

The operator shall make available to the Authority the hours flown for each helicopter operated during the previous calendar year.

**GM1 AOCR.OP.MPA.315 Flight hours reporting - helicopters**

**FLIGHT HOURS REPORTING**

(a) The requirement in AOCR.OP.MPA.315 may be achieved by making available either:

(1) the flight hours flown by each helicopter — identified by its serial number and registration mark — during the previous calendar year; or

(2) the total flight hours of each helicopter — identified by its serial number and registration mark — on the 31st of December of the previous calendar year.

(b) Where possible, the operator should have available, for each helicopter, the breakdown of hours for commercial air transport operations. If the exact hours for the functional activity cannot be established, the estimated proportion will be sufficient.
C PERFORMANCE AND OPERATING LIMITATIONS

General Requirements

AOCR.POL.H.100 Applicability

(a) Helicopters shall be operated in accordance with the applicable performance class requirements.

(b) Helicopters shall be operated in performance class 1:

(1) when operated to/from aerodromes or operating sites located in a congested hostile environment, except when operated to/from a public interest site (PIS) in accordance with AOCR.POL.H.225; or

(2) when having an MOPSC of more than 19, except when operated to/from a helideck in performance class 2 under an approval in accordance with AOCR.POL.H.305.

(c) Unless otherwise prescribed by (b), helicopters that have an MOPSC of 19 or less but more than nine shall be operated in performance class 1 or 2.

(d) Unless otherwise prescribed by (b), helicopters that have an MOPSC of nine or less shall be operated in performance class 1, 2 or 3.

AOCR.POL.H.105 General

(a) The mass of the helicopter:

(1) at the start of the take-off; or

(2) in the event of in-flight replanning, at the point from which the revised operational flight plan applies,

shall not be greater than the mass at which the applicable requirements of this Section can be complied with for the flight to be undertaken, taking into account expected reductions in mass as the flight proceeds and such fuel jettisoning as is provided for in the relevant requirement.

(b) The approved performance data contained in the AFM shall be used to determine compliance with the requirements of this Section, supplemented as necessary with other data as prescribed in the relevant requirement. The operator shall specify such other data in the operations manual. When applying the factors prescribed in this Section, account may be taken of any operational factors already
incorporated in the AFM performance data to avoid double application of factors.

(c) When showing compliance with the requirements of this Section, account shall be taken of the following parameters:

(1) mass of the helicopter;

(2) the helicopter configuration;

(3) the environmental conditions, in particular:

   (i) pressure altitude and temperature;

   (ii) wind:

      (A) except as provided in (C), for take-off, take-off flight path and landing requirements, accountability for wind shall be no more than 50 % of any reported steady headwind component of 5 kt or more;

      (B) where take-off and landing with a tailwind component is permitted in the AFM, and in all cases for the take-off flight path, not less than 150 % of any reported tailwind component shall be taken into account; and

      (C) where precise wind measuring equipment enables accurate measurement of wind velocity over the point of take-off and landing, wind components in excess of 50 % may be established by the operator, provided that the operator demonstrates to the Authority that the proximity to the FATO and accuracy enhancements of the wind measuring equipment provide an equivalent level of safety;

(4) the operating techniques; and

(5) the operation of any systems that have an adverse effect on performance.

**GM1 AOCR.POL.H.105(c) (3) (ii) (A) General**

**REPORTED HEADWIND COMPONENT**

The reported headwind component should be interpreted as being that reported at the time of flight planning and may be used, provided there is no significant change of unfactored wind prior to take-off.
AOCR.POL.H.110  Obstacle accountability

(a) For the purpose of obstacle clearance requirements, an obstacle located beyond the FATO, in the take-off flight path, or the missed approach flight path shall be considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than the following:

(1) For operations under VFR:

(i) half of the minimum width defined in the AFM — or, when no width is defined, ‘0, 75 × D’, where D is the largest dimension of the helicopter when the rotors are turning;

(ii) plus, the greater of ‘0, 25 × D’ or ‘3 m’;

(iii) plus:

(A) 0, 10 × distance DR for operations under VFR by day; or

(B) 0, 15 × distance DR for operations under VFR at night.

(2) For operations under IFR:

(i) ‘1, 5 D’ or 30 m, whichever is greater, plus:

(A) 0, 10 × distance DR, for operations under IFR with accurate course guidance;

(B) 0, 15 × distance DR, for operations under IFR with standard course guidance; or

(C) 0, 30 × distance DR for operations under IFR without course guidance.

(ii) When considering the missed approach flight path, the divergence of the obstacle accountability area only applies after the end of the take-off distance available.

(3) For operations with initial take-off conducted visually and converted to IFR/IMC at a transition point, the criteria required in (1) apply up to the transition point, and the criteria required in (2) apply after the transition point. The transition point cannot be located before the end of the take-off distance required for helicopters (TODRH) operating in performance class...
1 or before the defined point after take-off (DPATO) for helicopters operating in performance class 2.

(b) For take-off using a back-up or a lateral transition procedure, for the purpose of obstacle clearance requirements, an obstacle located in the back-up or lateral transition area shall be considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than:

(1) half of the minimum width defined in the AFM or, when no width is defined, ‘0, 75 × D’;

(2) plus the greater of ‘0, 25 × D’ or ‘3 m’;

(3) plus:

   (i) for operations under VFR by day 0, 10 × the distance travelled from the back of the FATO, or

   (ii) for operations under VFR at night 0, 15 × the distance travelled from the back of the FATO.

(c) Obstacles may be disregarded if they are situated beyond:

(1) 7 × rotor radius (R) for day operations, if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;

(2) 10 × R for night operations, if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;

(3) 300 m if navigational accuracy can be achieved by appropriate navigation aids; or

(4) 900 m in all other cases.

**GM1 AOCR.POL.H.110 (a) (2) (i) Obstacle accountability**

**COURSE GUIDANCE**

Standard course guidance includes automatic direction finder (ADF) and VHF omnidirectional radio range (VOR) guidance. Accurate course guidance includes ILS, MLS or other course guidance providing an equivalent navigational accuracy.
**DEPARTMENT OF CIVIL AVIATION**
**HELCOPTER SUPPLEMENT TO AIRCRAFT OPERATOR CERTIFICATE REQUIREMENTS**

**Performance Class 1**

**AOCR.POL.H.200 General**

Helicopters operated in performance class 1 shall be certified in category A or equivalent as determined by the Authority.

**GM1 AOCR.POL.H.200 & AOCR.POL.H.300 & AOCR.POL.H.400 General**

**CATEGORY A AND CATEGORY B**

(a) Helicopters that have been certified according to any of the following standards are considered to satisfy the Category A criteria. Provided that they have the necessary performance information scheduled in the AFM, such helicopters are therefore eligible for performance class 1 or 2 operations:

1. certification as Category A under CS-27 or CS-29;
2. certification as Category A under JAR-27 or JAR-29;
3. certification as Category A under FAR Part 29;
4. certification as group A under BCAR Section G; and
5. certification as group A under BCAR-29.

(b) In addition to the above, certain helicopters have been certified under FAR Part 27 and with compliance with FAR Part 29 engine isolation requirements as specified in FAA Advisory Circular AC 27-1. Provided that compliance is established with the following additional requirements of CS-29:

1. CS 29.1027(a) Independence of engine and rotor drive system lubrication;
2. CS 29.1187(e);
3. CS 29.1195(a) & (b) Provision of a one-shot fire extinguishing system for each engine;
   
   (i) The requirement to fit a fire extinguishing system may be waived if the helicopter manufacturer can demonstrate equivalent safety, based on service experience for the entire fleet showing that the actual incidence of fires in the engine fire zones has been negligible.

4. CS 29.1197;
(5) CS 29.1199;

(6) CS 29.1201; and

(7) CS 29.1323(c)(1) Ability of the airspeed indicator to consistently identify the take-off decision point, these helicopters are considered to satisfy the requirement to be certified as equivalent to Category A.

(c) The performance operating rules of JAR-OPS 3, which were transposed into this Part, were drafted in conjunction with the performance requirements of JAR-29 Issue 1 and FAR Part 29 at amendment 29-39. For helicopters certificated under FAR Part 29 at an earlier amendment, or under BCAR section G or BCAR-29, performance data will have been scheduled in the AFM according to these earlier requirements. This earlier scheduled data may not be fully compatible with this Part.

(d) Before any AOC is issued under which performance class 1 or 2 operations are conducted, it should be established that scheduled performance data are available that are compatible with the requirements of performance class 1 and 2 respectively.

(e) Any properly certified helicopter is considered to satisfy the Category B criteria. If appropriately equipped (in accordance with AOCR.IDE.H), such helicopters are therefore eligible for performance class 3 operations.

AOCR.POL.H.205 Take-off

(a) The take-off mass shall not exceed the maximum take-off mass specified in the AFM for the procedure to be used.

(b) The take-off mass shall be such that:

(1) it is possible to reject the take-off and land on the FATO in case of the critical engine failure being recognised at or before the take-off decision point (TDP);

(2) the rejected take-off distance required (RTODRH) does not exceed the rejected take-off distance available (RTODAH); and

(3) the TODRH does not exceed the take-off distance available (TODAH).

(4) Notwithstanding (b)(3), the TODRH may exceed the TODAH if the helicopter, with the critical engine failure recognised at TDP can, when continuing the take-off, clear all obstacles to the end
of the TODRH by a vertical margin of not less than 10.7 m (35 ft).

(c) When showing compliance with (a) and (b), account shall be taken of the appropriate parameters of AOCR.POL.H.105(c) at the aerodrome or operating site of departure.

(d) That part of the take-off up to and including TDP shall be conducted in sight of the surface such that a rejected take-off can be carried out.

(e) For take-off using a backup or lateral transition procedure, with the critical engine failure recognition at or before the TDP, all obstacles in the back-up or lateral transition area shall be cleared by an adequate margin.

**AMC1 AOCR.POL.H.205 (b) (4) Take-off**

**THE APPLICATION OF TODRH**

The selected height should be determined with the use of AFM data, and be at least 10.7 m (35 ft) above:

(a) the take-off surface; or

(b) as an alternative, a level height defined by the highest obstacle in the take-off distance required.

**GM1 AOCR.POL.H.205 (b) (4) Take-off**

**THE APPLICATION OF TODRH**

(a) Introduction

Original definitions for helicopter performance were derived from aeroplanes; hence the definition of take-off distance owes much to operations from runways. Helicopters on the other hand can operate from runways, confined and restricted areas and rooftop FATOs - all bounded by obstacles. As an analogy this is equivalent to a take-off from a runway with obstacles on and surrounding it. It can therefore be seen that unless the original definitions from aeroplanes are tailored for helicopters, the flexibility of the helicopter might be constrained by the language of operational performance.

This GM concentrates on the critical term - take-off distance required (TODRH) - and describes the methods to achieve compliance with it and, in particular, the alternative procedure described in ICAO Annex 6 Attachment A 4.1.1.3:
(1) the take-off distance required does not exceed the take-off distance available; or

(2) as an alternative, the take-off distance required may be disregarded provided that the helicopter with the critical engine failure recognised at TDP can, when continuing the take-off, clear all obstacles between the end of the take-off distance available and the point at which it becomes established in a climb at VTOSS by a vertical margin of 10.7 m (35 ft) or more. An obstacle is considered to be in the path of the helicopter if its distance from the nearest point on the surface below the intended line of flight does not exceed 30 m or 1.5 times the maximum dimension of the helicopter, whichever is greater.

(b) Definition of TODRH

The definition of TODRH from Annex I is as follows:

‘Take-off distance required (TODRH)’ in the case of helicopters means the horizontal distance required from the start of the take-off to the point at which take-off safety speed (VTOSS), a selected height and a positive climb gradient are achieved, following failure of the critical engine being recognised at the TDP, the remaining engines operating within approved operating limits.

AMC1 AOCR.POL.H.205 (b) (4) states how the specified height should be determined.

The original definition of TODRH was based only on the first part of this definition.

(c) The clear area procedure (runway)

In the past, helicopters certified in Category A would have had, at the least, a ‘clear area’ procedure. This procedure is analogous to an aeroplane Category A procedure and assumes a runway (either metalled or grass) with a smooth surface suitable for an aeroplane take-off (see Figure 1).

The helicopter is assumed to accelerate down the FATO (runway) outside of the height velocity (HV) diagram. If the helicopter has an engine failure before TDP, it must be able to land back on the FATO (runway) without damage to helicopter or passengers; if there is a failure at or after TDP the aircraft is permitted to lose height - providing it does not descend below a specified height above the surface (usually 15 ft if the TDP is above 15 ft). Errors by the pilot are taken into consideration but the smooth surface of the FATO limits serious damage if the error margin is eroded (e.g. by a change of wind conditions).
The operator only has to establish that the distances required are within the distance available (take-off distance and reject distance). The original definition of TODRH meets this case exactly.

From the end of the TODRH obstacle clearance is given by the climb gradient of the first or second climb segment meeting the requirement of AOCR.POL.H.210 (or for performance class 2 (PC2): AOCR.POL.H.315). The clearance margin from obstacles in the take-off flight path takes account of the distance travelled from the end of the take-off distance required and operational conditions (IMC or VMC).

(d) Category A procedures other than clear area

Procedures other than the clear area are treated somewhat differently. However, the short field procedure is somewhat of a hybrid as either (a) or (b) of AMC1 AOCR.POL.H.205(b)(4) can be utilised (the term ‘helipad’ is used in the following section to illustrate the principle only, it is not intended as a replacement for ‘aerodrome’ or ‘FATO’).

(1) Limited area, restricted area and helipad procedures (other than elevated)

The exact names of the procedure used for other than clear area are as many as there are manufacturers. However, principles for obstacle clearance are generic and the name is unimportant.

These procedures (see Figure 2 and Figure 3) are usually associated with an obstacle in the continued take-off area - usually shown as a line of trees or some other natural obstacle. As clearance above such obstacles is not readily associated with an accelerative procedure, as described in (c), a procedure using a vertical climb (or a steep climb in the forward, sideways or rearward direction) is utilised.
With the added complication of a TDP principally defined by height together with obstacles in the continued take off area, a drop down to within 15 ft of the take-off surface is not deemed appropriate and the required obstacle clearance is set to 35 ft (usually called min-dip). The distance to the obstacle does not need to be calculated (provided it is outside the rejected distance required), as clearance above all obstacles is provided by ensuring that helicopter does not descend below the min-dip associated with a level defined by the highest obstacle in the continued take-off area.

These procedures depend upon (b) of AMC1 AOCR.POL.H.205 (b) (4).

As shown in Figure 3, the point at which VTOSS and a positive rate of climb are met defines the TODRH. Obstacle clearance from that point is assured by meeting the requirement of AOCR.POL.H.210 (or for PC2 - AOCR.POL.H.315). Also shown in
Figure 3 is the distance behind the helipad which is the backup distance (B/U distance).  

(2) Elevated helipad procedures  

The elevated helipad procedure (see Figure 4) is a special case of the ground level helipad procedure discussed above.  

Figure 4: Elevate Helipad take – off  

The main difference is that drop down below the level of the take-off surface is permitted. In the drop down phase, the Category A procedure ensures deck-edge clearance but, once clear of the deck-edge, the 35 ft clearance from obstacles relies upon the calculation of drop down. Item (b) of AMC1 AOCR.POL.H.205 (b) (4) is applied. Although 35 ft is used throughout the requirements, it may be inadequate at particular elevated FATOs that are subject to adverse airflow effects, turbulence, etc.  

AMC1 AOCR.POL.H.205 (e) Take-off  

OBSTACLE CLEARANCE IN THE BACKUP AREA  

(a) The requirement in AOCR.POL.H.205 (e) has been established in order to take into account the following factors:  

(1) in the backup: the pilot has few visual cues and has to rely upon the altimeter and sight picture through the front window (if flight path guidance is not provided) to achieve an accurate rearward flight path;  

(2) in the rejected take-off: the pilot has to be able to manage the descent against a varying forward speed whilst still ensuring an
adequate clearance from obstacles until the helicopter gets in close proximity for landing on the FATO; and

(3) in the continued take-off; the pilot has to be able to accelerate to VTOSS (take-off safety speed for Category A helicopters) whilst ensuring an adequate clearance from obstacles.

(b) The requirements of AO.CR.POL.H.205 (e) may be achieved by establishing that:

(1) in the backup area no obstacles are located within the safety zone below the rearward flight path when described in the AFM (see Figure 1 - in the absence of such data in the AFM, the operator should contact the manufacturer in order to define a safety zone); or

(2) during the backup, the rejected take-off and the continued take-off manoeuvres, obstacle clearance is demonstrated to the Authority.

Figure 1: Rearward flight path

(c) An obstacle, in the backup area, is considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than:

(1) half of the minimum FATO (or the equivalent term used in the AFM) width defined in the AFM (or, when no width is defined 0.75 D, where D is the largest dimension of the helicopter when the rotors are turning); plus
(2) 0.25 times D (or 3 m, whichever is greater); plus

(3) 0.10 for VFR day, or 0.15 for VFR night, of the distance travelled from the back of the FATO (see Figure 2).

Figure 2: Obstacle accountability

AMC1 AOCR.POL.H.205&AOCR.POL.H.220  Take-off and landing

APPLICATION FOR ALTERNATIVE TAKE-OFF AND LANDING PROCEDURES

(a) A reduction in the size of the take-off surface may be applied when the operator has demonstrated to the Authority that compliance with the requirements of AOCR.POL.H.205, 210 and 220 can be assured with:

(1) a procedure based upon an appropriate Category A take-off and landing profile scheduled in the AFM;

(2) a take-off or landing mass not exceeding the mass scheduled in the AFM for a hover-out-of-ground-effect one-engine-inoperative (HOGE OEI) ensuring that:

(i) following an engine failure at or before TDP, there are adequate external references to ensure that the helicopter can be landed in a controlled manner; and

(ii) following an engine failure at or after the landing decision point (LDP) there are adequate external references to ensure that the helicopter can be landed in a controlled manner.

(b) An upwards shift of the TDP and LDP may be applied when the operator has demonstrated to the Authority that compliance with the requirements of AOCR.POL.H.205, 210 and 220 can be assured with:

(1) a procedure based upon an appropriate Category A take-off and landing profile scheduled in the AFM;
(2) A take-off or landing mass not exceeding the mass scheduled in the AFM for a HOGE OEI ensuring that:

(i) following an engine failure at or after TDP compliance with the obstacle clearance requirements of AOCR.POL.H.205 (b)(4) and AOCR.POL.H.210 can be met; and

(ii) following an engine failure at or before the LDP the balked landing obstacle clearance requirements of AOCR.POL.H.220 (b) and AOCR.POL.H.210 can be met.

(c) The Category A ground level surface area requirement may be applied at a specific elevated FATO when the operator can demonstrate to the Authority that the usable cue environment at that aerodrome/operating site would permit such a reduction in size.

GM1 AOCR.POL.H.205& AOCR.POL.H.220 Take-off and landing

APPLICATION FOR ALTERNATIVE TAKE-OFF AND LANDING PROCEDURES

The manufacturer’s Category A procedure defines profiles and scheduled data for take-off, climb, performance at minimum operating speed and landing, under specific environmental conditions and masses.

Associated with these profiles and conditions are minimum operating surfaces, take-off distances, climb performance and landing distances; these are provided (usually in graphic form) with the take-off and landing masses and the take-off decision point (TDP) and landing decision point (LDP).

The landing surface and the height of the TDP are directly related to the ability of the helicopter - following an engine failure before or at TDP - to reject onto the surface under forced landing conditions. The main considerations in establishing the minimum size of the landing surface are the scatter during flight testing of the reject manoeuvre, with the remaining engine operating within approved limits, and the required usable cue environment.

Hence, an elevated site with few visual cues - apart from the surface itself - would require a greater surface area in order that the helicopter can be accurately positioned during the reject manoeuvre within the specified area. This usually results in the stipulation of a larger surface for an elevated site than for a ground level site (where lateral cues may be present).

This could have the unfortunate side-effect that a FATO that is built 3 m above the surface (and therefore elevated by definition) might be out of operational scope for some helicopters - even though there might be a rich visual cue environment where rejects are not problematical. The presence of elevated
sites where ground level surface requirements might be more appropriate could be brought to the attention of the Authority.

It can be seen that the size of the surface is directly related to the requirement of the helicopter to complete a rejected take-off following an engine failure. If the helicopter has sufficient power such that a failure before or at TDP will not lead to a requirement for rejected take-off, the need for large surfaces is removed; sufficient power for the purpose of this GM is considered to be the power required for hover-out-of-ground-effect one-engine-inoperative (HOGE OEI).

Following an engine failure at or after the TDP, the continued take-off path provides OEI clearance from the take-off surface and the distance to reach a point from where climb performance in the first, and subsequent segments, is assured.

If HOGE OEI performance exists at the height of the TDP, it follows that the continued take-off profile, which has been defined for a helicopter with a mass such that a rejected take-off would be required following an engine failure at or before TDP, would provide the same, or better, obstacle clearance and the same, or less, distance to reach a point where climb performance in the first, and subsequent segments, is assured.

If the TDP is shifted upwards, provided that the HOGE OEI performance is established at the revised TDP, it will not affect the shape of the continued take-off profile but should shift the min-dip upwards by the same amount that the revised TDP has been increased - with respect to the basic TDP.

Such assertions are concerned only with the vertical or the backup procedures and can be regarded as achievable under the following circumstances:

(a) when the procedure is flown, it is based upon a profile contained in the AFM - with the exception of the necessity to perform a rejected take-off;

(b) the TDP, if shifted upwards (or upwards and backward in the backup procedure) will be the height at which the HOGE OEI performance is established; and

(c) if obstacles are permitted in the backup area they should continue to be permitted with a revised TDP.

**AOCR.POL.H.210 Take-off flight path**

(a) From the end of the TODRH with the critical engine failure recognised at the TDP:

(1) The take-off mass shall be such that the take-off flight path provides a vertical clearance, above all obstacles located in the climb path, of not less than 10,7 m (35 ft) for operations under
VFR and 10.7 m (35 ft) + 0.01 \times \text{distance DR} for operations under IFR. Only obstacles as specified in AOCR.POL.H.110 have to be considered.

(2) Where a change of direction of more than 15° is made, adequate allowance shall be made for the effect of bank angle on the ability to comply with the obstacle clearance requirements. This turn is not to be initiated before reaching a height of 61 m (200 ft) above the take-off surface unless it is part of an approved procedure in the AFM.

(b) When showing compliance with (a), account shall be taken of the appropriate parameters of AOCR.POL.H.105(c) at the aerodrome or operating site of departure.

**AOCR.POL.H.215 En-route — critical engine inoperative**

(a) The mass of the helicopter and flight path at all points along the route, with the critical engine inoperative and the meteorological conditions expected for the flight, shall permit compliance with (1), (2) or (3):

(1) When it is intended that the flight will be conducted at any time out of sight of the surface, the mass of the helicopter permits a rate of climb of at least 50 ft/minute with the critical engine inoperative at an altitude of at least 300 m (1 000 ft), or 600 m (2 000 ft) in areas of mountainous terrain, above all terrain and obstacles along the route within 9, 3 km (5 NM) on either side of the intended track.

(2) When it is intended that the flight will be conducted without the surface in sight, the flight path permits the helicopter to continue flight from the cruising altitude to a height of 300 m (1 000 ft) above a landing site where a landing can be made in accordance with AOCR.POL.H.220. The flight path clears vertically, by at least 300 m (1 000 ft) or 600 m (2 000 ft) in areas of mountainous terrain, all terrain and obstacles along the route within 9, 3 km (5 NM) on either side of the intended track. Drift-down techniques may be used.

(3) When it is intended that the flight will be conducted in VMC with the surface in sight, the flight path permits the helicopter to continue flight from the cruising altitude to a height of 300 m (1 000 ft) above a landing site where a landing can be made in accordance with AOCR.POL.H.220, without flying at any time below the appropriate minimum flight altitude. Obstacles within 900 m on either side of the route need to be considered.

(b) When showing compliance with (a) (2) or (a) (3):
(1) the critical engine is assumed to fail at the most critical point along the route;

(2) account is taken of the effects of winds on the flight path;

(3) fuel jettisoning is planned to take place only to an extent consistent with reaching the aerodrome or operating site with the required fuel reserves and using a safe procedure; and

(4) fuel jettisoning is not planned below 1 000 ft above terrain.

(c) The width margins of (a) (1) and (a) (2) shall be increased to 18, 5 km (10 NM) if the navigational accuracy cannot be met for 95 % of the total flight time.

**AOCR.POL.H.220 Landing**

(a) The landing mass of the helicopter at the estimated time of landing shall not exceed the maximum mass specified in the AFM for the procedure to be used.

(b) In the event of the critical engine failure being recognised at any point at or before the landing decision point (LDP), it is possible either to land and stop within the FATO, or to perform a balked landing and clear all obstacles in the flight path by a vertical margin of 10, 7 m (35 ft). Only obstacles as specified in AOCR.POL.H.110 have to be considered.

(c) In the event of the critical engine failure being recognised at any point at or after the LDP, it is possible to:

(1) clear all obstacles in the approach path; and

(2) land and stop within the FATO.

(d) When showing compliance with (a) to (c), account shall be taken of the appropriate parameters of AOCR.POL.H.105(c) for the estimated time of landing at the destination aerodrome or operating site, or any alternate if required.

(e) That part of the landing from the LDP to touchdown shall be conducted in sight of the surface.

**AOCR.POL.H.225 Helicopter operations to/from a public interest site**

(a) Operations to/from a public interest site (PIS) may be conducted in performance class 2, without complying with AOCR.POL.H.310 (b) or
AOCR.POL.H.325 (b), provided that all of the following are complied with:

(1) the PIS was in use before 1 July 2002;

(2) the size of the PIS or obstacle environment does not permit compliance with the requirements for operation in performance class 1;

(3) the operation is conducted with a helicopter with an MOPSC of six or less;

(4) the operator complies with AOCR.POL.H.305 (b) (2) and (b) (3);

(5) the helicopter mass does not exceed the maximum mass specified in the AFM for a climb gradient of 8 % in still air at the appropriate take-off safety speed (V TOSS ) with the critical engine inoperative and the remaining engines operating at an appropriate power rating; and

(6) the operator has obtained prior approval for the operation from the Authority. Before such operations take place in another State, the operator shall obtain an endorsement from the Authority of that State.

(b) Site-specific procedures shall be established in the operations manual to minimise the period during which there would be danger to helicopter occupants and persons on the surface in the event of an engine failure during take-off and landing.

(c) The operations manual shall contain for each PIS: a diagram or annotated photograph, showing the main aspects, the dimensions, the non-conformance with the requirements performance class 1, the main hazards and the contingency plan should an incident occur.

AMC1 AOCR.POL.H.225 (a) (5) Helicopter operations to/from a public interest site

HELI珂PTER MASS LIMITATION

(a) The helicopter mass limitation at take-off or landing specified in CAT.POL.H.225(a)(5) should be determined using the climb performance data from 35 ft to 200 ft at VTOSS (first segment of the take-off flight path) contained in the Category A supplement of the AFM (or equivalent manufacturer data acceptable in accordance with GM1-CAT.POL.H.200 & CAT.POL.H.300 & CAT.POL.H.400).
(b) The first segment climb data to be considered is established for a climb at the take-off safety speed VTOSS, with the landing gear extended (when the landing gear is retractable), with the critical engine inoperative and the remaining engines operating at an appropriate power rating (the 2 min 30 sec or 2 min OEI power rating, depending on the helicopter type certification). The appropriate VTOSS, is the value specified in the Category A performance section of the AFM for vertical take-off and landing procedures (VTOL, helipad or equivalent manufacturer terminology).

(c) The ambient conditions at the site (pressure-altitude and temperature) should be taken into account.

(d) The data are usually provided in charts in one of the following ways:

(1) Height gain in ft over a horizontal distance of 100 ft in the first segment configuration (35 ft to 200 ft, VTOSS, 2 min 30 sec/2 min OEI power rating). This chart should be entered with a height gain of 8 ft per 100 ft horizontally travelled, resulting in a mass value for every pressure-altitude/temperature combination considered.

(2) Horizontal distance to climb from 35 ft to 200 ft in the first segment configuration (VTOSS, 2 min 30 sec/2 min OEI power rating). This chart should be entered with a horizontally distance of 628 m (2 062 ft), resulting in a mass value for every pressure-altitude/temperature combination considered.

(3) Rate of climb in the first segment configuration (35 ft to 200 ft, VTOSS, 2 min 30 sec/2 min OEI power rating). This chart can be entered with a rate of climb equal to the climb speed (VTOSS) value in knots (converted to true airspeed) multiplied by 8.1, resulting in a mass value for every pressure altitude/temperature combination considered.

GM1 AOCR.POL.H.225 Helicopter operations to/from a public interest site

UNDERLYING PRINCIPLES

(a) General

The original Joint Aviation Authorities (JAA) Appendix 1 to JAR-OPS 3.005(i) was introduced in January 2002 to address problems that had been encountered by Member States at hospital sites due to the applicable performance requirements of JAR-OPS 3 Subparts G and H. These problems were enumerated in ACJ to Appendix 1 to JAR-OPS 3.005(d) paragraph 8, part of which is reproduced below. ‘8 Problems with hospital sites
During implementation of JAR-OPS 3, it was established that a number of States had encountered problems with the impact of performance rules where helicopters were operated for HEMS. Although States accept that progress should be made towards operations where risks associated with a critical power unit failure are eliminated, or limited by the exposure time concept, a number of landing sites exist which do not (or never can) allow operations to performance class 1 or 2 requirements.

These sites are generally found in a congested hostile environment:

– in the grounds of hospitals; or

– on hospital buildings;

The problem of hospital sites is mainly historical and, whilst the Authority could insist that such sites not be used - or used at such a low weight that critical power unit failure performance is assured, it would seriously curtail a number of existing operations.

Even though the rule for the use of such sites in hospital grounds for HEMS operations (Appendix 1 to JAR-OPS 3.005(d) sub-paragraph (c) (2) (i) (A)) attracts alleviation until 2005, it is only partial and will still impact upon present operations.

Because such operations are performed in the public interest, it was felt that the Authority should be able to exercise its discretion so as to allow continued use of such sites provided that it is satisfied that an adequate level of safety can be maintained - notwithstanding that the site does not allow operations to performance class 1 or 2 standards. However, it is in the interest of continuing improvements in safety that the alleviation of such operations be constrained to existing sites, and for a limited period.’

As stated in this ACJ and embodied in the text of the appendix, the solution was short-term (until 31 December 2004). During the commenting period of JAA NPA 18, representations were made to the JAA that the alleviation should be extended to 2009. The review committee, in not accepting this request, had in mind that this was a short-term solution to address an immediate problem, and a permanent solution should be sought.

(b) After 1 January 2005

Although elimination of such sites would remove the problem, it is recognised that phasing out, or rebuilding existing hospital sites, is a
long-term goal which may not be cost-effective, or even possible, in some Member States.

It should be noted, however, that AOCR.POL.H.225 (a) limits the problem by confining approvals to hospital sites established before 1 July 2002 (established in this context means either: built before that date, or brought into service before that date — this precise wording was used to avoid problems associated with a ground level aerodrome/operating site where no building would be required). Thus the problem of these sites is contained and reducing in severity. This date was set approximately 6 months after the intended implementation of the original JAR-OPS 3 appendix.

EASA adopted the JAA philosophy that, from 1st January 2005, approval would be confined to those sites where a CAT A procedure alone cannot solve the problem. The determination of whether the helicopter can or cannot be operated in accordance with performance class 1 should be established with the helicopter at a realistic payload and fuel to complete the mission. However, in order to reduce the risk at those sites, the application of the requirements contained in AOCR.POL.H.225 (a) should be applied.

Additionally and in order to promote understanding of the problem, the text contained in CAT.POL.H.225(c) refers to the performance class and not to ICAO Annex 14. Thus, Part C of the operations manual should reflect the non-conformance with performance class 1, as well as the site-specific procedures (approach and departure paths) to minimise the danger to third parties in the event of an incident.

The following paragraphs explain the problem and solutions.

(c) The problem associated with such sites

There is a number of problems: some of which can be solved with the use of appropriate helicopters and procedures; and others which, because of the size of the site or the obstacle environment, cannot. They consist of:

(1) the size of the surface of the site (smaller than that required by the manufacturer’s procedure);

(2) an obstacle environment that prevents the use of the manufacturer’s procedure (obstacles in the backup area); and

(3) an obstacle environment that does not allow recovery following an engine failure in the critical phase of take-off (a line of buildings requiring a demanding gradient of climb) at a realistic payload and fuel to complete the mission.
– Problems associated with (c) (1): the inability to climb and conduct a rejected landing back to the site following an engine failure before the Decision Point (DP).

– Problems associated with (c) (2): as in (c) (1).

– Problems associated with (c) (3): climb into an obstacle following an engine failure after DP.

Problems cannot be solved in the immediate future, but can, when mitigated with the use of the latest generation of helicopters (operated at a weight that can allow useful payloads and endurance), minimise exposure to risk.

(d) Long-term solution

Although not offering a complete solution, it was felt that a significant increase in safety could be achieved by applying an additional performance margin to such operations. This solution allowed the time restriction of 2004 to be removed.

The required performance level of 8 % climb gradient in the first segment reflects ICAO Annex 14 Volume II in ‘Table 4-3 ‘Dimensions and slopes of obstacle limitations surfaces’ for performance class 2.

The performance delta is achieved without the provision of further manufacturer’s data by using existing graphs to provide the reduced take-off mass (RTOM).

If the solution in relation to the original problem is examined, the effects can be seen.

(1) Solution with relation to (c)(1): although the problem still exists, the safest procedure is a dynamic take-off reducing the time taken to achieve $V_{stay up}$ and thus allowing VFR recovery — if the failure occurs at or after $V_y$ and 200 ft, an IFR recovery is possible.

(2) Solution with relation to (c) (2): as in (c) (1) above.

(3) Solution with relation to (c) (3): once again this does not give a complete solution, however, the performance delta minimises the time during which a climb over the obstacle cannot be achieved.
GM1 AOCR.POL.H.225 (a) (6) Helicopter operations to/from a public interest site

ENDORSEMENT FROM ANOTHER STATE

(a) Application to another State

To obtain an endorsement from another State, the operator should submit to that State:

1. the reasons that preclude compliance with the requirements for operations in performance class 1;

2. the site-specific procedures to minimise the period during which there would be danger to helicopter occupants and person on the surface in the event of an engine failure during take-off and landing; and

3. the extract from the operations manual to comply with AOCR.POL.H.225(c).

(b) Endorsement from another State

Upon receiving the endorsement from another State, the operator should submit it together with the site-specific procedures and the reasons and justification that preclude the use of performance class 1 criteria to the Authority issuing the AOC to obtain the approval or extend the approval to a new public interest site.
Performance Class 2

AOCR.POL.H.300   General

Helicopters operated in performance class 2 shall be certified in category A or equivalent as determined by the Authority.

AOCR.POL.H.305   Operations without an assured safe forced landing capability

(a) Operations without an assured safe forced landing capability during the take-off and landing phases shall only be conducted if the operator has been granted an approval by the Authority.

(b) To obtain and maintain such approval the operator shall:

(1) conduct a risk assessment, specifying:

   (i) the type of helicopter; and

   (ii) the type of operations;

(2) implement the following set of conditions:

   (i) attain and maintain the helicopter/engine modification standard defined by the manufacturer;

   (ii) conduct the preventive maintenance actions recommended by the helicopter or engine manufacturer;

   (iii) include take-off and landing procedures in the operations manual, where they do not already exist in the AFM;

   (iv) specify training for flight crew; and

   (v) provide a system for reporting to the manufacturer loss of power, engine shutdown or engine failure events; and

(3) implement a usage monitoring system (UMS).

AOCR.POL.H.310   Take-off

(a) The take-off mass shall not exceed the maximum mass specified for a rate of climb of 150 ft/min at 300 m (1 000 ft) above the level of the aerodrome or operating site with the critical engine inoperative and the remaining engine(s) operating at an appropriate power rating.
(b) For operations other than those specified in AOCR.POL.H.305, the take-off shall be conducted such that a safe forced landing can be executed until the point where safe continuation of the flight is possible.

(c) For operations in accordance with AOCR.POL.H.305, in addition to the requirements of (a):

(1) the take-off mass shall not exceed the maximum mass specified in the AFM for an all engines operative out of ground effect (AEO OGE) hover in still air with all engines operating at an appropriate power rating; or

(2) for operations from a helideck:

(i) with a helicopter that has an MOPSC of more than 19; or

(ii) any helicopter operated from a helideck located in a hostile environment,

the take-off mass shall take into account: the procedure; deck-edge miss and drop down appropriate to the height of the helideck with the critical engine(s) inoperative and the remaining engines operating at an appropriate power rating.

(d) When showing compliance with (a) to (c), account shall be taken of the appropriate parameters of AOCR.POL.H.105(c) at the point of departure.

(e) That part of the take-off before the requirement of AOCR.POL.H.315 is met shall be conducted in sight of the surface.

**AOCR.POL.H.315  Take-off flight path**

From the defined point after take-off (DPATO) or, as an alternative, no later than 200 ft above the take-off surface, with the critical engine inoperative, the requirements of AOCR.POL.H.210(a)(1), (a)(2) and (b) shall be complied with.

**AOCR.POL.H.320  En-route — critical engine inoperative**

The requirement of AOCR.POL.H.215 shall be complied with.

**AOCR.POL.H.325  Landing**

(a) The landing mass at the estimated time of landing shall not exceed the maximum mass specified for a rate of climb of 150 ft/min at 300 m (1000 ft) above the level of the aerodrome or operating site with the
If the critical engine fails at any point in the approach path:

(1) a balked landing can be carried out meeting the requirement of AOCR.POL.H.315; or

(2) for operations other than those specified in AOCR.POL.H.305, the helicopter can perform a safe forced landing.

For operations in accordance with AOCR.POL.H.305, in addition to the requirements of (a):

(1) the landing mass shall not exceed the maximum mass specified in the AFM for an AEO OGE hover in still air with all engines operating at an appropriate power rating; or

(2) for operations to a helideck:

(i) with a helicopter that has an MOPSC of more than 19; or

(ii) any helicopter operated to a helideck located in a hostile environment, the landing mass shall take into account the procedure and drop down appropriate to the height of the helideck with the critical engine inoperative and the remaining engine(s) operating at an appropriate power rating.

When showing compliance with (a) to (c), account shall be taken of the appropriate parameters of AOCR.POL.H.105(c) at the destination aerodrome or any alternate, if required.

That part of the landing after which the requirement of (b) (1) cannot be met shall be conducted in sight of the surface.
AOCR.POL.H.400  General

(a) Helicopters operated in performance class 3 shall be certified in category A or equivalent as determined by the Authority, or category B.

(b) Operations shall only be conducted in a non-hostile environment, except:

(1) when operating in accordance with AOCR.POL.H.420; or

(2) for the take-off and landing phase, when operating in accordance with (c).

(c) Provided the operator is approved in accordance with AOCR.POL.H.305, operations may be conducted to/from an aerodrome or operating site located outside a congested hostile environment without an assured safe forced landing capability:

(1) during take-off, before reaching V_y (speed for best rate of climb) or 200 ft above the take-off surface; or

(2) during landing, below 200 ft above the landing surface.

(d) Operations shall not be conducted:

(1) out of sight of the surface;

(2) at night;

(3) when the ceiling is less than 600 ft; or

(4) when the visibility is less than 800 m.

AOCR.POL.H.405  Take-off

(a) The take-off mass shall be the lower of:

(1) the MCTOM; or

(2) the maximum take-off mass specified for a hover in ground effect with all engines operating at take-off power, or if conditions are such that a hover in ground effect is not likely to be established, the take-off mass specified for a hover out of ground effect with all engines operating at take-off power.
(b) Except as provided in AOCR.POL.H.400 (b), in the event of an engine failure the helicopter shall be able to perform a safe forced landing.

**AOCR.POL.H.410 En-route**

(a) The helicopter shall be able, with all engines operating within the maximum continuous power conditions, to continue along its intended route or to a planned diversion without flying at any point below the appropriate minimum flight altitude.

(b) Except as provided in AOCR.POL.H.420, in the event of an engine failure the helicopter shall be able to perform a safe forced landing.

**AOCR.POL.H.415 Landing**

(a) The landing mass of the helicopter at the estimated time of landing shall be the lower of:

1. the maximum certified landing mass; or
2. the maximum landing mass specified for a hover in ground effect, with all engines operating at take-off power, or if conditions are such that a hover in ground effect is not likely to be established, the landing mass for a hover out of ground effect with all engines operating at take-off power.

(b) Except as provided in AOCR.POL.H.400 (b), in the event of an engine failure, the helicopter shall be able to perform a safe forced landing.

**AOCR.POL.H.420 Helicopter operations over a hostile environment located outside a congested area**

(a) Operations over a non-congested hostile environment without a safe forced landing capability with turbine-powered helicopters with an MOPSC of six or less shall only be conducted if the operator has been granted an approval by the Authority, following a safety risk assessment performed by the operator. Before such operations take place in another State, the operator shall obtain an endorsement from the Authority of that State.

(b) To obtain and maintain such approval the operator shall:

1. only conduct these operations in the areas and under the conditions specified in the approval;
2. not conduct these operations under a HEMS approval;
(3) substantiate that helicopter limitations, or other justifiable considerations, preclude the use of the appropriate performance criteria; and

(4) be approved in accordance with AOCR.POL.H.305 (b).

(c) Notwithstanding AOCR.IDE.H.240, such operations may be conducted without supplemental oxygen equipment, provided the cabin altitude does not exceed 10,000 ft for a period in excess of 30 minutes and never exceeds 13,000 ft pressure altitude.
CHAPTER FOUR INSTRUMENTS, DATA and EQUIPMENT

Helicopters

AOCR.IDE.H.100 Instruments and equipment — general

(a) Instruments and equipment required by this Subpart shall be approved in accordance with the Civil Aviation Regulations, except for the following items:

(1) Spare fuses;

(2) Independent portable lights;

(3) An accurate time piece;

(4) Chart holder;

(5) First-aid kit;

(6) Megaphones;

(7) Survival and signaling equipment;

(8) Sea anchors and equipment for mooring; and

(9) Child restraint devices.

(b) Instruments and equipment not required by this Subpart that do not need to be approved in accordance with the Civil Aviation Regulations but are carried on a flight, shall comply with the following:

(1) the information provided by these instruments, equipment or accessories shall not be used by the flight crew to comply with MCAR-PART AIRWORTHINESS or AOCR.IDE.H.330, AOCR.IDE.H.335, AOCR.IDE.H.340 and AOCR.IDE.H.345; and

(2) the instruments and equipment shall not affect the airworthiness of the helicopter, even in the case of failures or malfunction.

(c) If equipment is to be used by one flight crew member at his/her station during flight, it must be readily operable from that station. When a single item of equipment is required to be operated by more than one flight crew member it must be installed so that the equipment is readily operable from any station at which the equipment is required to be operated.
(d) Those instruments that are used by any flight crew member shall be so arranged as to permit the flight crew member to see the indications readily from his/her station, with the minimum practicable deviation from the position and line of vision that he/she normally assumes when looking forward along the flight path.

(e) All required emergency equipment shall be easily accessible for immediate use.

**GM1 AOCR.IDE.H.100 (a) Instruments and equipment — general**

**REQUIRED INSTRUMENTS AND EQUIPMENT THAT DO NOT NEED TO BE APPROVED IN ACCORDANCE WITH MCAR-PART 21**

The functionality of non-installed instruments and equipment required by this Subpart and that do not need an equipment approval, as listed in AOCR.IDE.H.100 (a), should be checked against recognised industry standards appropriate to the intended purpose. The operator is responsible for ensuring the maintenance of these instruments and equipment.

**GM1 AOCR.IDE.H.100 (b) Instruments and equipment – general**

**INSTRUMENTS AND EQUIPMENT THAT DO NOT NEED TO BE APPROVED IN ACCORDANCE WITH THE CIVIL AVIATION REGULATIONS, BUT ARE CARRIED ON A FLIGHT**

(a) The provision of this paragraph does not exempt the item of equipment from complying with MCAR-PART-21 if the instrument or equipment is installed in the helicopter. In this case, the installation should be approved as required in MCAR-PART-21 and should comply with the applicable airworthiness codes as required under that Regulation.

(b) The functionality of non-installed instruments and equipment required by this Subpart that do not need an equipment approval should be checked against recognised industry standards appropriated for the intended purpose. The operator is responsible for ensuring the maintenance of these instruments and equipment.

(c) The failure of additional non-installed instruments or equipment not required by this Part or the airworthiness codes as required under MCAR-PART-21 or any applicable airspace requirements should not adversely affect the airworthiness and/or the safe operation of the aircraft. Examples are the following:

(1) instruments supplying additional flight information (e.g. stand-alone Global Positioning System (GPS)).
(2) mission dedicated equipment (e.g. radios); and

(3) non-installed passenger entertainment equipment.

GM1 AOCR.IDE.H.100 (d) Instruments and equipment - general

POSITIONING OF INSTRUMENTS

This requirement implies that whenever a single instrument is required to be installed in a helicopter operated in a multi-crew environment, the instrument needs to be visible from each flight crew station.

AOCR.IDE.H.105 Minimum equipment for flight

A flight shall not be commenced when any of the helicopter’s instruments, items of equipment or functions required for the intended flight are inoperative or missing, unless:

(a) the helicopter is operated in accordance with the operator’s MEL; or

(b) the operator is approved by the Authority to operate the helicopter within the constraints of the MMEL.

AOCR.IDE.H.115 Operating lights

(a) Helicopters operated under VFR by day shall be equipped with an anti-collision light system.

(b) Helicopters operated at night or under IFR shall, in addition to (a), be equipped with:

(1) lighting supplied from the helicopter’s electrical system to provide adequate illumination for all instruments and equipment essential to the safe operation of the helicopter;

(2) lighting supplied from the helicopter’s electrical system to provide illumination in all passenger compartments;

(3) an independent portable light for each required crew member readily accessible to crew members when seated at their designated stations;

(4) navigation/position lights;

(5) two landing lights of which at least one is adjustable in flight so as to illuminate the ground in front of and below the helicopter and the ground on either side of the helicopter; and
lights to conform with the International Regulations for Preventing Collisions at Sea if the helicopter is amphibious.

**AOCR.IDE.H.125 Operations under VFR by day — flight and navigational instruments and associated equipment**

(a) Helicopters operated under VFR by day shall be equipped with the following equipment, available at the pilot’s station:

(1) A means of measuring and displaying:

   (i) Magnetic heading;

   (ii) Time in hours, minutes, and seconds;

   (iii) Pressure altitude;

   (iv) Indicated airspeed;

   (v) Vertical speed;

   (vi) Slip; and

   (vii) Outside air temperature.

(2) A means of indicating when the supply of power to the required flight instruments is not adequate.

(b) Whenever two pilots are required for the operation, an additional separate means of displaying the following shall be available for the second pilot:

(1) Pressure altitude;

(2) Indicated airspeed;

(3) Vertical speed; and

(4) Slip.

(c) Helicopters with an MCTOM of more than 3 175 kg or any helicopter operating over water when out of sight of land or when the visibility is less than 1 500 m, shall be equipped with a means of measuring and displaying:

(1) Attitude; and

(2) Heading.
(d) A means for preventing malfunction of the airspeed indicating systems due to condensation or icing shall be available for helicopters with an MCTOM of more than 3 175 kg or an MOPSC of more than nine.

**AMC1 AOCR.IDE.H.125 & AOCR.IDE.H.130**

**Operations under VFR by day & Operations under IFR or at night – flight and navigational instruments and associated equipment and**

**INTEGRATED INSTRUMENTS**

(a) Individual equipment requirements may be met by combinations of instruments or by integrated flight systems or by a combination of parameters on electronic displays, provided that the information so available to each required pilot is not less than the required in the applicable operational requirements, and the equivalent safety of the installation has been shown during type certification approval of the helicopter for the intended type of operation.

(b) The means of measuring and indicating slip, helicopter attitude and stabilised helicopter heading may be met by combinations of instruments or by integrated flight director systems, provided that the safeguards against total failure, inherent in the three separate instruments, are retained.

**AMC1 AOCR.IDE.H.125 (a) (1) (i) & AOCR.IDE.H.130 (a) (1)**

**Operations under VFR by day & Operations under IFR or at night – flight and navigational instruments and associated equipment**

**MEANS OF MEASURING AND DISPLAYING MAGNETIC HEADING**

The means of measuring and displaying magnetic direction should be a magnetic compass or equivalent.

**AMC1 AOCR.IDE.H.125 (a) (1) (ii) & AOCR.IDE.H.130 (a) (2)**

**Operations under VFR by day & Operations under IFR or at night – flight and navigational instruments and associated equipment**

**MEANS OF MEASURING AND DISPLAYING THE TIME**

An acceptable means of compliance is a clock displaying hours, minutes and seconds, with a sweep-second pointer or digital presentation, or a crew member with a suitable chronograph.

**AMC1 AOCR.IDE.H.125 (a) (1) (iii) & AOCR.IDE.H.130 (b)**

**Operations under VFR by day & Operations under IFR or at night – flight and navigational instruments and associated equipment**
CALIBRATION OF THE MEANS OF MEASURING AND DISPLAYING PRESSURE ALTITUDE

The instrument measuring and displaying pressure altitude should be of a sensitive type calibrated in feet (ft), with a sub-scale setting, calibrated in hectopascals/millibars, adjustable for any barometric pressure likely to be set during flight.

**AMC1 AOCR.IDE.H.125 (a) (1) (iv) & AOCR.IDE.H.130 (a) (43) Operations under VFR by day & Operations under IFR or at night – flight and navigational instruments and associated equipment**

CALIBRATION OF THE INSTRUMENT INDICATING AIRSPEED

The instrument indicating airspeed should be calibrated in knots (kt).

**AMC1 AOCR.IDE.H.125 (a) (1) (vii) & AOCR.IDE.H.130 (a) (8) Operations under VFR by day & Operations under IFR or at night – flight and navigational instruments and associated equipment**

OUTSIDE AIR TEMPERATURE

(a) The means of displaying outside air temperature should be calibrated in degrees Celsius.

(b) The means of displaying outside air temperature may be an air temperature indicator that provides indications that are convertible to outside air temperature.

**AMC1 AOCR.IDE.H.125 (b) & AOCR.IDE.H.130 (h) Operations under VFR by day & Operations under IFR or at night – flight and navigational instruments and associated equipment**

MULTI-PILOT OPERATIONS - DUPLICATE INSTRUMENTS

Duplicate instruments should include separate displays for each pilot and separate selectors or other associated equipment where appropriate.

**AMC1 AOCR.IDE.H.125 (c) (2) & AOCR.IDE.H.130 (a) (7) Operations under VFR by day & Operations under IFR or at night – flight and navigational instruments and associated equipment**

STABILISED HEADING

Stabilised heading should be achieved for VFR flights by a gyroscopic heading indicator, whereas for IFR flights, this should be achieved through a magnetic gyroscopic heading indicator.
MEANS OF PREVENTING MALFUNCTION DUE TO CONDENSATION OR ICING

The means of preventing malfunction due to either condensation or icing of the airspeed indicating system should be a heated pitot tube or equivalent.

AOCR.IDE.H.130 Operations under IFR or at night — flight and navigational instruments and associated equipment

Helicopters operated under VFR at night or under IFR shall be equipped with the following equipment, available at the pilot’s station:

(a) A means of measuring and displaying:

(1) Magnetic heading;
(2) Time in hours, minutes and seconds;
(3) Indicated airspeed;
(4) Vertical speed;
(5) Slip;
(6) Attitude;
(7) Stabilised heading; and
(8) Outside air temperature.

(b) Two means of measuring and displaying pressure altitude. For single-pilot operations under VFR at night one pressure altimeter may be substituted by a radio altimeter.

(c) A means of indicating when the supply of power to the required flight instruments is not adequate.

(d) A means of preventing malfunction of the airspeed indicating systems required in (a)(3) and (h)(2) due to either condensation or icing.

(e) A means of annunciating to the flight crew the failure of the means required in (d) for helicopters:

(1) issued with an individual CofA on or after 1 August 1999; or
(2) issued with an individual CofA before 1 August 1999 with an MCTOM of more than 3 175 kg, and with an MOPSC of more than nine.

(f) A standby means of measuring and displaying attitude that:

(1) is powered continuously during normal operation and, in the event of a total failure of the normal electrical generating system, is powered from a source independent of the normal electrical generating system;

(2) operates independently of any other means of measuring and displaying attitude;

(3) is capable of being used from either pilot’s station;

(4) is operative automatically after total failure of the normal electrical generating system;

(5) provides reliable operation for a minimum of 30 minutes or the time required to fly to a suitable alternate landing site when operating over hostile terrain or offshore, whichever is greater, after total failure of the normal electrical generating system, taking into account other loads on the emergency power supply and operational procedures;

(6) is appropriately illuminated during all phases of operation; and

(7) is associated with a means to alert the flight crew when operating under its dedicated power supply, including when operated by emergency power.

(g) An alternate source of static pressure for the means of measuring altitude, airspeed and vertical speed.

(h) Whenever two pilots are required for the operation, a separate means for displaying for the second pilot:

(1) Pressure altitude;

(2) Indicated airspeed;

(3) Vertical speed;

(4) Slip;

(5) Attitude; and
(6) Stabilised heading.

(i) For IFR operations, a chart holder in an easily readable position that can be illuminated for night operations.

**AMC1 AOCR.IDE.H.130 (e) Operations under IFR or at night – flight and navigational instruments and associated equipment**

**MEANS OF INDICATING FAILURE OF THE AIRSPEED INDICATING SYSTEM’S MEANS OF PREVENTING MALFUNCTION DUE TO EITHER CONDENSATION OR ICING**

A combined means of indicating failure of the airspeed indicating system’s means of preventing malfunction due to either condensation or icing is acceptable provided that it is visible from each flight crew station and that there it is a means to identify the failed heater in systems with two or more sensors.

**AMC1 AOCR.IDE.H.130 (f) (6) Operations under IFR or at night – flight and navigational instruments and associated equipment**

**ILLUMINATION OF STANDBY MEANS OF MEASURING AND DISPLAYING ATTITUDE**

The standby means of measuring and displaying attitude should be illuminated so as to be clearly visible under all conditions of daylight and artificial lighting.

**AMC1 AOCR.IDE.H.130 (i) Operations under IFR or at night – flight and navigational instruments and associated equipment**

**CHART HOLDER**

An acceptable means of compliance with the chart holder requirement is to display a pre-composed chart on an electronic flight bag (EFB).

**GM1 AOCR.IDE.H.125&AOCR.IDE.H.130 Operations under VFR by day & Operations under IFR or at night – flight and navigational instruments and associated equipment**

**SUMMARY TABLE**

**Table 1: Flight and navigational instruments and associated equipment**

<table>
<thead>
<tr>
<th>SERIAL</th>
<th>FLIGHTS UNDER VFR</th>
<th>FLIGHTS UNDER IFR OR AT NIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INSTRUMENT</td>
<td>SINGLE PILOT</td>
</tr>
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<td>(a)</td>
<td>Magnetic direction</td>
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</tr>
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</table>
### DEPARTMENT OF CIVIL AVIATION
### HELICOPTER SUPPLEMENT TO AIRCRAFT OPERATOR CERTIFICATE REQUIREMENTS

#### Table:

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>2</td>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Pressure altitude</td>
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<td>2</td>
<td>2 (note 1)</td>
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<td>Vertical speed</td>
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<td>2 Note (2)</td>
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<td>2</td>
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<td>2 Note (2)</td>
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<td>2 Note (4)</td>
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<td>Standby attitude</td>
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<td>Chart holder</td>
<td></td>
<td></td>
<td>1 Note (6)</td>
<td>1 Note (6)</td>
</tr>
</tbody>
</table>

**Note (1)**  For single pilot night operation under VFR, one means of measuring and displaying pressure altitude may be substituted by a means of measuring and displaying radio altitude.

**Note (2)**  Applicable only to helicopters with a maximum certified take-off mass (MCTOM) of more than 3,175 kg; or helicopters operated over water when out of sight of land or when the visibility is less than 1,500 m.

**Note (3)**  Applicable only to helicopters with an MCTOM of more than 3,175 kg, or with an MOPSC of more than nine.

**Note (4)**  The pitot heater failure annunciation applies to any helicopter issued with an individual CofA on or after 1 August 1999. It also applies before that date when: the helicopter has a MCTOM of more than 3,175 kg and an MOPSC of more than nine.

**Note (5)**  for helicopters with an MCTOM of more than 3,175 kg, CS 291303 (g) may require either a gyroscopic rate-of-turn indicator combined with a slip-skid indicator (turn and bank indicator) or a standby attitude indicator satisfying the requirements. In any case, the original type certification standard should be referred to determine the exact requirement.

**Note (6)**  Applicable only to helicopters operating under IFR.

**AOCR.IDE.H.135 Additional equipment for single-pilot operation under IFR**

Helicopters operated under IFR with a single-pilot shall be equipped with an autopilot with at least altitude hold and heading mode.

**AOCR.IDE.H.145 Radio altimeters**
(a) Helicopters on flights over water shall be equipped with a radio altimeter capable of emitting an audio warning below a pre-set height and a visual warning at a height selectable by the pilot, when operating:

(1) out of sight of the land;

(2) in a visibility of less than 1500 m;

(3) at night; or

(4) At a distance from land corresponding to more than three minutes at normal cruising speed.

**AMC1 AOCR.IDE.H.145  Radio altimeters**

**AUDIO WARNING DEVICE**

*The audio warning required in AOCR.IDE.H.145 should be a voice warning.*

**AOCR.IDE.H.160  Airborne weather detecting equipment**

Helicopters with an MOPSC of more than nine and operated under IFR or at night shall be equipped with airborne weather detecting equipment when current weather reports indicate that thunderstorms or other potentially hazardous weather conditions, regarded as detectable with airborne weather detecting equipment, may be expected to exist along the route to be flown.

**AMC1 AOCR.IDE.H.160  Airborne weather detecting equipment**

**GENERAL**

*The airborne weather detecting equipment should be an airborne weather radar.*

**AOCR.IDE.H.165  Additional equipment for operations in icing conditions at night**

(a) Helicopters operated in expected or actual icing conditions at night shall be equipped with a means to illuminate or detect the formation of ice.

(b) The means to illuminate the formation of ice shall not cause glare or reflection that would handicap crew members in the performance of their duties.

**AOCR.IDE.H.170  Flight crew interphone system**
Helicopters operated by more than one flight crew member shall be equipped with a flight crew interphone system, including headsets and microphones for use by all flight crew members.

**AMC1 AOCR.IDE.H.170  Flight crew interphone system**

**TYPE OF FLIGHT CREW INTERPHONE**

The flight crew interphone system should not be of a handheld type.

**AOCR.IDE.H.175  Crew member interphone system**

Helicopters shall be equipped with a crew member interphone system when carrying a crew member other than a flight crew member.

**AMC1 AOCR.IDE.H.175  Crew member interphone system**

**SPECIFICATIONS**

The crew member interphone system should:

(a) operate independently of the public address system except for handsets, headsets, microphones, selector switches and signaling devices;

(b) in the case of helicopters where at least one cabin crew member is required, be readily accessible for use at required cabin crew stations close to each separate or pair of floor level emergency exits;

(c) in the case of helicopters where at least one cabin crew member is required, have an alerting system incorporating aural or visual signals for use by flight and cabin crew;

(d) have a means for the recipient of a call to determine whether it is a normal call or an emergency call that uses:

   (1) lights of different colours;

   (2) codes defined by the operator (e.g. different number of rings for normal and emergency calls); and

   (3) any other indicating signal specified in the operations manual;

(e) provide a means of two-way communication between the flight crew compartment and each crew member station; and
**Public address system**

**AOCR.IDE.H.180**

(a) Helicopters with an MOPSC of more than nine shall be equipped with a public address system, with the exception of (b).

(b) Notwithstanding (a) helicopters with an MOPSC of more than nine and less than 20 are exempted from having a public address system, if:

1. the helicopter is designed without a bulkhead between pilot and passengers; and
2. the operator is able to demonstrate that when in flight, the pilot’s voice is audible and intelligible at all passengers’ seats.

**AMC1 AOCR.IDE.H.180**

**Public address system**

**SPECIFICATIONS**

The public address system should:

(a) operate independently of the interphone systems except for handsets, headsets, microphones, selector switches and signaling devices;

(b) be readily accessible for immediate use from each required flight crew station;

(c) have, for each floor level passenger emergency exit that has an adjacent cabin crew seat, a microphone operable by the seated cabin crew member, except that one microphone may serve more than one exit, provided the proximity of exits allows unassisted verbal communication between seated cabin crew members;

(d) be operable within 10 seconds by a cabin crew member at each of those stations;

(e) be audible at all passenger seats, lavatories, cabin crew seats and work stations and any other location or compartment that may be occupied by persons; and

(f) following a total failure of the normal electrical generating system, provide reliable operation for a minimum of 10 minutes.
The following helicopter types shall be equipped with a cockpit voice recorder (CVR):

(1) all helicopters with an MCTOM of more than 7 000 kg; and

(2) helicopters with an MCTOM of more than 3 175 kg and first issued with an individual CofA on or after 1 January 1987.

The CVR shall be capable of retaining the data recorded during at least:

(1) the preceding two hours for helicopters referred to in (a) (1) and (a) (2), when first issued with an individual CofA on or after 1 January 2016;

(2) the preceding one hour for helicopters referred to in (a) (1), when first issued with an individual CofA on or after 1 August 1999 and before 1 January 2016;

(3) the preceding 30 minutes for helicopters referred to in (a)(1), when first issued with an individual CofA before 1 August 1999; or

(4) the preceding 30 minutes for helicopters referred to in (a) (2), when first issued with an individual CofA before 1 January 2016.

The CVR shall record with reference to a timescale:

(1) voice communications transmitted from or received in the flight crew compartment by radio;

(2) flight crew members’ voice communications using the interphone system and the public address system, if installed;

(3) the aural environment of the flight crew compartment, including without interruption:

   (i) for helicopters first issued with an individual CofA on or after 1 August 1999, the audio signals received from each crew microphone;

   (ii) for helicopters first issued with an individual CofA before 1 August 1999, the audio signals received from each crew microphone, where practicable;
(4) voice or audio signals identifying navigation or approach aids introduced into a headset or speaker.

(d) The CVR shall start to record prior to the helicopter moving under its own power and shall continue to record until the termination of the flight when the helicopter is no longer capable of moving under its own power.

(e) In addition to (d), for helicopters referred to in (a) (2) issued with an individual CofA on or after 1 August 1999:

(1) the CVR shall start automatically to record prior to the helicopter moving under its own power and continue to record until the termination of the flight when the helicopter is no longer capable of moving under its own power; and

(2) depending on the availability of electrical power, the CVR shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

(f) The CVR shall have a device to assist in locating it in water.

**AMC1 AOCR.IDE.H.185 Cockpit voice recorder**

**OPERATIONAL PERFORMANCE REQUIREMENTS**

*For helicopters first issued with an individual CofA on or after 01 January 2016 the operational performance requirements for cockpit voice recorders (CVRs) should be those laid down in EUROCAE Document ED-112 (Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems) dated March 2003, including amendments n°1 and n°2, or any later equivalent standard produced by EUROCAE.*

**AOCR.IDE.H.190 Flight data recorder**

(a) The following helicopters shall be equipped with an FDR that uses a digital method of recording and storing data and for which a method of readily retrieving that data from the storage medium is available:

(1) helicopters with an MCTOM of more than 3175 kg and first issued with an individual CofA on or after 1 August 1999;

(2) helicopters with an MCTOM of more than 7000 kg, or an MOPSC of more than nine, and first issued with an individual CofA on or after 1 January 1989 but before 1 August 1999.
(b) The FDR shall record the parameters required to determine accurately the:

1. flight path, speed, attitude, engine power, operation and configuration and be capable of retaining the data recorded during at least the preceding 10 hours, for helicopters referred to in (a)(1) and first issued with an individual CofA on or after 1 January 2016;

2. flight path, speed, attitude, engine power and operation and be capable of retaining the data recorded during at least the preceding eight hours, for helicopters referred to in (a)(1) and first issued with an individual CofA before 1 January 2016;

3. flight path, speed, attitude, engine power and operation and be capable of retaining the data recorded during at least the preceding five hours, for helicopters referred to in (a)(2).

(c) Data shall be obtained from helicopter sources that enable accurate correlation with information displayed to the flight crew.

(d) The FDR shall automatically start to record the data prior to the helicopter being capable of moving under its own power and shall stop automatically after the helicopter is incapable of moving under its own power.

(e) The FDR shall have a device to assist in locating it in water.

**AMC1 AO7R.IDE.H.190 Flight data recorder**

**OPERATIONAL PERFORMANCE REQUIREMENTS FOR HELICOPTERS HAVING AN MCTOM OF MORE THAN 3 175 KG AND FIRST ISSUED WITH AN INDIVIDUAL C OF A ON OR AFTER 1 JANUARY 2016**

(a) The operational performance requirements for flight data recorders (FDRs) should be those laid down in EUROCAE Document ED-112 (Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems) dated March 2003, including amendments n°1 and n°2, or any later equivalent standard produced by EUROCAE.

(b) The FDR should, with reference to a timescale, record:

1. the parameters listed in Table 1 below;

2. the additional parameters listed in Table 2 below, when the information data source for the parameter is used by helicopter systems or is available on the instrument panel for use by the flight crew to operate the helicopter; and
(3) any dedicated parameters related to novel or unique design or operational characteristics of the helicopter as determined by the Agency.

(c) The FDR parameters should meet, as far as practicable, the performance specifications (range, sampling intervals, accuracy limits and minimum in read-out) defined in the operational performance requirements and specifications of EUROCAE Document ED-112, including amendments n°1 and n°2, or any later equivalent standard produced by EUROCAE.

(d) FDR systems for which some recorded parameters do not meet the performance specifications of EUROCAE Document ED-112 may be acceptable to the Authority.

Table 1: FDR – All Helicopters

<table>
<thead>
<tr>
<th>No*</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Time or relative time count</td>
</tr>
<tr>
<td>2</td>
<td>Pressure altitude</td>
</tr>
<tr>
<td>3</td>
<td>Indicated airspeed or calibrated airspeed</td>
</tr>
<tr>
<td>4</td>
<td>Heading</td>
</tr>
<tr>
<td>5</td>
<td>Normal acceleration</td>
</tr>
<tr>
<td>6</td>
<td>Pitch attitude</td>
</tr>
<tr>
<td>7</td>
<td>Roll attitude</td>
</tr>
<tr>
<td>8</td>
<td>Manual radio transmission keying CVR/FDR synchronisation reference</td>
</tr>
<tr>
<td>9</td>
<td>Power on each engine</td>
</tr>
<tr>
<td>9a</td>
<td>Free power turbine speed</td>
</tr>
<tr>
<td>9b</td>
<td>( N_f ) Engine torque</td>
</tr>
<tr>
<td>9c</td>
<td>Engine gas generator speed ( N_{g} )</td>
</tr>
<tr>
<td>9d</td>
<td>Cockpit power control position</td>
</tr>
<tr>
<td>9e</td>
<td>Other parameters to enable engine power to be determined</td>
</tr>
<tr>
<td>10a</td>
<td>Main rotor speed</td>
</tr>
<tr>
<td>10b</td>
<td>Rotor brake (if installed)</td>
</tr>
</tbody>
</table>
### DEPARTMENT OF CIVIL AVIATION
### HELICOPTER SUPPLEMENT TO AIRCRAFT OPERATOR CERTIFICATE REQUIREMENTS

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Primary flight controls – Pilot input and/or control output position (if applicable)</td>
</tr>
<tr>
<td>11a</td>
<td>Collective pitch</td>
</tr>
<tr>
<td>11b</td>
<td>Longitudinal cyclic pitch</td>
</tr>
<tr>
<td>11c</td>
<td>Lateral cyclic pitch</td>
</tr>
<tr>
<td>11d</td>
<td>Tail rotor pedal</td>
</tr>
<tr>
<td>11e</td>
<td>Controllable stabilator (if applicable)</td>
</tr>
<tr>
<td>11f</td>
<td>Hydraulic selection</td>
</tr>
<tr>
<td>12</td>
<td>Hydraulics low pressure (each system should be recorded)</td>
</tr>
<tr>
<td>13</td>
<td>Outside air temperature</td>
</tr>
<tr>
<td>18</td>
<td>Yaw rate or yaw acceleration</td>
</tr>
<tr>
<td>20</td>
<td>Longitudinal acceleration (body axis)</td>
</tr>
<tr>
<td>21</td>
<td>Lateral acceleration</td>
</tr>
<tr>
<td>25</td>
<td>Marker beacon passage</td>
</tr>
<tr>
<td>26</td>
<td>Warnings – a discrete should be recorded for the master warning, gearbox low oil pressure and stability augmentation system failure. Other ‘red’ warnings should be recorded where the warning condition cannot be determined from other parameters or from the cockpit voice recorder.</td>
</tr>
<tr>
<td>27</td>
<td>Each navigation receiver frequency selection</td>
</tr>
<tr>
<td>37</td>
<td>Engine control modes</td>
</tr>
</tbody>
</table>

* The number in the left hand column reflects the serial numbers depicted in EUROCAE Document ED-112

**Table 2: Helicopters for which the data source for the parameter is either used by helicopter systems or is available on the instrument panel for use by the flight crew to operate the helicopter**

<table>
<thead>
<tr>
<th>No*</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>AFCS mode and engagement status</td>
</tr>
<tr>
<td>15</td>
<td>Stability augmentation system engagement (each system should be recorded)</td>
</tr>
<tr>
<td>16</td>
<td>Main gear box oil pressure</td>
</tr>
<tr>
<td>17</td>
<td>Gear box oil temperature</td>
</tr>
<tr>
<td>17a</td>
<td>Main gear box oil temperature</td>
</tr>
<tr>
<td>17b</td>
<td>Intermediate gear box oil temperature Tail rotor gear box</td>
</tr>
<tr>
<td>17c</td>
<td>Indicated sling load force (if signals readily available)</td>
</tr>
<tr>
<td>22</td>
<td>Radio altitude</td>
</tr>
</tbody>
</table>
### DEPARTMENT OF CIVIL AVIATION
### HELICOPTER SUPPLEMENT TO AIRCRAFT OPERATOR CERTIFICATE REQUIREMENTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td><strong>Vertical deviation – the approach aid in use should be</strong></td>
</tr>
<tr>
<td>23a</td>
<td>recorded. ILS glide path</td>
</tr>
<tr>
<td>23b</td>
<td>MLS elevation</td>
</tr>
<tr>
<td>23c</td>
<td>GNSS approach path</td>
</tr>
<tr>
<td>24</td>
<td><strong>Horizontal deviation – the approach aid in use should be</strong></td>
</tr>
<tr>
<td>24a</td>
<td>be recorded. ILS localiser</td>
</tr>
<tr>
<td>24b</td>
<td>MLS azimuth</td>
</tr>
<tr>
<td>24c</td>
<td>GNSS approach path</td>
</tr>
<tr>
<td>28</td>
<td><strong>DME 1 &amp; 2 distances</strong></td>
</tr>
<tr>
<td>29</td>
<td><strong>Navigation data</strong></td>
</tr>
<tr>
<td>29a</td>
<td>Drift angle</td>
</tr>
<tr>
<td>29b</td>
<td>Wind speed</td>
</tr>
<tr>
<td>29c</td>
<td>Wind direction</td>
</tr>
<tr>
<td>29d</td>
<td>Latitude</td>
</tr>
<tr>
<td>29e</td>
<td>Longitude</td>
</tr>
<tr>
<td>29f</td>
<td>Ground speed</td>
</tr>
<tr>
<td>30</td>
<td><strong>Landing gear or gear selector position</strong></td>
</tr>
<tr>
<td>31</td>
<td><strong>Engine exhaust gas temperature (T&lt;sub&gt;4&lt;/sub&gt;)</strong></td>
</tr>
<tr>
<td>32</td>
<td><strong>Turbine inlet temperature (TIT/ITT)</strong></td>
</tr>
<tr>
<td>33</td>
<td><strong>Fuel contents</strong></td>
</tr>
<tr>
<td>34</td>
<td><strong>Altitude rate (vertical speed) – only necessary when available from cockpit instruments</strong></td>
</tr>
<tr>
<td>35</td>
<td><strong>Ice detection</strong></td>
</tr>
<tr>
<td>36</td>
<td><strong>Helicopter health and usage monitor system (HUMS)</strong></td>
</tr>
<tr>
<td>36a</td>
<td>Engine data</td>
</tr>
<tr>
<td>36b</td>
<td>Chip detector</td>
</tr>
<tr>
<td>36c</td>
<td>Track timing</td>
</tr>
<tr>
<td>36d</td>
<td>Exceedance discrete</td>
</tr>
<tr>
<td>36e</td>
<td>Broadband average engine vibration</td>
</tr>
<tr>
<td>38</td>
<td><strong>Selected barometric setting – to be recorded for helicopters where the parameter is displayed electronically</strong></td>
</tr>
<tr>
<td>38a</td>
<td>Pilot</td>
</tr>
<tr>
<td>38b</td>
<td>Co-pilot</td>
</tr>
<tr>
<td>39</td>
<td><strong>Selected altitude (all pilot selectable modes of operation) – to be recorded for the helicopters where the parameter is displayed electronically</strong></td>
</tr>
<tr>
<td>40</td>
<td><strong>Selected speed (all pilot selectable modes of operation) – to be recorded for the helicopters where the parameter is displayed electronically</strong></td>
</tr>
</tbody>
</table>
### DEPARTMENT OF CIVIL AVIATION
### HELICOPTER SUPPLEMENT TO AIRCRAFT OPERATOR CERTIFICATE REQUIREMENTS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td>Selected Mach (all pilot selectable modes of operation) – to be recorded for the helicopters where the parameter is displayed electronically</td>
</tr>
<tr>
<td>42</td>
<td>Selected vertical speed (all pilot selectable modes of operation) – to be recorded for the helicopters where the parameter is displayed electronically</td>
</tr>
<tr>
<td>43</td>
<td>Selected heading (all pilot selectable modes of operation) – to be recorded for the helicopters where the parameter is displayed electronically</td>
</tr>
<tr>
<td>44</td>
<td>Selected flight path (all pilot selectable modes of operation) – to be recorded for the helicopters where the parameter is displayed electronically</td>
</tr>
<tr>
<td>45</td>
<td>Selected decision height (all pilot selectable modes of operation) – to be recorded for the helicopters where the parameter is displayed electronically</td>
</tr>
<tr>
<td>46</td>
<td>EFIS display format</td>
</tr>
<tr>
<td>47</td>
<td>Multi-function / engine / alerts display format</td>
</tr>
<tr>
<td>48</td>
<td>Event marker</td>
</tr>
</tbody>
</table>

* The number in the left hand column reflects the serial numbers depicted in EUROCAE Document ED-112

**AMC2 AOCR.IDE.H.190 Flight data recorder**

**LIST OF PARAMETERS TO BE RECORDED FOR HELICOPTERS HAVING AN MCTOM OF MORE THAN 3 175 KG AND FIRST ISSUED WITH AN INDIVIDUAL COFA ON OR AFTER 1 AUGUST 1999 AND BEFORE 1 JANUARY 2016 AND HELICOPTERS HAVING AN MCTOM OF MORE THAN 7 000 KG OR AN MOPSC OF MORE THAN NINE AND FIRST ISSUED WITH AN INDIVIDUAL COFA ON OR AFTER 1 JANUARY 1989 AND BEFORE 1 AUGUST 1999**

(a) The FDR should, with reference to a timescale, record:

1. for helicopters with an MCTOM between 3 175 kg and 7 000 kg the parameters listed in Table 1 below;
2. for helicopters with an MCTOM of more than 7 000 kg the parameters listed in Table 2 below;
3. for helicopters equipped with electronic display systems, the additional parameters listed in Table 3 below; and
4. any dedicated parameters relating to novel or unique design or operational characteristics of the helicopter.

(b) When determined by the Agency, the FDR of helicopters with an MCTOM of more than 7 000 kg do not need to record parameter 19 of Table 2 below, if any of the following conditions are met:

1. the sensor is not readily available; or
(2) a change is required in the equipment that generates the data.

(c) Individual parameters that can be derived by calculation from the other recorded parameters need not to be recorded, if agreed by the Authority.

(d) The parameters should meet, as far as practicable, the performance specifications (range, sampling intervals, accuracy limits and resolution in read-out) defined in AMC3 AOER.IDE.H.190.

(e) If recording capacity is available, as many of the additional parameters as possible specified in table II-A.2 of EUROCAE Document ED 112 dated March 2003 should be recorded.

(f) For the purpose of this AMC a sensor is considered ‘readily available’ when it is already available or can be easily incorporated.

Table 1: Helicopters with an MCTOM of 7 000 kg or less

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Time or relative time count</td>
</tr>
<tr>
<td>2</td>
<td>Pressure altitude</td>
</tr>
<tr>
<td>3</td>
<td>Indicated airspeed or calibrated airspeed</td>
</tr>
<tr>
<td>4</td>
<td>Heading</td>
</tr>
<tr>
<td>5</td>
<td>Normal acceleration</td>
</tr>
<tr>
<td>6</td>
<td>Pitch attitude</td>
</tr>
<tr>
<td>7</td>
<td>Roll attitude</td>
</tr>
<tr>
<td>8</td>
<td>Manual radio transmission keying</td>
</tr>
<tr>
<td>9</td>
<td>Power on each engine (free power turbine speed and engine torque) /</td>
</tr>
<tr>
<td></td>
<td>cockpit power control position (if applicable)</td>
</tr>
<tr>
<td>10a</td>
<td>Main rotor speed</td>
</tr>
<tr>
<td>10b</td>
<td>Rotor brake (if installed)</td>
</tr>
<tr>
<td>11</td>
<td>Primary flight controls - pilot input and control output position (if</td>
</tr>
<tr>
<td></td>
<td>applicable)</td>
</tr>
<tr>
<td>11a</td>
<td>Collective pitch</td>
</tr>
<tr>
<td>11b</td>
<td>Longitudinal cyclic pitch</td>
</tr>
<tr>
<td>11c</td>
<td>Lateral cyclic pitch</td>
</tr>
<tr>
<td>11d</td>
<td>Tail rotor pedal</td>
</tr>
<tr>
<td>11e</td>
<td>Controllable stabilator</td>
</tr>
<tr>
<td>11f</td>
<td>Hydraulic selection</td>
</tr>
<tr>
<td>12</td>
<td>Hydraulics low pressure</td>
</tr>
<tr>
<td>13</td>
<td>Outside air temperature</td>
</tr>
<tr>
<td>14</td>
<td>Autopilot engagement status</td>
</tr>
<tr>
<td>15</td>
<td>Stability augmentation system engagement</td>
</tr>
<tr>
<td>26</td>
<td>Warnings</td>
</tr>
</tbody>
</table>

Table 2: Helicopters with an MCTOM of more than 7 000 kg

<table>
<thead>
<tr>
<th>Para</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time or relative time count</td>
</tr>
<tr>
<td>Pressure altitude</td>
</tr>
<tr>
<td>Requirement</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Indicated airspeed or calibrated airspeed</td>
</tr>
<tr>
<td>Heading</td>
</tr>
<tr>
<td>Normal acceleration</td>
</tr>
<tr>
<td>Pitch attitude</td>
</tr>
<tr>
<td>Roll attitude</td>
</tr>
<tr>
<td>Manual radio transmission keying</td>
</tr>
<tr>
<td>Power on each engine (free power turbine speed and engine torque) / cockpit power control</td>
</tr>
<tr>
<td>Main rotor speed</td>
</tr>
<tr>
<td>Rotor brake (if installed)</td>
</tr>
<tr>
<td>Primary flight controls – pilot input and control output position (if applicable) Collective pitch</td>
</tr>
<tr>
<td>Longitudinal cyclic pitch</td>
</tr>
<tr>
<td>Lateral cyclic pitch</td>
</tr>
<tr>
<td>Tail rotor pedal</td>
</tr>
<tr>
<td>Controllable</td>
</tr>
<tr>
<td>Hydraulics low pressure</td>
</tr>
<tr>
<td>Outside air temperature</td>
</tr>
<tr>
<td>AFCS mode and engagement status</td>
</tr>
<tr>
<td>Stability augmentation system engagement</td>
</tr>
<tr>
<td>Main gear box oil pressure</td>
</tr>
<tr>
<td>Main gear box oil temperature</td>
</tr>
<tr>
<td>Yaw rate or yaw acceleration</td>
</tr>
<tr>
<td>Indicated sling load force (if installed)</td>
</tr>
<tr>
<td>Longitudinal acceleration (body axis)</td>
</tr>
<tr>
<td>Lateral acceleration</td>
</tr>
<tr>
<td>Radio altitude</td>
</tr>
<tr>
<td>Vertical beam deviation (ILS glide path or MLS elevation)</td>
</tr>
<tr>
<td>Horizontal beam deviation (ILS localiser or MLS azimuth)</td>
</tr>
<tr>
<td>Marker beacon passage</td>
</tr>
<tr>
<td>Warnings</td>
</tr>
<tr>
<td>Reserved (navigation receiver frequency selection is recommended)</td>
</tr>
<tr>
<td>Reserved (DME distance is recommended)</td>
</tr>
<tr>
<td>Reserved (navigation data is recommended)</td>
</tr>
<tr>
<td>Landing gear or gear selector position</td>
</tr>
</tbody>
</table>

DEPARTMENT OF CIVIL AVIATION
HELICOPTER SUPPLEMENT TO AIRCRAFT OPERATOR CERTIFICATE REQUIREMENTS

Issue 1
Dated 04 March 2015

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**Table 3: Helicopters equipped with electronic display systems**

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>Selected barometric setting (each pilot station)</td>
</tr>
<tr>
<td>39</td>
<td>Selected altitude</td>
</tr>
<tr>
<td>40</td>
<td>Selected speed</td>
</tr>
<tr>
<td>41</td>
<td>Selected Mach</td>
</tr>
<tr>
<td>42</td>
<td>Selected vertical speed</td>
</tr>
<tr>
<td>43</td>
<td>Selected heading</td>
</tr>
<tr>
<td>44</td>
<td>Selected flight path</td>
</tr>
<tr>
<td>45</td>
<td>Selected decision height</td>
</tr>
<tr>
<td>46</td>
<td>EFIS display format</td>
</tr>
<tr>
<td>47</td>
<td>Multi-function / engine / alerts display format</td>
</tr>
</tbody>
</table>

**AMC3 AOCR.IDE.H.190 Flight data recorder**

PERFORMANCE SPECIFICATIONS FOR THE PARAMETERS TO BE RECORDED FOR HELICOPTERS HAVING AN MCTOM OF MORE THAN 3 175 KG AND FIRST ISSUED WITH AN INDIVIDUAL COFA ON OR AFTER 1 AUGUST 1999 AND BEFORE 1 JANUARY 2016 AND HELICOPTERS HAVING AN MCTOM OF MORE THAN 7 000 KG OR AN MOPSC OF MORE THAN NINE AND FIRST ISSUED WITH AN INDIVIDUAL COFA ON OR AFTER 1 JANUARY 1989 AND BEFORE 1 AUGUST 1999
Table 1: Helicopters With A MCTOM of 7 000 Kg Or Less

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
<th>Range</th>
<th>Sampling Interval</th>
<th>Accuracy Limits (Sensor Input Compared To FDR Read Out)</th>
<th>Minimum Resolution Read Out</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Time or relative time count</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1a</td>
<td>Time</td>
<td>24 hours</td>
<td>4</td>
<td>± 0.125 % per hour</td>
<td>1 second</td>
<td>(a) UTC time preferred where available.</td>
</tr>
<tr>
<td>1b</td>
<td>Relative Time Count</td>
<td>0 to 4 095</td>
<td>4</td>
<td>± 0.125 % per hour</td>
<td></td>
<td>(b) Counter increments every 4 seconds of system</td>
</tr>
<tr>
<td>2</td>
<td>Pressure altitude</td>
<td>-1 000 ft to 20 000 ft</td>
<td>1</td>
<td>±100 ft to ±700 ft Refer to table II.A-2 of EUROCAE Document ED-</td>
<td>25 ft</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Indicated airspeed or calibrated airspeed</td>
<td>As the installed measuring</td>
<td>1</td>
<td>± 5 % or ± 10 kt, whichever is greater</td>
<td>1 kt</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Heading</td>
<td>360 °</td>
<td>1</td>
<td>± 5°</td>
<td>1 °</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Normal acceleration</td>
<td>-3 g to +6 g</td>
<td>0.125</td>
<td>± 0.2 g in addition to a maximum offset of ±0.3 g</td>
<td>0.01 g</td>
<td>The resolution may be rounded from 0.01 g to 0.05 g, provided that one sample is recorded at full resolution at least every 4 seconds.</td>
</tr>
<tr>
<td>6</td>
<td>Pitch attitude</td>
<td>100 % of usable range</td>
<td>0.5</td>
<td>± 2 degrees</td>
<td>0.8 degree</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Description</td>
<td>Input and/or* control output position</td>
<td>Discrete(s)</td>
<td>Each</td>
<td>Each</td>
<td>Each</td>
</tr>
<tr>
<td>-----</td>
<td>-----------------------------------------------</td>
<td>---------------------------------------</td>
<td>-------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>7</td>
<td>Roll attitude</td>
<td></td>
<td>± 60 ° or 100 % of usable range from installed system if greater</td>
<td>± 5 %</td>
<td>± 2 degrees</td>
<td>± 2 degrees</td>
</tr>
<tr>
<td>8</td>
<td>Manual radio transmission keying</td>
<td></td>
<td>Discrete(s)</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Power on each engine</td>
<td></td>
<td>Full range</td>
<td>± 5 %</td>
<td>± 5 %</td>
<td>± 5 %</td>
</tr>
<tr>
<td>9a</td>
<td>Power turbine speed</td>
<td></td>
<td>Maximum range</td>
<td>± 5 %</td>
<td>± 5 %</td>
<td>± 5 %</td>
</tr>
<tr>
<td>9b</td>
<td>Engine torque</td>
<td></td>
<td>Maximum range</td>
<td>± 5 %</td>
<td>± 5 %</td>
<td>± 5 %</td>
</tr>
<tr>
<td>9c</td>
<td>Cockpit power control</td>
<td></td>
<td>Full range or each discrete position</td>
<td>±2 % or sufficient to determine any gate</td>
<td>2 % of full range position</td>
<td>2 % of full range position</td>
</tr>
<tr>
<td>10</td>
<td>Rotor</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10a</td>
<td>Main rotor speed</td>
<td></td>
<td>Maximum range</td>
<td>± 5 %</td>
<td>± 5 %</td>
<td>± 5 %</td>
</tr>
<tr>
<td>10b</td>
<td>Rotor brake</td>
<td></td>
<td>Discrete</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>Primary flight controls – Pilot input and/or* control output position</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11a</td>
<td>Collective pitch</td>
<td></td>
<td>Full range</td>
<td>0.5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>11b</td>
<td>Longitudinal cyclic pitch</td>
<td></td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>11c</td>
<td>Lateral cyclic pitch</td>
<td></td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>11d</td>
<td>Tail rotor pedal</td>
<td></td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>11e</td>
<td>Controllable stabilator</td>
<td></td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>11f</td>
<td>Hydraulic selection</td>
<td></td>
<td>Discretess</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

* For helicopters that can demonstrate the capability of deriving either the control input or control movement (one from the other) for all modes of operation and flight regimes, the ‘or’ applies. For helicopters with non-mechanical control systems the ‘and’ applies.

Where the input controls for each pilot can be operated.
### Table 2: Helicopters with A MCTOM of More Than 7 000 Kg

<table>
<thead>
<tr>
<th>N°</th>
<th>Parameter</th>
<th>Range</th>
<th>Sampling Interval In Seconds</th>
<th>Accuracy Limits (Sensor Input Compared To FDR Read Out)</th>
<th>Minimum Resolution In Read Out</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Time or relative time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1a</td>
<td>Time</td>
<td>24 hours</td>
<td>4</td>
<td>± 0.125 % per hour</td>
<td>1 second</td>
<td>(a) UTC time preferred where available.</td>
</tr>
<tr>
<td>1b</td>
<td>Relative time count</td>
<td>0 to 4095</td>
<td>4</td>
<td>± 0.125 % per hour</td>
<td></td>
<td>(b) Counter increments every 4 seconds of system operation.</td>
</tr>
</tbody>
</table>
### DEPARTMENT OF CIVIL AVIATION
HELI Coupiel SUPPLEMENT TO AIRCRAFT OPERATOR CERTIFICATE REQUIREMENTS

<table>
<thead>
<tr>
<th>2.</th>
<th>Pressure altitude</th>
<th>-1,000 ft to maximum certified altitude of aircraft +5,000 ft</th>
<th>1</th>
<th>± 100 ft to ± 700 ft Refer to table II-A.3 EUROCAE Document ED-112</th>
<th>5 ft</th>
<th>Should be obtained from the air data computer when installed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>Indicated airspeed or calibrated airspeed</td>
<td>As the installed measuring system</td>
<td>1</td>
<td>± 3%</td>
<td>1 kt</td>
<td>Should be obtained from the air data computer when installed.</td>
</tr>
<tr>
<td>4.</td>
<td>Heading</td>
<td>360 degrees</td>
<td>1</td>
<td>± 2 degrees</td>
<td>0.5 degree</td>
<td>The recording resolution may be rounded from 0.004 g to 0.01 g provided that one sample is recorded at full resolution at least every 4 seconds.</td>
</tr>
<tr>
<td>5.</td>
<td>Normal acceleration</td>
<td>-3 g to +6 g</td>
<td>0.125</td>
<td>1% of range excluding a datum error of 0.004 g</td>
<td>0.004 g</td>
<td>Preferably each crew member but one discrete acceptable for all transmissions provided that the replay of a recording made by any required recorder can be synchronised in time with any other required recording to within 1 second.</td>
</tr>
<tr>
<td>6.</td>
<td>Pitch attitude</td>
<td>± 75 degrees</td>
<td>0.5</td>
<td>± 2 degrees</td>
<td>0.5 degree</td>
<td>Similar to the heading.</td>
</tr>
<tr>
<td>7.</td>
<td>Roll attitude</td>
<td>± 180 degrees</td>
<td>0.5</td>
<td>± 2 degrees</td>
<td>0.5 degree</td>
<td>Similar to the heading.</td>
</tr>
<tr>
<td>8.</td>
<td>Manual radio transmission Keying and synchronisation reference</td>
<td>Discrete(s)</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>Similar to the heading.</td>
</tr>
<tr>
<td>9.</td>
<td>Power on each engine</td>
<td>Full range</td>
<td>Each engine</td>
<td>± 2%</td>
<td>0.2% of full range</td>
<td>Sufficient parameters e.g. Power Turbine Speed and engine torque</td>
</tr>
<tr>
<td>Issue</td>
<td>Description</td>
<td>Units</td>
<td>50 to 130%</td>
<td>0.5</td>
<td>2%</td>
<td>0.3% of full range</td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
<td>-------</td>
<td>------------</td>
<td>------</td>
<td>-----</td>
<td>-------------------</td>
</tr>
</tbody>
</table>
| 9b    | Engine torque | Full range | | | | | | should be recorded to enable engine power to be determined. A margin for possible overspeed should be provided.
| 9c    | Cockpit power control position | Full range or each discrete position | Each control each second | ± 2 % or sufficient to determine any gated position | | | Parameter 9c is required for helicopters with non-mechanically linked cockpit-engine controls |
| 10    | Rotor speed | 50 to 130% | 0.5 | 2% | 0.3% of full range | | |
| 10a   | Main rotor speed | 50 to 130% | 0.5 | 2% | 0.3% of full range | | |
| 10b   | Rotor brake | Discrete | | | | | Where available |
| 11    | Primary flight controls – Pilot input and/or* control output position | | | | | | |
| 11a   | Collective pitch | Full range | 0.5 | ± 3 % unless higher accuracy is uniquely required | | | 0.5 % of operating range |
| 11b   | Longitudinal cyclic pitch | 0.5 | | | | | |
| 11c   | Lateral cyclic pitch | 0.5 | | | | | |
| 11d   | Tail rotor pedal | 0.5 | | | | | |
| 11e   | Controllable stabilator | 0.5 | | | | | |
| 11f   | Hydraulic selection | Discrete(s) | 1 | | | | |
| 12    | Hydraulics low pressure | Discrete(s) | 1 | | | | Each essential system should be recorded |

* For helicopters that can demonstrate the capability of deriving either the control input or control movement (one from the other) for all modes of operation and flight regimes, the ‘or’ applies. For helicopters with non-mechanical control systems the standard ‘and’ applies. Where the input controls for each pilot can be operated independently, both inputs will need to be recorded.
<table>
<thead>
<tr>
<th>Issue 1</th>
<th>Dated 04 March 2015</th>
</tr>
</thead>
</table>

### DEPARTMENT OF CIVIL AVIATION

#### HELICOPTER SUPPLEMENT TO AIRCRAFT OPERATOR CERTIFICATE REQUIREMENTS

<table>
<thead>
<tr>
<th>13</th>
<th>Outside air temperature</th>
<th>-50° to +90°C or available sensor range</th>
<th>2</th>
<th>± 2°C</th>
<th>0.3°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>AFCS mode and engagement status</td>
<td>A suitable combination of discreet</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discretes should show which systems are engaged and which primary modes are controlling the flight path of the helicopter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Stability augmentation system engagement</td>
<td>Discrete</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>16</td>
<td>Main gearbox oil pressure</td>
<td>As installed</td>
<td>1</td>
<td>As installed</td>
<td>6.895 kN/m² (1 psi)</td>
</tr>
<tr>
<td>17</td>
<td>Main gearbox oil pressure</td>
<td>As installed</td>
<td>2</td>
<td>As installed</td>
<td>1°C</td>
</tr>
<tr>
<td>18</td>
<td>Yaw rate</td>
<td>± 400 degrees/second</td>
<td>0.25</td>
<td>± 1%</td>
<td>2 degrees per second</td>
</tr>
<tr>
<td>19</td>
<td>Indicated sling load force</td>
<td>0 to 200 % of maximum certified load</td>
<td>0.5</td>
<td>± 3% of maximum certified load</td>
<td>0.5% for maximum certified load</td>
</tr>
<tr>
<td>20</td>
<td>Longitudinal acceleration</td>
<td>± 1 g</td>
<td>0.25</td>
<td>± 1.5% of range excluding a datum error of ±5%</td>
<td>0.004 g</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See comment to parameter 5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Lateral acceleration</td>
<td>± 1 g</td>
<td>0.25</td>
<td>± 1.5% of range excluding a datum error of ±5%</td>
<td>0.004 g</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See comment to parameter 5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Radio altitude</td>
<td>-20 ft to +2 500 ft</td>
<td>1</td>
<td>As installed, ± 2 ft or ± 3% whichever is greater below 500 ft and ± 5% above 500 ft recommended</td>
<td>1 ft below 500 ft, 1 ft + 0.5% of full range above 500 ft</td>
</tr>
<tr>
<td>23</td>
<td>Vertical beam deviation</td>
<td>1</td>
<td>As installed, ± 3% recommended</td>
<td>0.3% of full range</td>
<td>Data from both the ILS and MLS systems need not to be recorded at the same time. The approach aid in use should be recorded.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
<td>Value 1</td>
<td>Value 2</td>
<td>Value 3</td>
<td>Notes</td>
</tr>
<tr>
<td>-----------</td>
<td>------------------------------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>23a</td>
<td>ILS glide path</td>
<td>± 0.22</td>
<td></td>
<td></td>
<td>It should be ± 0.22 DDM or ± 3% of full range as installed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DDM</td>
<td></td>
<td></td>
<td>± 0.22 DDM or ± 3% of full range as installed.</td>
</tr>
<tr>
<td>23b</td>
<td>MLS elevation</td>
<td>+0.9</td>
<td>+30</td>
<td></td>
<td>± 0.22 DDM or ± 3% of full range as installed.</td>
</tr>
<tr>
<td>24</td>
<td>Horizontal beam deviation</td>
<td>1</td>
<td></td>
<td></td>
<td>± 0.22 DDM or ± 3% of full range as installed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>As installed.</td>
</tr>
<tr>
<td>24a</td>
<td>ILS localiser</td>
<td>± 0.22</td>
<td></td>
<td></td>
<td>± 0.22 DDM or ± 3% of full range as installed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DDM</td>
<td></td>
<td></td>
<td>± 0.22 DDM or ± 3% of full range as installed.</td>
</tr>
<tr>
<td>24b</td>
<td>MLS azimuth</td>
<td>± 62</td>
<td></td>
<td></td>
<td>± 0.22 DDM or ± 3% of full range as installed.</td>
</tr>
<tr>
<td>25</td>
<td>Marker beacon passage</td>
<td>Discrete</td>
<td></td>
<td></td>
<td>One discrete is acceptable for all markers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>± 0.22 DDM or ± 3% of full range as installed.</td>
</tr>
<tr>
<td>26</td>
<td>Warnings</td>
<td>Discretes</td>
<td></td>
<td></td>
<td>One discrete is acceptable for all markers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>± 0.22 DDM or ± 3% of full range as installed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A discrete should be recorded for the master warning, gearbox low oil pressure and SAS failure. Other ‘red’ warnings should be recorded where the warning condition cannot be determined from other parameters or from the cockpit voice recorder.</td>
</tr>
<tr>
<td>27</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Landing gear or gear selector position</td>
<td>Discrete(s)</td>
<td>4</td>
<td></td>
<td>Where installed.</td>
</tr>
</tbody>
</table>
## Table 3: Helicopters Equipped With Electronic Display Systems

<table>
<thead>
<tr>
<th>No.</th>
<th>Parameter</th>
<th>Range</th>
<th>Sampling Interval</th>
<th>Accuracy Limits (Sensor Input Compared To Fdr Read Out)</th>
<th>Minimum Resolution In Read Out</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>Selected barometric setting (each pilot station)</td>
<td>As installed</td>
<td>64</td>
<td>As installed</td>
<td>1mb</td>
<td>Where practicable, a sampling interval of 4 seconds is recommended</td>
</tr>
<tr>
<td>38a</td>
<td>Pilot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38b</td>
<td>Co-pilot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Selected altitude</td>
<td>As installed</td>
<td>1</td>
<td>As installed</td>
<td>100 ft</td>
<td>Where capacity is limited a sampling interval of 64 seconds is permissible</td>
</tr>
<tr>
<td>39a</td>
<td>Manual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39b</td>
<td>Automatic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Selected speed</td>
<td>As installed</td>
<td>1</td>
<td>As installed</td>
<td>1 kt</td>
<td>Where capacity is limited a sampling interval of 64 seconds is permissible</td>
</tr>
<tr>
<td>40a</td>
<td>Manual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40b</td>
<td>Automatic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Selected Mach</td>
<td>As installed</td>
<td>1</td>
<td>As installed</td>
<td>0.01</td>
<td>Where capacity is limited a sampling interval of 64 seconds is permissible</td>
</tr>
<tr>
<td>41a</td>
<td>Manual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41b</td>
<td>Automatic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Selected vertical speed</td>
<td>As installed</td>
<td>1</td>
<td>As installed</td>
<td>100 ft /min</td>
<td>Where capacity is limited a sampling interval of 64 seconds is permissible</td>
</tr>
<tr>
<td>42a</td>
<td>Manual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42b</td>
<td>Automatic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Selected heading</td>
<td>360 degrees</td>
<td>1</td>
<td>As installed</td>
<td>100 ft /min</td>
<td>Where capacity is limited a sampling interval of 64 seconds is permissible</td>
</tr>
<tr>
<td>44</td>
<td>Selected flight path</td>
<td></td>
<td>1</td>
<td>As</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44a</td>
<td>Course/DSTRK</td>
<td></td>
<td></td>
<td>1 degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44b</td>
<td>Path angle</td>
<td></td>
<td></td>
<td>0.1 degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Selected decision height</td>
<td>0-500 ft</td>
<td>64</td>
<td>As</td>
<td>1ft</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>EFIS display format</td>
<td>Discrete(s)</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>Discretes should show the display system status e.g. normal, fail, composite, sector, plan, rose, nav aids, wxr, range, copy</td>
</tr>
<tr>
<td>46a</td>
<td>Pilot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46b</td>
<td>Co-pilot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 3

| No. | Function / Engine / Alerts Display Format | Discrete(s) | 4 | - | - | Discretes should show the display system status e.g. normal, fail, and the identity of the display pages for the emergency procedures and checklists. Information in checklists and procedures need not be recorded. |

The term ‘where practicable’ used in the remarks column of Table 3 means that account should be taken of the following:

- (a) if the sensor is already available or can be easily incorporated;
- (b) sufficient capacity is available in the flight recorder system;
- (c) for navigational data (nav frequency selection, DME distance, latitude, longitude, groundspeed and drift) the signals are available in digital form;
- (d) the extent of modification required;
- (e) the down-time period; and
- (f) equipment software development.
GM1 AOCR.IDE.H.190  Flight data recorder

GENERAL

For the purpose of AMC2 AOCR.IDE.H.190(b) a sensor is considered ‘readily available’ when it is already available or can be easily incorporated.

AOCR.IDE.H.195  Data link recording

(a) Helicopters first issued with an individual CofA on or after 8 April 2014 that have the capability to operate data link communications and are required to be equipped with a CVR, shall record on a recorder, where applicable:

(1) data link communication messages related to ATS communications to and from the helicopter, including messages applying to the following applications:

(i) data link initiation;

(ii) controller-pilot communication;

(iii) addressed surveillance;

(iv) flight information;

(v) as far as is practicable, given the architecture of the system, aircraft broadcast surveillance;

(vi) as far as is practicable, given the architecture of the system, aircraft operational control data;

(vii) as far as is practicable, given the architecture of the system, graphics;

(2) information that enables correlation to any associated records related to data link communications and stored separately from the helicopter; and

(3) information on the time and priority of data link communications messages, taking into account the system’s architecture.

(b) The recorder shall use a digital method of recording and storing data and information and a method of readily retrieving that data shall be
available. The recording method shall allow the data to match the data recorded on the ground.

(c) The recorder shall be capable of retaining data recorded for at least the same duration as set out for CVRs in AOCR.IDE.H.185.

(d) The recorder shall have a device to assist in locating it in water.

(e) The requirements applicable to the start and stop logic of the recorder are the same as the requirements applicable to the start and stop logic of the CVR contained in AOCR.IDE.H.185(d) and (e).

AMC1 AOCR.IDE.H.195  Data link recording

GENERAL

(a) The helicopter should be capable of recording the messages as specified in this AMC.

(b) As a means of compliance with AOCR.IDE.H.195 (a), the recorder on which the data link messages are recorded may be:

(1) the CVR;

(2) the FDR;

(3) a combination recorder when AOCR.IDE.H.200 is applicable; or

(4) a dedicated flight recorder. In that case, the operational performance requirements for this recorder should be those laid down in EUROCAE Document ED-112 (Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems) dated March 2003, including amendments n°1 and n°2, or any later equivalent standard produced by EUROCAE.

(c) As a means of compliance with AOCR.IDE.H.195 (a)(2), the operator should enable correlation by providing information that allows an accident investigator to understand what data were provided to the helicopter and, when the provider identification is contained in the message, by which provider.

(d) The timing information associated with the data link communications messages required to be recorded by AOCR.IDE.H.195 (a) (3) should be capable of being determined from the airborne-based recordings. This timing information should include at least the following:
(1) the time each message was generated;
(2) the time any message was available to be displayed by the crew;
(3) the time each message was actually displayed or recalled from a queue; and
(4) the time of each status change.

(e) The message priority should be recorded when it is defined by the protocol of the data link communication message being recorded.

(f) The expression ‘taking into account the system architecture’, in AOCTR.1.DE.195 (a) (3), means that the recording of the specified information may be omitted if the existing source systems involved would require a major upgrade. The following should be considered:

(1) the extent of the modification required;
(2) the down-time period; and
(3) equipment software development.

(g) The intention is that new designs of source systems should include this functionality and support the full recording of the required information.

(h) Data link communications messages that support the applications in Table 1 below should be recorded.

(i) Further details on the recording requirements can be found in the recording requirement matrix in Appendix D.2 of EUROCAE Document ED-93 (Minimum Aviation System Performance Specification for CNS/ATM Recorder Systems, dated November 1998).

**Table 1: Applications**

<table>
<thead>
<tr>
<th>Item No</th>
<th>Application Type</th>
<th>Application Description</th>
<th>Required Recording Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Data link initiation</td>
<td>This includes any application used to log on to, or initiate, a data link service. In future air navigation system (FANS)-1/A and air traffic navigation (ATN), these are ATS facilities notification (AFN) and context management (CM), respectively.</td>
<td>C</td>
</tr>
<tr>
<td>2</td>
<td>Controller/pilot communication</td>
<td>This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and air traffic controllers. In FANS-1/A and ATN, this includes the controller</td>
<td>C</td>
</tr>
</tbody>
</table>
### Definitions and Acronyms

#### (a) The letters and expressions in Table 1 of AMC1 AOCR.IDE.H.195 have the following meaning:

<table>
<thead>
<tr>
<th>Letter</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C:</strong></td>
<td>Complete contents recorded</td>
</tr>
<tr>
<td><strong>M:</strong></td>
<td>Information that enables correlation with any associated records stored separately from the helicopter.</td>
</tr>
<tr>
<td>*<em>:</em></td>
<td>Applications that are to be recorded only as far as is practicable, given the architecture of the system.</td>
</tr>
</tbody>
</table>

---

**GM1 AOCR.IDE.H.195 Data link recording**

- **pilot data link communications (CPDLC) application.**
  - CPDLC includes the exchange of oceanic clearances (OCLs) and departure clearances (DCLs).

3 **Addressed surveillance**

- This includes any surveillance application in which the ground sets up contracts for delivery of surveillance data.
- In FANS-1/A and ATN, this includes the automatic dependent surveillance-contract (ADS-C) application.

4 **Flight information**

- This includes any application used for delivery of flight information data to specific aeroplanes. This includes for example data link-automatic terminal information service (D-ATIS), data link-operational terminal information service (D-OTIS), digital weather information services (D-METAR or TWIP), data link flight information service (D-FIS) and Notice to Airmen (D-NOTAM) delivery.

5 **Aircraft broadcast surveillance**

- This includes elementary and enhanced surveillance systems, as well as automatic dependent surveillance-broadcast (ADS-B) output data.

6 **Airlines operations centre (AOC) data**

- This includes any application transmitting or receiving data used for AOC purposes (in accordance with the ICAO definition of AOC). Such systems may also process AAC messages, but there is no requirement to record AAC messages.

7 **Graphics**

- This includes any application receiving graphical data to be used for operational purposes (i.e. excluding applications that are receiving such things as updates to manuals).
F1: Graphics applications may be considered as AOC data when they are part of a data link communications application service run on an individual basis by the operator itself in the framework of the operational control.

F2: Where parametric data sent by the helicopter, such as Mode S, is reported within the message, it should be recorded unless data from the same source is recorded on the FDR.

(c) The definitions of the applications type in Table 1 of AMC1 AOCR.IDE.H.195 are described in Table 1 below.

Table 1: Descriptions of the applications type

<table>
<thead>
<tr>
<th>Item No</th>
<th>Application Type</th>
<th>Messages</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CM</td>
<td>CM is an ATN service</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>AFN</td>
<td>AFN is a FANS 1/A service</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>CPDLC</td>
<td>All implemented up and downlink messages to be recorded</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>ADS-C</td>
<td>ADS-C reports</td>
<td>All contract requests and reports recorded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Position</td>
<td>Only used within FANS 1/A. Only used in oceanic and remote</td>
</tr>
<tr>
<td>5</td>
<td>ADS-B</td>
<td>Surveillance data</td>
<td>Information that enables correlation with any associated records stored separately from the</td>
</tr>
<tr>
<td>6</td>
<td>D-FIS</td>
<td>D-FIS is an ATN service. All implemented up and downlink messages to be recorded</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>TWIP</td>
<td>TWIP</td>
<td>Terminal weather information for pilots</td>
</tr>
<tr>
<td>8</td>
<td>D-ATIS</td>
<td>ATIS messages</td>
<td>Refer to EUROCAE Document ED-89A dated December 2003 Data Link</td>
</tr>
<tr>
<td>10</td>
<td>DCL</td>
<td>DCL messages</td>
<td>Refer to EUROCAE Document ED-85A dated December 2003. Data Link Application System Document (DLASD) for ‘Departure Clearance’ Data Link Service</td>
</tr>
<tr>
<td>11</td>
<td>Graphics &amp; other graphics</td>
<td>Weather maps</td>
<td>Graphics exchanged in the framework of procedures within the operational control, as specified in Part-ORO. Information that enables correlation with any associated records stored separately from the aeroplane.</td>
</tr>
</tbody>
</table>
12 AOC Aeronautical operational control messages Messages exchanged in the framework of procedures within the operational control, as specified in Part-ORO. Information that enables correlation with any associated records stored separately from the helicopter. Definition in EUROCAE Document ED-112, dated March 2003.

13 Surveil lance Downlinked aircraft parameters (DAP) As defined in ICAO Annex 10 Volume IV (Surveillance systems and ACAS).

AAC aeronautical administrative communications
ADS-B automatic dependent surveillance – broadcast
ADS-C automatic dependent surveillance – contract
AFN aircraft flight notification
AOC aeronautical operational control
ATIS automatic terminal information service
ATSC air traffic service communication
CAP controller access parameters
CPDLC controller pilot data link communications
CM configuration/context management
D-ATIS data link ATIS
D-FIS data link flight information service
DCL departure clearance
FANS Future Air Navigation System
FLIPCY flight plan consistency
OCL oceanic clearance
SAP system access parameters
TWIP terminal weather information for pilots

**AOCR.IDE.H.200 Flight data and cockpit voice combination recorder**

Compliance with CVR and FDR requirements may be achieved by the carriage of one combination recorder.

**AMC1 AOCR.IDE.H.200 Flight data and cockpit voice combination recorder**

**GENERAL**

(a) A flight data and cockpit voice combination recorder is a flight recorder that records:

(1) all voice communications and the aural environment required by AOCR.IDE.H.185 regarding CVRs; and

(2) all parameters required by AOCR.IDE.H.190 regarding FDRs, with the same specifications required by those paragraphs.
(b) In addition a flight data and cockpit voice combination recorder may record data link communication messages and related information required by AOCR.IDE.H.195.

**AOCR.IDE.H.205 Seats, seat safety belts, restraint systems and child restraint devices**

(a) Helicopters shall be equipped with:

1. a seat or berth for each person on board who is aged 24 months or more;
2. a seat belt on each passenger seat and restraining belts for each berth;
3. for helicopters first issued with an individual CofA on or after 1 August 1999, a safety belt with upper torso restraint system for use on each passenger seat for each passenger aged 24 months or more;
4. a child restraint device (CRD) for each person on board younger than 24 months;
5. a seat belt with upper torso restraint system incorporating a device that will automatically restrain the occupant’s torso in the event of rapid deceleration on each flight crew seat;
6. a seat belt with upper torso restraint system on each seat for the minimum required cabin crew.

(b) A seat belt with upper torso restraint system shall:

1. have a single point release; and
2. on flight crew seats and on the seats for the minimum required cabin crew include two shoulder straps and a seat belt that may be used independently.

**AMC1 AOCR.IDE.H.205 Seats, seat safety belts, restraint systems and child restraint devices**

**CHILD RESTRAINT DEVICES (CRDS)**

(a) A CRD is considered to be acceptable if:
it is a ‘supplementary loop belt’ manufactured with the same techniques and the same materials of the approved safety belts; or

(2) it complies with (b).

(b) Provided the CRD can be installed properly on the respective helicopter seat, the following CRDs are considered acceptable:

(1) CRDs approved for use in aircraft by an Authority on the basis of a technical standard and marked accordingly;

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

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

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

(i) “THIS CHILD RESTRAINT SYSTEM CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY STANDARDS“; and

(ii) “THIS RESTRAINT IS CERTIFIED FOR USE IN MOTOR VEHICLES AND AIRCRAFT“;

(5) CRDs qualified for use in aircraft according to the German ‘Qualification Procedure for Child Restraint Systems for Use in Aircraft’ (TÜV Doc.: TÜV/958-01/2001); and

(6) devices approved for use in cars, manufactured and tested to standards equivalent to those listed above. The device should be marked with an associated qualification sign, which shows the name of the qualification organisation and a specific identification number, related to the associated qualification project. The qualifying organisation should be a competent and independent organisation that is acceptable to the Authority.

(c) Location

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

(2) An infant in a CRD should be located as near to a floor level exit as feasible.

(3) An infant in a CRD should not hinder evacuation for any passenger.

(4) An infant in a CRD should neither be located in the row (where rows are existing) leading to an emergency exit nor located in a row immediately forward or aft of an emergency exit. A window passenger seat is the preferred location. An aisle passenger seat or a cross aisle passenger seat that forms part of the evacuation route to exits is not recommended. Other locations may be acceptable provided the access of neighbour passengers to the nearest aisle is not obstructed by the CRD.

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

(6) A row segment is the fraction of a row separated by two aisles or by one aisle and the helicopter fuselage.

(d) Installation

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

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

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

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

(5) Forward facing restraint devices with an integral harness must not be installed such that the adult safety belt is secured over the infant.

(e) Operation

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

(2) Where a CRD is adjustable in recline it must be in an upright position for all occasions when passenger restraint devices are required.

AMC2 AOCR.IDE.H.205 Seats, seat safety belts, restraint systems and child restraint devices

UPPER TORSO RESTRAINT SYSTEM

An upper torso restraint system having three straps is deemed to be compliant with the requirement for restraint systems with two shoulder straps.

SAFETY BELT

A safety belt with diagonal should strap (three anchorage points) is deemed to be compliant with safety belts (two anchorage points).

AMC3 AOCR.IDE.H.205 Seats, seat safety belts, restraint systems and child restraint devices

SEATS FOR MINIMUM REQUIRED CABIN CREW
(a) Seats for the minimum required cabin crew members should be located near required floor level emergency exits, except if the emergency evacuation of passengers would be enhanced by seating the cabin crew members elsewhere. In this case other locations are acceptable. This criterion should also apply if the number of required cabin crew members exceeds the number of floor level emergency exits.

(b) Seats for cabin crew member(s) should be forward or rearward facing within 15° of the longitudinal axis of the helicopter.

**AOCR.IDE.H.210 Fasten seat belt and no smoking signs**

Helicopters in which not all passenger seats are visible from the flight crew seat(s) shall be equipped with a means of indicating to all passengers and cabin crew when seat belts shall be fastened and when smoking is not allowed.

**AOCR.IDE.H.220 First-aid kits**

(a) Helicopters shall be equipped with at least one first-aid kit.

(b) First-aid kits shall be:

(1) readily accessible for use;

(2) kept up to date.

**AMC1 AOCR.IDE.H.220 First-aid kits**

**CONTENT OF FIRST-AID KITS**

(a) First-aid kits should be equipped with appropriate and sufficient medications and instrumentation. However, these kits should be complemented by the operator according to the characteristics of the operation (scope of operation, flight duration, number and demographics of passengers etc.).

(b) The following should be included in the first-aid kit:

(1) **Equipment**

   (i) bandages (assorted sizes);

   (ii) burns dressings (unspecified);

   (iii) wound dressings (large and small);
(iv) adhesive dressings (assorted sizes);
(v) adhesive tape;
(vi) adhesive wound closures;
(vii) safety pins;
(viii) safety scissors;
(ix) antiseptic wound cleaner;
(x) disposable resuscitation aid;
(xi) disposable gloves;
(xii) tweezers: splinter; and
(xiii) thermometers (non mercury).

(2) Medications

(i) simple analgesic (may include liquid form);
(ii) antiemetic;
(iii) nasal decongestant;
(iv) gastrointestinal antacid, in the case of helicopters carrying more than nine passengers;
(v) anti-diarrhoeal medication in the case of helicopters carrying more than nine passengers; and
(vi) antihistamine.

(3) Other

(i) a list of contents in at least two languages (English and one other). This should include information on the effects and side effects of medications carried;
(ii) first-aid handbook, current edition;
(iii) medical incident report form;
(iv) biohazard disposal bags.

(4) An eye irrigator, whilst not required to be carried in the first-aid kit, should, where possible, be available for use on the ground.

**AMC2 AOCR.IDE.H.220 First-aid kits**

**MAINTENANCE OF FIRST-AID KITS**

*To be kept up to date first-aid kits should be:*

(a) inspected periodically to confirm, to the extent possible, that contents are maintained in the condition necessary for their intended use;

(b) replenished at regular intervals, in accordance with instructions contained on their labels, or as circumstances warrant; and

(c) replenished after use-in-flight at the first opportunity where replacement items are available.

**AOCR.IDE.H.240 Supplemental oxygen — non-pressurised helicopters**

Non-pressurised helicopters operated at pressure altitudes above 10 000 ft shall be equipped with supplemental oxygen equipment capable of storing and dispensing the oxygen supplies in accordance with the following tables.

**Table 1**

**Oxygen minimum requirements for complex non-pressurised helicopters**

<table>
<thead>
<tr>
<th>Supply for</th>
<th>Duration and cabin pressure altitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Occupants of flight crew compartment seats on flight crew compartment duty and crew members assisting flight crew in their duties</td>
<td>The entire flying time at pressure altitudes above 10 000 ft.</td>
</tr>
<tr>
<td>2. Required cabin crew members</td>
<td>The entire flying time at pressure altitudes above 10 000 ft and for any period exceeding 30 minutes at pressure altitudes above 10 000 ft but not exceeding 13 000 ft.</td>
</tr>
<tr>
<td>3. Additional crew members and 100% of passengers (*)</td>
<td>The entire flying time at pressure altitudes above 13 000 ft.</td>
</tr>
<tr>
<td>4. 10% of passengers (*)</td>
<td>The entire flying time after 30 minutes at pressure altitudes above 10 000 ft but not exceeding 13 000 ft.</td>
</tr>
</tbody>
</table>

(*) Passenger numbers in Table 1 refer to passengers actually carried on board including persons younger than 24 months.
Table 2

Oxygen minimum requirements for other-than-complex non-pressurised helicopters

<table>
<thead>
<tr>
<th>Supply for</th>
<th>Duration and cabin pressure altitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Occupants of flight crew compartment seats on flight crew compartment duty, crew members assisting flight crew in their duties, and required cabin crew members</td>
<td>The entire flying time at pressure altitudes above 13 000 ft and for any period exceeding 30 minutes at pressure altitudes above 10 000 ft but not exceeding 13 000 ft.</td>
</tr>
<tr>
<td>2. Additional crew members and 100% of passengers (*)</td>
<td>The entire flying time at pressure altitudes above 13 000 ft.</td>
</tr>
<tr>
<td>3. 10% of passengers (*)</td>
<td>The entire flying time after 30 minutes at pressure altitudes above 10 000 ft but not exceeding 13 000 ft.</td>
</tr>
</tbody>
</table>

(*) Passenger numbers in Table 2 refer to passengers actually carried on board including persons younger than 24 months.

**AMC1 AOCR.IDE.H.240 Supplemental oxygen - non-pressurised helicopters**

**DETERMINATION OF OXYGEN**

The amount of supplemental oxygen for sustenance for a particular operation should be determined on the basis of flight altitudes and flight duration, consistent with the operating procedures, including emergency, procedures, established for each operation and the routes to be flown as specified in the operations manual.

**AOCR.IDE.H.250 Hand fire extinguishers**

(a) Helicopters shall be equipped with at least one hand fire extinguisher in the flight crew compartment.

(b) At least one hand fire extinguisher shall be located in, or readily accessible for use in, each galley not located on the main passenger compartment.

(c) At least one hand fire extinguisher shall be available for use in each cargo compartment that is accessible to crew members in flight.

(d) The type and quantity of extinguishing agent for the required fire extinguishers shall be suitable for the type of fire likely to occur in the compartment where the extinguisher is intended to be used and to minimise the hazard of toxic gas concentration in compartments occupied by persons.

(e) The helicopter shall be equipped with at least a number of hand fire extinguishers in accordance with Table 1, conveniently located to provide adequate availability for use in each passenger compartment.
**Table 1**

<table>
<thead>
<tr>
<th>MOPSC</th>
<th>Number of extinguishers</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-30</td>
<td>1</td>
</tr>
<tr>
<td>31-60</td>
<td>2</td>
</tr>
<tr>
<td>61-200</td>
<td>3</td>
</tr>
</tbody>
</table>

**AMC1 AOCR.IDE.H.250 Hand fire extinguishers**

**NUMBER, LOCATION AND TYPE**

(a) The number and location of hand fire extinguishers should be such as to provide adequate availability for use, account being taken of the number and size of the passenger compartments, the need to minimise the hazard of toxic gas concentrations and the location of lavatories, galleys etc. These considerations may result in a number of fire extinguishers greater than the minimum required.

(b) There should be at least one hand fire extinguisher installed in the flight crew compartment and this should be suitable for fighting both flammable fluid and electrical equipment fires. Additional hand fire extinguishers may be required for the protection of other compartments accessible to the crew in flight. Dry chemical fire extinguishers should not be used in the flight crew compartment, or in any compartment not separated by a partition from the flight crew compartment, because of the adverse effect on vision during discharge and, if conductive, interference with electrical contacts by the chemical residues.

(c) Where only one hand fire extinguisher is required in the passenger compartments it should be located near the cabin crew member’s station, where provided.

(d) Where two or more hand fire extinguishers are required in the passenger compartments and their location is not otherwise dictated by consideration of (a), an extinguisher should be located near each end of the cabin with the remainder distributed throughout the cabin as evenly as is practicable.

(e) Unless an extinguisher is clearly visible, its location should be indicated by a placard or sign. Appropriate symbols may also be used to supplement such a placard or sign.

**AOCR.IDE.H.260 Marking of break-in points**

If areas of the helicopter’s fuselage suitable for break-in by rescue crews in an emergency are marked, such areas shall be marked as shown in Figure 1.
MARKINGS — COLOUR AND CORNERS

(a) The colour of the markings should be red or yellow and, if necessary, should be outlined in white to contrast with the background.

(b) If the corner markings are more than 2 m apart, intermediate lines 9 cm x 3 cm should be inserted so that there is no more than 2 m between adjacent markings.

AOCR.IDE.H.270 Megaphones

Helicopters with an MOPSC of more than 19 shall be equipped with one portable battery-powered megaphone readily accessible for use by crew members during an emergency evacuation.

AMC1 AOCR.IDE.H.270 Megaphones

LOCATION OF MEGAPHONES

(a) The megaphone should be readily accessible at the assigned seat of a cabin crew member or crew members other than flight crew.

(b) This does not necessarily require megaphones to be positioned such that they can be physically reached by a crew member when strapped in a cabin crew member’s seat.
AOCR.IDE.H.275  Emergency lighting and marking

(a) Helicopters with an MOPSC of more than 19 shall be equipped with:

(1) an emergency lighting system having an independent power supply to provide a source of general cabin illumination to facilitate the evacuation of the helicopter; and

(2) emergency exit marking and locating signs visible in daylight or in the dark.

(b) Helicopters shall be equipped with emergency exit markings visible in daylight or in the dark when operated:

(1) in performance class 1 or 2 on a flight over water at a distance from land corresponding to more than 10 minutes flying time at normal cruising speed;

(2) in performance class 3 on a flight over water at a distance corresponding to more than three minutes flying time at normal cruising speed.

AOCR.IDE.H.280  Emergency locator transmitter (ELT)

(a) Helicopters shall be equipped with at least one automatic ELT.

(b) Helicopters operating in performance class 1 or 2 used in offshore operations on a flight over water in a hostile environment and at a distance from land corresponding to more than 10 minutes flying time at normal cruising speed shall be equipped with an automatically deployable ELT (ELT (AD)).

(c) An ELT of any type shall be capable of transmitting simultaneously on 121.5 MHz and 406 MHz.

AMC1  AOCR.IDE.H.280  Emergency locator transmitter (ELT)

BATTERIES

(a) All batteries used in ELTs should be replaced (or recharged if the battery is rechargeable) when the equipment has been in use for more than 1 cumulative hour or in the following cases:

(1) Batteries specifically designed for use in ELTs and having an airworthiness release certificate (EASA Form 1 or equivalent)
should be replaced (or recharged if the battery is rechargeable) before the end of their useful life in accordance with the maintenance instructions applicable to the ELT.

(2) Standard batteries manufactured in accordance with an industry standard and not having an airworthiness release certificate (EASA Form 1 or equivalent), when used in ELTs should be replaced (or recharged if the battery is rechargeable) when 50 % of their useful life (or for rechargeable, 50 % of their useful life of charge), as established by the battery manufacturer, has expired.

(3) The battery useful life (or useful life of charge) criteria in (1) and (2) do not apply to batteries (such as water-activated batteries) that are essentially unaffected during probable storage intervals.

(b) The new expiry date for a replaced (or recharged) battery should be legibly marked on the outside of the equipment

**AMC2 AOCR.IDE.H.280 Emergency locator transmitter (ELT)**

**TYPES OF ELT AND GENERAL TECHNICAL SPECIFICATIONS**

(a) The ELT required by this provision should be one of the following:

(1) **Automatic Fixed (ELT (AF)).** An automatically activated ELT that is permanently attached to a helicopter and is designed to aid search and rescue (SAR) teams in locating the crash site.

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

(3) **Automatic Deployable (ELT (AD)).** An ELT that is rigidly attached to the helicopter before the crash and that is automatically ejected, deployed and activated by an impact, and, in some cases, also by hydrostatic sensors. Manual deployment is also provided. This type of ELT should float in water and is intended to aid SAR teams in locating the crash site.
(4) Survival ELT (ELT(S)). An ELT that is removable from a helicopter, stowed so as to facilitate its ready use in an emergency, and manually activated by a survivor. An ELT(S) may be activated manually or automatically (e.g. by water activation). It should be designed either to be tethered to a life-raft or a survivor.

(b) To minimise the possibility of damage in the event of crash impact, the automatic ELT should be rigidly fixed to the helicopter structure, as far aft as is practicable, with its antenna and connections arranged so as to maximise the probability of the signal being transmitted after a crash.

(c) Any ELT carried should operate in accordance with the relevant provisions of ICAO Annex 10, Volume III Communications Systems and should be registered with the national agency responsible for initiating search and rescue or other nominated agency.

**GM1 AOCR.IDE.H.280 Emergency locator transmitter (ELT)**

**TERMINOLOGY**

‘ELT’ is a generic term describing equipment that broadcasts distinctive signals on designated frequencies and, depending on application, may be activated by impact or may be manually activated.

**AOCR.IDE.H.290 Life-jackets**

(a) Helicopters shall be equipped with a life-jacket for each person on board or equivalent floatation device for each person on board younger than 24 months, stowed in a position that is readily accessible from the seat or berth of the person for whose use it is provided, when operated in:

(1) performance class 1 or 2 on a flight over water at a distance from land corresponding to more than 10 minutes flying time at normal cruising speed;

(2) performance class 3 on a flight over water beyond auto rotational distance from land;

(3) performance class 2 or 3 when taking off or landing at an aerodrome or operating site where the take-off or approach path is over water.

(b) Each life-jacket or equivalent individual flotation device shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons.
AMC1 AOCR.IDE.H.290 (a) Life-jackets

ACCESSIBILITY

The life-jacket should be accessible from the seat or berth of the person for whose use it is provided, with a safety belt or harness fastened.

AMC2 AOCR.IDE.H.290(c) Life-jackets

ELECTRIC ILLUMINATION

The means of electric illumination should be a survivor locator light as defined in the applicable ETSO issued by the Agency or equivalent.

GM1 AOCR.IDE.H.290 Life-jackets

SEAT CUSHIONS

Seat cushions are not considered to be flotation devices.

AOCR.IDE.H.295 Crew survival suits

Each crew member shall wear a survival suit when operating:

(a) in performance class 1 or 2 on a flight over water in support of offshore operations, at a distance from land corresponding to more than 10 minutes flying time at normal cruising speed, when the weather report or forecasts available to the commander indicate that the sea temperature will be less than plus 10 °C during the flight, or when the estimated rescue time exceeds the estimated survival time;

(b) in performance class 3 on a flight over water beyond autorotational distance or safe forced landing distance from land, when the weather report or forecasts available to the commander indicate that the sea temperature will be less than plus 10 °C during the flight.

GM1 AOCR.IDE.H.295 Crew survival suits

ESTIMATING SURVIVAL TIME

(a) Introduction

(1) A person accidentally immersed in cold seas (typically offshore Northern Europe) will have a better chance of survival if he/she is wearing an effective survival suit in addition to a life-jacket. By
wearing the survival suit, he/she can slow down the rate which his/her body temperature falls and, consequently, protect himself/herself from the greater risk of drowning brought about by incapacitation due to hypothermia.

(2) The complete survival suit system – suit, life-jacket and clothes worn under the suit – should be able to keep the wearer alive long enough for the rescue services to find and recover him/her. In practice the limit is about 3 hours. If a group of persons in the water cannot be rescued within this time they are likely to have become so scattered and separated that location will be extremely difficult, especially in the rough water typical of Northern European sea areas. If it is expected that in water protection could be required for periods greater than 3 hours, improvements should, rather, be sought in the search and rescue procedures than in the immersion suit protection.

(b) Survival times

(1) The aim should be to ensure that a person in the water can survive long enough to be rescued, i.e. the survival time must be greater than the likely rescue time. The factors affecting both times are shown in Figure 1 below. The figure emphasises that survival time is influenced by many factors, physical and human. Some of the factors are relevant to survival in cold water and some are relevant in water at any temperature.
(2) Broad estimates of likely survival times for the thin individual offshore are given in Table 1 below. As survival time is significantly affected by the prevailing weather conditions at the time of immersion, the Beaufort wind scale has been used as an indicator of these surface conditions.

Table 1: Timescale within which the most vulnerable individuals are likely to succumb to the prevailing conditions.

<table>
<thead>
<tr>
<th>Clothing assembly</th>
<th>Beaufort wind force</th>
<th>Times within which the most vulnerable individuals are likely to drown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working clothes</td>
<td>0 – 2</td>
<td>Within ¾ hour</td>
</tr>
<tr>
<td>(no)</td>
<td>3 – 4</td>
<td>Within ½ hour</td>
</tr>
<tr>
<td></td>
<td>5 and above</td>
<td>Significantly less</td>
</tr>
</tbody>
</table>

*(water temp 5°C) *(water temp 13°C)*
Immersion suit worn over working clothes (with leakage inside suit) | than ½ hour | than ½ hour |
--- | --- | --- |
0 - 2 | May well exceed 3 hours | May well exceed 3 hours |
3 – 4 | Within 2 ¾ hours | May well exceed 3 hours |
5 and above | Significantly less than 2 ¾ hours. May well exceed 1 hour | May well exceed 3 hours |

(3) Consideration should also be given to escaping from the helicopter itself should it submerge or invert in the water. In this case escape time is limited to the length of time the occupants can hold their breath. The breath holding time can be greatly reduced by the effect of cold shock. Cold shock is caused by the sudden drop in skin temperature on immersion, and is characterised by a gasp reflex and uncontrolled breathing. The urge to breathe rapidly becomes overwhelming and, if still submerged, the individual will inhale water resulting in drowning. Delaying the onset of cold shock by wearing an immersion suit will extend the available escape time from a submerged helicopter.

(4) The effects of water leakage and hydrostatic compression on the insulation quality of clothing are well recognised. In a nominally dry system the insulation is provided by still air trapped within the clothing fibres and between the layers of suit and clothes. It has been observed that many systems lose some of their insulative capacity either because the clothes under the ‘waterproof’ survival suit get wet to some extent or because of hydrostatic compression of the whole assembly. As a result of water leakage and compression, survival times will be shortened. The wearing of warm clothing under the suit is recommended.

(5) Whatever type of survival suit and other clothing is provided, it should not be forgotten that significant heat loss can occur from the head.
AOCR.IDE.H.300  Life-rafts, survival ELTs and survival equipment on extended overwater flights

Helicopters operated:

(a) in performance class 1 or 2 on a flight over water at a distance from land corresponding to more than 10 minutes flying time at normal cruising speed;

(b) in performance class 3 on a flight over water at a distance corresponding to more than three minutes flying time at normal cruising speed, shall be equipped with:

1. in the case of a helicopter carrying less than 12 persons, at least one life-raft with a rated capacity of not less than the maximum number of persons on board, stowed so as to facilitate its ready use in an emergency;

2. in the case of a helicopter carrying more than 11 persons, at least two life-rafts, stowed so as to facilitate their ready use in an emergency, sufficient together to accommodate all persons capable of being carried on board and, if one is lost, the remaining life-raft(s) having, the overload capacity sufficient to accommodate all persons on the helicopter;

3. at least one survival ELT (ELT(S)) for each required life-raft; and

4. life-saving equipment, including means of sustaining life, as appropriate to the flight to be undertaken.

AMC1 AOCR.IDE.H.300  Life-rafts, survival ELTs and survival equipment on extended overwater flights

LIFE–RAFTS AND EQUIPMENT FOR MAKING DISTRESS SIGNALS - HELICOPTERS

(a) Each required life-raft should conform to the following specifications:

1. be of an approved design and stowed so as to facilitate their ready use in an emergency;

2. be radar conspicuous to standard airborne radar equipment;

3. when carrying more than one life-raft on board, at least 50 % should be able to be deployed by the crew while seated at their normal station, where necessary by remote control; and
(4) Life-rafts that are not deployable by remote control or by the crew should be of such weight as to permit handling by one person. 40 kg should be considered a maximum weight.

(b) Each required life-raft should contain at least the following:

(1) One approved survivor locator light;

(2) One approved visual signaling device;

(3) One canopy (for use as a sail, sunshade or rain catcher) or other means to protect occupants from the elements;

(4) One radar reflector;

(5) One 20 m retaining line designed to hold the life-raft near the helicopter but to release it if the helicopter becomes totally submerged;

(6) One sea anchor;

(7) One survival kit, appropriately equipped for the route to be flown, which should contain at least the following:

(i) One life-raft repair kit;

(ii) One bailing bucket;

(iii) One signaling mirror;

(iv) One police whistle;

(v) One buoyant raft knife;

(vi) One supplementary means of inflation;

(vii) Sea sickness tablets;

(viii) One first-aid kit;

(ix) One portable means of illumination;

(x) 500 ml of pure water and one sea water desalting kit; and

(xi) One comprehensive illustrated survival booklet in an appropriate language.
**AMC1 AOCR.IDE.H.300 (b) (3) & AOCR.IDE.H.305 (b) Flight over water & Survival equipment**

**SURVIVAL ELT**

An ELT (AP) may be used to replace one required ELT(S) provided that it meets the ELT(S) requirements. A water-activated ELT(S) is not an ELT (AP).

**AOCR.IDE.H.305 Survival equipment**

Helicopters operated over areas in which search and rescue would be especially difficult shall be equipped with:

(a) signaling equipment to make distress signals;

(b) at least one ELT(S); and

(c) additional survival equipment for the route to be flown taking account of the number of persons on board.

**AMC1 AOCR.IDE.H.305 Survival equipment**

**ADDITIONAL SURVIVAL EQUIPMENT**

(a) The following additional survival equipment should be carried when required:

(1) 500 ml of water for each 4, or fraction of 4, persons on board;

(2) one knife;

(3) first-aid equipment; and

(4) one set of air/ground codes.

(b) In addition, when polar conditions are expected, the following should be carried:

(1) a means for melting snow;

(2) one snow shovel and 1 ice saw;

(3) sleeping bags for use by 1/3 of all persons on board and space blankets for the remainder or space blankets for all passengers on board; and
(4) one arctic/polar suit for each crew member.

(c) If any item of equipment contained in the above list is already carried on board the helicopter in accordance with another requirement, there is no need for this to be duplicated.

**GM1 AOCR.IDE.H.305 Survival equipment**

**SIGNALLING EQUIPMENT**

The signaling equipment for making distress signals is described in ICAO Annex 2, Rules of the Air.

**GM2 AOCR.IDE.H.305 Survival equipment**

**AREAS IN WHICH SEARCH AND RESCUE WOULD BE ESPECIALLY DIFFICULT**

The expression ‘areas in which search and rescue would be especially difficult’ should be interpreted, in this context, as meaning:

(a) areas so designated by the authority responsible for managing search and rescue; or

(b) areas that are largely uninhabited and where:

   (1) the authority referred to in (a) has not published any information to confirm whether search and rescue would be or would not be especially difficult; and

   (2) the authority referred to in (a) does not, as a matter of policy, designate areas as being especially difficult for search and rescue.

**AOCR.IDE.H.310 Additional requirements for helicopters conducting offshore operations in a hostile sea area**

Helicopters operated in offshore operations in a hostile sea area, at a distance from land corresponding to more than 10 minutes flying time at normal cruising speed, shall comply with the following:

(a) When the weather report or forecasts available to the commander indicate that the sea temperature will be less than plus 10 °C during the flight, or when the estimated rescue time exceeds the calculated survival time, or the flight is planned to be conducted at night, all persons on board shall wear a survival suit.
(b) All life-rafts carried in accordance with AOCR.IDE.H.300 shall be installed so as to be usable in the sea conditions in which the helicopter’s ditching, flotation and trim characteristics were evaluated in order to comply with the ditching requirements for certification.

(c) The helicopter shall be equipped with an emergency lighting system with an independent power supply to provide a source of general cabin illumination to facilitate the evacuation of the helicopter.

(d) All emergency exits, including crew emergency exits, and the means for opening them shall be conspicuously marked for the guidance of occupants using the exits in daylight or in the dark. Such markings shall be designed to remain visible if the helicopter is capsized and the cabin is submerged.

(e) All non-jettisonable doors that are designated as ditching emergency exits shall have a means of securing them in the open position so that they do not interfere with occupants’ egress in all sea conditions up to the maximum required to be evaluated for ditching and flotation.

(f) All doors, windows or other openings in the passenger compartment assessed as suitable for the purpose of underwater escape shall be equipped so as to be operable in an emergency.

(g) Life-jackets shall be worn at all times, unless the passenger or crew member is wearing an integrated survival suit that meets the combined requirement of the survival suit and life-jacket.

AMC1 AOCR.IDE.H.310 Additional requirements for helicopters operating to or from helidecks located in a hostile sea area

INSTALLATION OF THE LIFE-RAFT

(a) Projections on the exterior surface of the helicopter, that are located in a zone delineated by boundaries that are 1.22 m (4 ft) above and 0.61 m (2 ft) below the established static water line could cause damage to a deployed life-raft. Examples of projections that need to be considered are aerials, overboard vents, unprotected split-pin tails, guttering and any projection sharper than a three dimensional right angled corner.

(b) While the boundaries specified in (a) are intended as a guide, the total area that should be considered should also take into account the likely behaviour of the life-raft after deployment in all sea states up to the maximum in which the helicopter is capable of remaining upright.
Wherever a modification or alteration is made to a helicopter within the boundaries specified, the need to prevent the modification or alteration from causing damage to a deployed life-raft should be taken into account in the design.

Particular care should also be taken during routine maintenance to ensure that additional hazards are not introduced by, for example, leaving inspection panels with sharp corners proud of the surrounding fuselage surface, or allowing door sills to deteriorate to a point where sharp edges become a hazard.

Helicopters certified for operating on water — miscellaneous equipment

Helicopters certified for operating on water shall be equipped with:

(a) a sea anchor and other equipment necessary to facilitate mooring, anchoring or manoeuvring the helicopter on water, appropriate to its size, weight and handling characteristics; and

(b) equipment for making the sound signals prescribed in the International Regulations for Preventing Collisions at Sea, where applicable.

International Regulations for Preventing Collisions at Sea are those that were published by the International Maritime Organisation (IMO) in 1972.

All helicopters on flights over water — ditching

(a) Helicopters shall be designed for landing on water or certified for ditching in accordance with the relevant airworthiness code when operated in performance class 1 or 2 on a flight over water in a hostile environment at a distance from land corresponding to more than 10 minutes flying time at normal cruise speed.

(b) Helicopters shall be designed for landing on water or certified for ditching in accordance the relevant airworthiness code or fitted with emergency flotation equipment when operated in:
(1) performance class 1 or 2 on a flight over water in a non-hostile environment at a distance from land corresponding to more than 10 minutes flying time at normal cruise speed;

(2) performance class 2, when taking off or landing over water, except in the case of helicopter emergency medical services (HEMS) operations, where for the purpose of minimising exposure, the landing or take-off at a HEMS operating site located in a congested environment is conducted over water;

(3) performance class 3 on a flight over water beyond safe forced landing distance from land.

**AMC1 AOCR.IDE.H.320 (b) All helicopters on flight over water - ditching**

**GENERAL**

The same considerations of AMC1 AOCR.IDE.H.310 should apply in respect of emergency flotation equipment.

**AOCR.IDE.H.325 Headset**

Whenever a radio communication and/or radio navigation system is required, helicopters shall be equipped with a headset with boom microphone or equivalent and a transmit button on the flight controls for each required pilot and/or crew member at his/her assigned station.

**AMC1 AOCR.IDE.H.325 Headset**

**GENERAL**

(a) A headset consists of a communication device that includes two earphones to receive and a microphone to transmit audio signals to the helicopter’s communication system. To comply with the minimum performance requirements, the earphones and microphone should match the communication system’s characteristics and the cockpit environment. The headset should be adequately adjustable in order to fit the pilot’s head. Headset boom microphones should be of the noise cancelling type.

(b) If the intention is to utilise noise cancelling earphones, the operator should ensure that the earphones do not attenuate any aural warnings or sounds necessary for alerting the flight crew on matters related to the safe operation of the helicopter.
GM1 AOCR.IDE.H.325 Headset

GENERAL

The term ‘headset’ includes any aviation helmet incorporating headphones and microphone worn by a flight crew member.

AOCR.IDE.H.330 Radio communication equipment

(a) Helicopters shall be equipped with the radio communication equipment required by the applicable airspace requirements.

(b) The radio communication equipment shall provide for communication on the aeronautical emergency frequency 121.5 MHz.

AOCR.IDE.H.335 Audio selector panel

Helicopters operated under IFR shall be equipped with an audio selector panel operable from each required flight crew member station.

AOCR.IDE.H.340 Radio equipment for operations under VFR over routes navigated by reference to visual landmarks

Helicopters operated under VFR over routes that can be navigated by reference to visual landmarks shall be equipped with radio communication equipment necessary under normal radio propagation conditions to fulfil the following:

(a) communicate with appropriate ground stations;

(b) communicate with appropriate ATC stations from any point in controlled airspace within which flights are intended; and

(c) receive meteorological information.

AOCR.IDE.H.345 Communication and navigation equipment for operations under IFR or under VFR over routes not navigated by reference to visual landmarks

(a) Helicopters operated under IFR or under VFR over routes that cannot be navigated by reference to visual landmarks shall be equipped with radio communication and navigation equipment in accordance with the applicable airspace requirements.

(b) Radio communication equipment shall include at least two independent radio communication systems necessary under normal
operating conditions to communicate with an appropriate ground station from any point on the route, including diversions.

(c) Helicopters shall have sufficient navigation equipment to ensure that, in the event of the failure of one item of equipment at any stage of the flight, the remaining equipment shall allow safe navigation in accordance with the flight plan.

(d) Helicopters operated on flights in which it is intended to land in IMC shall be equipped with suitable equipment capable of providing guidance to a point from which a visual landing can be performed for each aerodrome at which it is intended to land in IMC and for any designated alternate aerodromes.

**AMC1 AOCR.IDE.H.345 Communication and navigation equipment for operations under IFR or under VFR over routes not navigated by reference to visual landmarks**

**TWO INDEPENDENT MEANS OF COMMUNICATION**

Whenever two independent means of communication are required, each system should have an independent antenna installation, except where rigidly supported non-wire antennae or other antenna installations of equivalent reliability are used.

**AMC2 AOCR.IDE.H.345 Communication and navigation equipment for operations under IFR or under VFR over routes not navigated by reference to visual landmarks**

**ACCEPTABLE NUMBER AND TYPE OF COMMUNICATION AND NAVIGATION EQUIPMENT**

(a) An acceptable number and type of communication and navigation equipment is:

(1) two VHF omnidirectional radio range (VOR) receiving systems on any route, or part thereof, where navigation is based only on VOR signals;

(2) two automatic direction finder (ADF) systems on any route, or part thereof, where navigation is based only on non-directional beacon (NDB) signals; and

(3) area navigation equipment when area navigation is required for the route being flown (e.g. equipment required by Part-SPA).
(b) The helicopter may be operated without the navigation equipment specified in (a) (1) and (a) (2) provided it is equipped with alternative equipment. The reliability and the accuracy of alternative equipment should allow safe navigation for the intended route.

(c) VHF communication equipment, instrument landing system (ILS) localiser and VOR receivers installed on helicopters to be operated under IFR should comply with the following FM immunity performance standards:

1. ICAO Annex 10, Volume I - Radio Navigation Aids, and Volume III, Part II - Voice Communications Systems; and


**AMC3 AOCR.IDE.H.345 Communication and navigation equipment for operations under IFR or under VFR over routes not navigated by reference to visual landmarks**

**FAILURE OF A SINGLE UNIT**

Required communication and navigation equipment should be installed such that the failure of any single unit required for either communication or navigation purposes, or both, will not result in the failure of another unit required for communications or navigation purposes.

**GM1 AOCR.IDE.H.345 Communication and navigation equipment for operations under IFR or under VFR over routes not navigated by reference to visual landmarks**

**APPLICABLE AIRSPACE REQUIREMENTS**

For helicopters being operated under Mauritian air traffic control, the applicable airspace requirements include the Mauritian Airspace Regulation.

**AOCR.IDE.H.350 Transponder**

Helicopters shall be equipped with a pressure altitude reporting secondary surveillance radar (SSR) transponder and any other SSR transponder capability required for the route being flown.
(a) The secondary surveillance radar (SSR) transponders of aircraft being operated under Mauritian air traffic control should comply with any applicable Mauritian Airspace Regulation.

(b) If the Single European Sky legislation is not applicable, the SSR transponders should operate in accordance with the relevant provisions of Volume IV of ICAO Annex 10.
CHAPTER 5 SPECIFIC APPROVALS

A Low Visibility Operations (LVO)

AOCR.SPA.LVO.100 Low visibility operations

The operator shall only conduct the following low visibility operations (LVO) when approved by the Authority:

(a) low visibility take-off (LVTO) operation;
(b) lower than standard category I (LTS CAT I) operation;
(c) standard category II (CAT II) operation;
(d) other than standard category II (OTS CAT II) operation;
(e) standard category III (CAT III) operation;
(f) approach operation utilising enhanced vision systems (EVS) for which an operational credit is applied to reduce the runway visual range (RVR) minima by no more than one third of the published RVR.

AMC2 AOCR.SPA.LVO.100 Low visibility operations

LVTO OPERATIONS - HELICOPTERS

For LVTOs with helicopters the provisions specified in Table 1.H should apply.

Table 1.H: LVTO – helicopters

RVR vs. facilities

<table>
<thead>
<tr>
<th>Facilities</th>
<th>RVR (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Onshore aerodromes with IFR departure procedures</strong></td>
<td></td>
</tr>
<tr>
<td>No light and no markings (day only)</td>
<td>250 or the rejected takeoff distance, whichever is the greater</td>
</tr>
<tr>
<td>No markings (night)</td>
<td>800</td>
</tr>
<tr>
<td>Runway edge/FATO light and centre line marking</td>
<td>200</td>
</tr>
<tr>
<td>Runway edge/FATO light, centre line marking and relevant RVR information</td>
<td>150</td>
</tr>
</tbody>
</table>
### Offshore helideck *

<table>
<thead>
<tr>
<th>Two-pilot operations</th>
<th>250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-pilot operations</td>
<td>500</td>
</tr>
</tbody>
</table>

*: The take-off flight path to be free of obstacles

**FATO**: final approach and take-off area
B HELICOPTER OPERATIONS WITH NIGHT VISION IMAGING SYSTEMS

AOCR.SPA.NVIS.100 Night Vision Imaging System (NVIS) Operations

(a) Helicopters shall only be operated under VFR at night with the aid of NVIS if the operator has been approved by the Authority.

(b) To obtain such approval by the Authority, the operator shall:

(1) operate in commercial air transport (CAT) and hold a CAT AOC in accordance with MCAR AOCR;

(2) demonstrate to the Authority:

(i) compliance with the applicable requirements contained in this Subpart;

(ii) the successful integration of all elements of the NVIS.

AOCR.SPA.NVIS.110 Equipment Requirements For NVIS Operations

(a) Before conducting NVIS operations each helicopter and all associated NVIS equipment shall have been issued with the relevant airworthiness approval in accordance with MCAR-PART-21

(b) Radio altimeter. The helicopter shall be equipped with a radio altimeter capable of emitting an audio warning below a pre-set height and an audio and visual warning at a height selectable by the pilot, instantly discernable during all phases of NVIS flight.

(c) Aircraft NVIS compatible lighting. To mitigate the reduced peripheral vision cues and the need to enhance situational awareness, the following shall be provided:

(1) NVIS-compatible instrument panel flood-lighting, if installed, that can illuminate all essential flight instruments;

(2) NVIS-compatible utility lights;

(3) portable NVIS compatible flashlight; and

(4) a means for removing or extinguishing internal NVIS non-compatible lights.
(d) Additional NVIS equipment. The following additional NVIS equipment shall be provided:

(1) a back-up or secondary power source for the night vision goggles (NVG);

(2) a helmet with the appropriate NVG attachment.

(e) All required NVGs on an NVIS flight shall be of the same type, generation and model.

(f) Continuing airworthiness

(1) Procedures for continuing airworthiness shall contain the information necessary for carrying out ongoing maintenance and inspections on NVIS equipment installed in the helicopter and shall cover, as a minimum:

(i) helicopter windscreens and transparencies;

(ii) NVIS lighting;

(iii) NVGs; and

(iv) any additional equipment that supports NVIS operations.

(2) Any subsequent modification or maintenance to the aircraft shall be in compliance with the NVIS airworthiness approval.

AMC1 AOCR.SPA.NVIS.110 (b) Equipment Requirements For NVIS Operations

RADIO ALTIMETER

(a) The radio altimeter should:

(1) be of an analogue type display presentation that requires minimal interpretation for both an instantaneous impression of absolute height and rate of change of height;

(2) be positioned to be instantly visible and discernable from each cockpit crew station;

(3) have an integral audio and visual low height warning that operates at a height selectable by the pilot; and
(4) provide unambiguous warning to the crew of radio altimeter failure.

(b) The visual warning should provide:

(1) clear visual warning at each cockpit crew station of height below the pilot-selectable height; and

(2) adequate attention-getting-capability for typical NVIS operations.

(c) The audio warning should:

(1) be unambiguous and readily cancellable;

(2) not extinguish any visual low height warnings when cancelled; and

(3) operate at the same pilot-selectable height as the visual warning.

**GM1 AOCR.SPA.NVIS.110 (b) equipment requirements for NVIS operations**

**RADIO ALTIMETER**

An analogue type display presentation may be, for example, a representation of a dial, ribbon or bar, but not a display that provides numbers only. An analogue type display may be embedded into an electronic flight instrumentation system (EFIS).

**GM1 AOCR.SPA.NVIS.110 (f) equipment requirements for NVIS operations**

**MODIFICATION OR MAINTENANCE TO THE HELICOPTER**

It is important that the operator reviews and considers all modifications or maintenance to the helicopter with regard to the NVIS airworthiness approval. Special emphasis needs to be paid to modification and maintenance of equipment such as light emitting or reflecting devices, transparencies and avionics equipment, as the function of this equipment may interfere with the NVGs.

**AOCR.SPA.NVIS.120 NVIS operating minima**

(a) Operations shall not be conducted below the VFR weather minima for the type of night operations being conducted.

(b) The operator shall establish the minimum transition height from where a change to/from aided flight may be continued.

**AOCR.SPA.NVIS.130 Crew requirements for NVIS operations**
(a) Selection. The operator shall establish criteria for the selection of crew members for the NVIS task.

(b) Experience. The minimum experience for the commander shall not be less than 20 hours VFR at night as pilot-in-command/commander of a helicopter before commencing training.

(c) Operational training. All pilots shall have completed the operational training in accordance with the NVIS procedures contained in the operations manual.

(d) Recency. All pilots and NVIS technical crew members conducting NVIS operations shall have completed three NVIS flights in the last 90 days. Recency may be re-established on a training flight in the helicopter or an approved full flight simulator (FFS), which shall include the elements of (f) (1).

(e) Crew composition. The minimum crew shall be the greater of that specified:

(1) in the aircraft flight manual (AFM);

(2) for the underlying activity; or

(3) in the operational approval for the NVIS operations.

(f) Crew training and checking

(1) Training and checking shall be conducted in accordance with a detailed syllabus approved by the Authority and included in the operations manual.

(2) Crew members

   (i) Crew training programmes shall: improve knowledge of the NVIS working environment and equipment; improve crew coordination; and include measures to minimise the risks associated with entry into low visibility conditions and NVIS normal and emergency procedures.

   (ii) The measures referred to in (f) (2) (i) shall be assessed during:

      (A) night proficiency checks; and

      (B) line checks.
GM1 AOCR.SPA.NVIS.130 (e)  Crew requirements for NVIS operations

UNDERLYING ACTIVITY

Examples of an underlying activity are:

(a)  commercial air transport;
(b)  helicopter emergency medical service (HEMS); and
(c)  helicopter hoist operation (HHO).

GM1 AOCR.SPA.NVIS.130 (e)  Crew requirements for NVIS operations

OPERATIONAL APPROVAL

(a)  When determining the composition of the minimum crew, the Authority should take account of the type of operation that is to be conducted. The minimum crew should be part of the operational approval.

(b)  If the operational use of NVIS is limited to the en-route phase of a commercial air transport flight, a single-pilot operation may be approved.

(c)  Where operations to/from a HEMS operating site are to be conducted, a crew of at least one pilot and one NVIS technical crew member would be necessary (this may be the suitably qualified HEMS technical crew member).

(d)  A similar assessment may be made for night HHO, when operating to unprepared sites.

AMC1 AOCR.SPA.NVIS.130 (f) (1)  Crew requirements for NVIS operations

TRAINING AND CHECKING SYLLABUS

(a)  The flight crew training syllabus should include the following items:

(1)  NVIS working principles, eye physiology, vision at night, limitations and techniques to overcome these limitations;

(2)  preparation and testing of NVIS equipment;

(3)  preparation of the helicopter for NVIS operations;

(4)  normal and emergency procedures including all NVIS failure modes;
(5) maintenance of unaided night flying;

(6) crew coordination concept specific to NVIS operations;

(7) practice of the transition to and from NVG procedures;

(8) awareness of specific dangers relating to the operating environment; and

(9) risk analysis, mitigation and management.

(b) The flight crew checking syllabus should include:

(1) night proficiency checks, including emergency procedures to be used on NVIS operations; and

(2) line checks with special emphasis on the following

(i) local area meteorology;
(ii) NVIS flight planning;
(iii) NVIS in-flight procedures;
(iv) transitions to and from night vision goggles (NVG);
(v) normal NVIS procedures; and
(vi) crew coordination specific to NVIS operations.

(c) Whenever the crew is required to also consist of an NVIS technical crew member, he/she should be trained and checked in the following items:

(1) NVIS working principles, eye physiology, vision at night, limitations, and techniques to overcome these limitations;

(2) duties in the NVIS role, with and without NVGs;

(3) the NVIS installation;

(4) operation and use of the NVIS equipment;

(5) preparing the helicopter and specialist equipment for NVIS operations;
normal and emergency procedures;
(7) crew coordination concepts specific to NVIS operations;
(8) awareness of specific dangers relating to the operating environment; and
(9) risk analysis, mitigation and management.

**AMC1 AOCR.SPA.NVIS.130 (f) Crew requirements**

**CHECKING OF NVIS CREW MEMBERS**

The checks required in AOCR.SPA.NVIS.130 (f) may be combined with those checks required for the underlying activity.

**GM1 AOCR.SPA.NVIS.130 (f) Crew requirements**

**TRAINING GUIDELINES AND CONSIDERATIONS**

(a) Purpose

The purpose of this GM is to recommend the minimum training guidelines and any associated considerations necessary for the safe operation of a helicopter while operating with night vision imaging systems (NVIS).

To provide an appropriate level of safety, training procedures should accommodate the capabilities and limitations of the NVIS and associated systems as well as the restraints of the operational environment.

(b) Assumptions

The following assumptions were used in the creation of this material:

(1) Most civilian operators may not have the benefit of formal NVIS training, similar to that offered by the military. Therefore, the stated considerations are predicated on that individual who has no prior knowledge of NVIS or how to use them in flight. The degree to which other applicants who have had previous formal training should be exempted from this training will be dependent on their prior NVIS experience.

(2) While NVIS are principally an aid to flying under VFR at night, the two-dimensional nature of the NVG image necessitates frequent reference to the flight instruments for spatial and situational
awareness information. The reduction of peripheral vision and increased reliance on focal vision exacerbates this requirement to monitor flight instruments. Therefore, any basic NVIS training syllabus should include some instruction on basic instrument flight.

(c) Two-tiered approach: basic and advance training

To be effective, the NVIS training philosophy would be based on a two-tiered approach: basic and advanced NVIS training. The basic NVIS training would serve as the baseline standard for all individuals seeking an NVIS endorsement. The content of this initial training would not be dependent on any operational requirements. The training required for any individual pilot should take into account the previous NVIS flight experience. The advanced training would build on the basic training by focusing on developing specialised skills required to operate a helicopter during NVIS operations in a particular operational environment. Furthermore, while there is a need to stipulate minimum flight hour requirements for an NVIS endorsement, the training should also be event-based. This necessitates that operators be exposed to all of the relevant aspects, or events, of NVIS flight in addition to acquiring a minimum number of flight hours. NVIS training should include flight in a variety of actual ambient light and weather conditions.

(d) Training requirements

(1) Flight crew ground training

The ground training necessary to initially qualify a pilot to act as the pilot of a helicopter using NVGs should include at least the following subjects:

(i) applicable aviation regulations that relate to NVIS limitations and flight operations;

(ii) aero-medical factors relating to the use of NVGs to include how to protect night vision, how the eyes adapt to operate at night, self-imposed stresses that affect night vision, effects of lighting (internal and external) on night vision, cues utilized to estimate distance and depth perception at night, and visual illusions;

(iii) NVG performance and scene interpretation;

(iv) normal, abnormal, and emergency operations of NVGs; and

(v) NVIS operations flight planning to include night terrain interpretation and factors affecting terrain interpretation.
The ground training should be the same for flight crew and crew members other than flight crew. An example of a ground training syllabus is presented in Table 1 of GM2 SPA.NVIS.130 (f).

(2) Flight crew flight training

The flight training necessary to initially qualify a pilot to act as the pilot of a helicopter using NVGs may be performed in a helicopter or FSTD approved for the purpose, and should include at least the following subjects:

(i) preparation and use of internal and external helicopter lighting systems for NVIS operations;

(ii) pre-flight preparation of NVGs for NVIS operations;

(iii) proper piloting techniques (during normal, abnormal, and emergency helicopter operations) when using NVGs during the take-off, climb, en-route, descent, and landing phases of flight that includes unaided flight and aided flight; and

(iv) normal, abnormal, and emergency operations of the NVIS during flight.

Crew members other than flight crew should be involved in relevant parts of the flight training. An example of a flight training syllabus is presented in Table 1 of GM3 AOCR.SPA.NVIS.130 (f).

(3) Training crew members other than flight crew

Crew members other than flight crew (including the technical crew member) should be trained to operate around helicopters employing NVIS. These individuals should complete all phases of NVIS ground training that is given to flight crew. Due to the importance of crew coordination, it is imperative that all crew members are familiar with all aspects of NVIS flight. Furthermore, these crew members may have task qualifications specific to their position in the helicopter or areas of responsibility. To this end, they should demonstrate competency in those areas, both on the ground and in flight.

(4) Ground personnel training

Non-flying personnel who support NVIS operations should also receive
adequate training in their areas of expertise. The purpose is to ensure, for example, that correct light discipline is used when helicopters are landing in a remote area.

(5) Instructor qualifications

An NVIS flight instructor should at least have the following licences and qualifications:

(i) at least flight instructor (FI(H)) or type rating instructor (TRI(H)) with the applicable type rating on which NVIS training will be given; and

(ii) logged at least 100 NVIS flights or 30 hours’ flight time under NVIS as pilot-in-command/commander.

(6) NVIS equipment minimum requirements (training)

While minimum equipment lists and standard NVIS equipment requirements may be stipulated elsewhere, the following procedures and minimum equipment requirements should also be considered:

(i) NVIS: the following is recommended for minimum NVIS equipment and procedural requirements:

(A) back-up power supply;

(B) NVIS adjustment kit or eye lane;

(C) use of helmet with the appropriate NVG attachment; and

(D) both the instructor and student should wear the same NVG type, generation and model.

(ii) Helicopter NVIS compatible lighting, flight instruments and equipment: given the limited peripheral vision cues and the need to enhance situational awareness, the following is recommended for minimum compatible lighting requirements:

(A) NVIS compatible instrument panel flood lighting that can illuminate all essential flight instruments;

(B) NVIS compatible hand-held utility lights;

(C) portable NVIS compatible flashlight;
(D) a means for removing or extinguishing internal NVIS non-compatible lights;

(E) NVIS pre-flight briefing/checklist (an example of an NVIS pre-flight briefing/checklist is in Table 1 of GM4-SPA.NVIS.130 (f));

(F) training references:

a number of training references are available, some of which are listed below:

– DO 295 US CONOPS civil operator training guidelines for integrated NVIS equipment
– United States Marine Corp MAWTS-1 Night Vision Device (NVD) Manual;
– U.S. Army Night Flight (TC 1-204);
– U.S. Army NVIS Operations, Exportable Training Package;
– U.S. Army TM 11-5855-263-10;
– Air Force TO 12S10-2AVS6-1;
– Navy NAVAIR 16-35AVS-7; and

There may also be further documents available from European civil or military sources.

**GM2 AOAC.SPA.NVIS.130 (f) Crew requirements**

**INSTRUCTION - GROUND TRAINING AREAS OF INSTRUCTION**

A detailed example of possible subjects to be instructed in an NVIS ground instruction is included below. (The exact details may not always be applicable, e.g. due to goggle configuration differences.)
### Table 1: Ground Training Areas Of Instruction

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<thead>
<tr>
<th>Item</th>
<th>Subject Area</th>
<th>Subject Details</th>
<th>Recommended Time</th>
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<td>General anatomy and characteristics of the eye</td>
<td>Anatomy:</td>
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<td>• Overall structure of the eye</td>
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<td>Effects of light on night vision &amp; NV protection physiology:</td>
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<td>• Night blind spot (as compared to day blind spot)</td>
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<td>• Somatogravic illusions:</td>
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<td>• Helicopter design limitations:</td>
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<td>• Self-imposed stresses:</td>
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</table>
- hypoglycaemia
- injuries
- physical fitness

- **Stress & fatigue:**
  - acute vs. chronic
  - prevention

- **Hypoxia issues and night vision**

- **Weather/environmental conditions:**
  - snow (white-out)
  - dust (brown-out)
  - haze
  - fog
  - rain
  - light level

- **Astronomical lights** (moon, star, northern lights)
- **Effects of cloud cover**
### NVIS General Characteristics

<table>
<thead>
<tr>
<th>Topic</th>
<th>Details</th>
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</table>
| Definitions and types of NVIS: | - light spectrum  
- types of NVIS |
| Thermal-imaging devices | |
| Image-intensifier devices | |
| Image-intensifier operational theory | |
| Types of image intensifier systems: | - generation 1  
- generation 2  
- generation 3  
- generation 4  
- type I/II  
- class A & B minus blue filter |
| NVIS equipment | - shipping and storage case  
- carrying case  
- binocular assembly  
- lens caps  
- lens paper  
- operators manual  
- power pack (dual battery)  
- batteries |
| Characteristics of NVIS: | - light amplification  
- light intensification  
- frequency sensitivity  
- visual range acuity  
- unaided peripheral vision  
- weight  
- flip-up device  
- break-away feature  
- neck cord  
- maintenance issues  
- human factor issues |
| Description and functions of NVIS components: | - helmet visor cover and extension strap  
- helmet NVIS mount and attachment points  
- different mount options for various helmets  
- lock release button  
- vertical adjustment knob  
- low battery indicator  
- binocular assembly  
- monocular tubes  
- fore and aft adjustment knob  
- eye span knob  
- tilt adjustment lever  
- objective focus rings  
- eyepiece focus rings  
- battery pack |
| 4 | NVIS care & cleaning | • Handling procedures  
• NVIS operating instructions:  
  – pre-mounting inspection  
  – mounting procedures  
  – focusing procedures  
  – faults  
• Post-flight procedures;  
• Deficiencies: type and recognition of faults:  
  – acceptable faults  
  – black spots  
  – chicken wire  
  – fixed pattern noise (honeycomb effect)  
  – output brightness variation  
  – bright spots  
  – image disparity  
  – image distortion  
  – emission points  
• Unacceptable faults:  
  – shading  
  – edge glow  
  – flashing, flickering or intermittent operation  
• Cleaning procedures  
• Care of batteries  
• Hazardous material considerations; | 1 hour |
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<thead>
<tr>
<th>5</th>
<th><strong>Pre- &amp; post-flight procedures</strong></th>
<th>1 hour</th>
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<td>Inspect NVIS</td>
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<td>Carrying case condition</td>
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<td>Nitrogen purge due date</td>
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<td>Collimation test due date</td>
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<td>Screens diagram(s) of any faults</td>
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<td>NVIS kit: complete</td>
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<td>NVIS binocular assembly condition</td>
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<td>Battery pack and quick disconnect condition</td>
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<td>Batteries life expended so far</td>
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<td>Mount battery pack onto helmet:</td>
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<td>- verify no LED showing (good battery)</td>
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<td>- fail battery by opening cap and LED illuminates (both compartments)</td>
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<td>Mount NVIS onto helmet</td>
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<td>Adjust and focus NVIS</td>
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<td>Eye-span to known inter-pupillary distance</td>
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<td>Eye piece focus ring to zero</td>
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<td>- eye-span (fine-tuning)</td>
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<td>Focus (one eye at a time at 20 ft, then at 30 ft from an eye chart)</td>
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<td>- objective focus ring</td>
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<td>- eye piece focus ring</td>
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<td>- verify both images are harmonised</td>
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<td>- read eye-chart 20/40 line from 20 ft</td>
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<td>NVIS mission planning</td>
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<td>NVIS light level planning</td>
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<td>NVIS risk assessment</td>
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<td>6</td>
<td>NVIS terrain interpretation and environmental factors</td>
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<td>• Night terrain interpretation</td>
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<td>• Meteorological conditions:</td>
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<td>− indications of restriction to visibility:</td>
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<td>− loss of celestial lights</td>
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<td>− reduced ambient light levels</td>
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<td>− increase in video noise</td>
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<td>• Cues for visual recognition:</td>
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<td></td>
<td>− background</td>
<td></td>
</tr>
<tr>
<td></td>
<td>− reflectivity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Factors affecting terrain interpretation:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>− ambient light</td>
<td></td>
</tr>
<tr>
<td></td>
<td>− flight altitudes</td>
<td></td>
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<tr>
<td></td>
<td>− terrain type</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Seasons</td>
<td></td>
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<tr>
<td></td>
<td>• Night navigation cues:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>− terrain relief</td>
<td></td>
</tr>
<tr>
<td></td>
<td>− vegetation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>− hydrographical features</td>
<td></td>
</tr>
<tr>
<td></td>
<td>− cultural features</td>
<td></td>
</tr>
</tbody>
</table>

1 hour
7 NVIS training & equipment requirements

Cover the relevant regulations and guidelines that pertain to night and NVIS flight to include as a minimum:
- Crew experience requirements;
- Crew training requirements;
- Airspace requirements;
- Night / NVIS MEL;
- NVIS / night weather limits;
- NVIS equipment minimum standard requirements.

1 hour

8 NVIS emergency procedures

Cover relevant emergency procedures:
- Inadvertent IMC procedures
- NVIS goggle failure
- Helicopter emergencies:
  - with goggles
  - transition from goggles

1 hour

9 NVIS flight techniques

Respective flight techniques for each phase of flight for the type and class of helicopter used for NVIS training

1 hour

10 Basic instrument techniques

Present and confirm understanding of basic instrument flight techniques:
- Instrument scan
- Role of instruments in NVIS flight
- Unusual attitude recovery procedures

1 hour

11 Blind cockpit drills

Perform blind cockpit drills:
- Switches
- Circuit breakers
- Exit mechanisms
- External / internal lighting
- Avionics

1 hour

GM3 AO.CR.SPA.NVIS.130 (f) Crew requirements

FLIGHT TRAINING - AREAS OF INSTRUCTION

A detailed example of possible subjects to be instructed in a NVIS flight instruction is included below.
**Table 1: Flight Training Areas Of Instruction**

<table>
<thead>
<tr>
<th>Item</th>
<th>Subject Area</th>
<th>Subject Details</th>
<th>Recommended</th>
</tr>
</thead>
</table>
| 1    | Ground operations | • NVIS equipment assembly  
• Pre-flight inspection of NVIS  
• Helicopter pre-flight  
• NVIS flight planning:  
  • light level planning  
  • meteorology  
  • obstacles and known hazards  
  • risk analysis matrix  
  • CRM concerns  
  • NVIS emergency procedures review  
• Start-up/ shut down  
• Goggling and degoggling | 1 hour |
| 2    | General handling | • Level turns, climbs, and descents  
• For helicopters, confined areas and sloped landings  
• Operation specific flight tasks  
• Transition from aided to unaided flight  
• Demonstration of NVIS related ambient conditions | 1 hour |
| 3    | Take-offs & landings | • At both improved illuminated areas such as airports/ airfields and unimproved unlit areas such as open fields  
• Traffic pattern  
• Low speed manoeuvres for helicopters | 1 hour |
| 4    | Navigation | • Navigation over variety of terrain and under different cultural lighting conditions | 1 hour |
| 5    | Emergency procedures | • Goggle failure  
• Helicopter emergencies  
• inadvertent IMC  
• Unusual attitude recovery | 1 hour |

**GM4 AOCR.SPA.NVIS.130 (f) Crew requirements**

NVIS PRE-FLIGHT BRIEFING/CHECKLIST

A detailed example of a pre-flight briefing/checklist is included below.

**Table 1: NVIS Pre-Flight Briefing/Checklist**

<table>
<thead>
<tr>
<th>Item</th>
<th>Subject</th>
</tr>
</thead>
</table>
| 1    | Weather:  
• METAR/forecast  
• Cloud cover/dew point spread/precipitation |
## AOCR.SPA.NVIS.140  Information and documentation

The operator shall ensure that, as part of its risk analysis and management process, risks associated with the NVIS environment are minimised by specifying in the operations manual: selection, composition and training of crews; levels of equipment and dispatch criteria; and operating procedures and minima, such that normal and likely abnormal operations are described and adequately

<table>
<thead>
<tr>
<th></th>
<th>OPS items:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>• NOTAMs</td>
</tr>
<tr>
<td></td>
<td>• IFR publications backup/maps</td>
</tr>
<tr>
<td></td>
<td>• Goggles adjusted using test set [RTCA Document DO-275 [NVIS MOPS], Appendices G &amp; H give suggested NVG pre-flight and adjustment procedures and a ground test checklist]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Ambient light:</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>• Moon rise/set/phase/position/elevation</td>
</tr>
<tr>
<td></td>
<td>• % illumination and millilux (MLX) for duration of flight</td>
</tr>
<tr>
<td></td>
<td>• Recommended minimum MLX: 1.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Mission:</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>• Mission outline</td>
</tr>
<tr>
<td></td>
<td>• Terrain appreciation</td>
</tr>
<tr>
<td></td>
<td>• Detailed manoeuvres</td>
</tr>
<tr>
<td></td>
<td>• Flight timings</td>
</tr>
<tr>
<td></td>
<td>• Start/airborne/debrief</td>
</tr>
<tr>
<td></td>
<td>• Airspace coordination for NVIS</td>
</tr>
<tr>
<td></td>
<td>• Obstacles/minimum safe altitude</td>
</tr>
<tr>
<td></td>
<td>• NVIS goggle up/degoggle location/procedure</td>
</tr>
<tr>
<td></td>
<td>• Instrument IFR checks</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Crew:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>• Crew day/experience</td>
</tr>
<tr>
<td></td>
<td>• Crew position</td>
</tr>
<tr>
<td></td>
<td>• Equipment: NVIS, case, video, flashlights</td>
</tr>
<tr>
<td></td>
<td>• Lookout duties: left hand seat (LHS) – from 90° left to 45° right RHS – from 90° right to 45° left;</td>
</tr>
<tr>
<td></td>
<td>• Calling of hazards/movements landing light</td>
</tr>
<tr>
<td></td>
<td>• Transfer of control terminology</td>
</tr>
<tr>
<td></td>
<td>• Below 100 ft AGL – pilot monitoring (PM) ready to assume control</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Helicopter:</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>• Helicopter configuration</td>
</tr>
<tr>
<td></td>
<td>• Fuel and CG</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Emergencies:</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>• NVIS failure: cruise and low level flight</td>
</tr>
<tr>
<td></td>
<td>• Inadvertent IMC/IFR recovery</td>
</tr>
<tr>
<td></td>
<td>• Helicopter emergency: critical &amp; non-critical</td>
</tr>
</tbody>
</table>
mitigated.

**AMC1 AOCR.SPA.NVIS.140  Information and documentation**

**OPERATIONS MANUAL**

The operations manual should include:

(a) equipment to be carried and its limitations;

(b) the minimum equipment list (MEL) entry covering the equipment specified;

(c) risk analysis, mitigation and management;

(d) pre- and post-flight procedures and documentation;

(e) selection and composition of crew;

(f) crew coordination procedures, including:

(1) flight briefing;

(2) procedures when one crew member is wearing NVG and/or procedures when two or more crew members are wearing NVGs;

(3) procedures for the transition to and from NVIS flight;

(4) use of the radio altimeter on an NVIS flight; and

(5) inadvertent instrument meteorological conditions (IMC) and helicopter recovery procedures, including unusual attitude recovery procedures;

(g) the NVIS training syllabus;

(h) in-flight procedures for assessing visibility, to ensure that operations are not conducted below the minima stipulated for non-assisted night VFR operations;

(i) weather minima, taking the underlying activity into account; and

(j) the minimum transition heights to/from an NVIS flight.

**GM1 AOCR.SPA.NVIS.140  Information And Documentation**

**CONCEPT OF OPERATIONS**
Night Vision Imaging System for Civil Operators

Foreword

This document, initially incorporated in JAA TGL-34, prepared by a Sub-Group of EUROCAE Working Group 57 “Night Vision Imaging System (NVIS) Standardisation” is an abbreviated and modified version of the RTCA Report DO-268 “Concept Of Operations – Night Vision Imaging Systems For Civil Operators” which was prepared in the USA by RTCA Special Committee 196 (SC-196) and approved by the RTCA Technical Management Committee in March 2001.

The EUROCAE Working Group 57 (WG-57) Terms of Reference included a task to prepare a Concept of Operations (CONOPS) document describing the use of NVIS in Europe. To complete this task, a Sub-Group of WG-57 reviewed the RTCA SC-196 CONOPS (DO-268) to assess its applicability for use in Europe. Whilst the RTCA document was considered generally applicable, some of its content, such as crew eligibility and qualifications and the detail of the training requirements, was considered to be material more appropriately addressed in Europe by at that time other Joint Aviation Requirements (JAR) documents such as JAR-OPS and JAR-FCL. Consequently, WG-57 condensed the RTCA CONOPS document by removing this material which is either already addressed by other JAR documents or will be covered by the Agency’s documents in the future.

In addition, many of the technical standards already covered in the Minimum Operational Performance Standards (MOPS) for Integrated Night Vision Imaging System Equipment (DO-275) have been deleted in this European CONOPS.

Executive Summary

The hours of darkness add to a pilot’s workload by decreasing those visual cues commonly used during daylight operations. The decreased ability of a pilot to see and avoid obstructions at night has been a subject of discussion since aviators first attempted to operate at night. Technology advancements in the late 1960s and early 1970s provided military aviators some limited ability to see at night and therein changed the scope of military night operations. Continuing technological improvements have advanced the capability and reliability of night vision imaging systems to the point that they are receiving increasing scrutiny are generally accepted by the public and are viewed by many as a tool for night flight.

Simply stated, night vision imaging systems are an aid to night VFR flight. Currently, such systems consist of a set of night vision goggles and normally a complimentary array of cockpit lighting modifications. The specifications of these two sub-system elements are interdependent and, as technology advances, the characteristics associated with each element are expected to evolve. The complete
description and performance standards of the night vision goggles and cockpit lighting modifications appropriate to civil aviation are contained in the Minimum Operational Performance Standards for Integrated Night Vision Imaging System Equipment.

An increasing interest on the part of civil operators to conduct night operations has brought a corresponding increased level of interest in employing night vision imaging systems. However, the night vision imaging systems do have performance limitations. Therefore, it is incumbent on the operator to employ proper training methods and operating procedures to minimise these limitations to ensure safe operations. In turn, operators employing night vision imaging systems must have the guidance and support of their regulatory agency in order to safely train and operate with these systems.

The role of the regulatory agencies in this matter is to develop the technical standard orders for the hardware as well as the advisory material and inspector handbook materials for the operations and training aspect. In addition, those agencies charged with providing flight weather information should modify their products to include the night vision imaging systems flight data elements not currently provided.

An FAA study (DOT/FAA/RD-94/21, 1994) best summarised the need for night vision imaging systems by stating, “When properly used, NVGs can increase safety, enhance situational awareness, and reduce pilot workload and stress that are typically associated with night operations.”
Foreword

Executive summary

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2. Terminology

2.1 Night vision goggles

An NVG is a binocular appliance that amplifies ambient light and is worn by a pilot. The NVG enhances the wearer’s ability to maintain visual surface reference at night.

2.1.1 Type

Type refers to the design of the NVG with regards to the manner in which the image is relayed to the pilot. A Type 1 NVG is one in which the image is viewed directly in-line with the image intensification process. A Type 1 NVG is also referred to as “direct view” goggles. A Type 2 NVG is one in which the image intensifier is not in-line with the image viewed by the pilot. In this design, the image may be reflected several times before being projected onto a combiner in front of the pilot’s eyes. A Type 2 NVG is also referred to as an “indirect view” goggle.

2.1.2 Class

Class is a terminology used to describe the filter present on the NVG objective lens. The filter restricts the transmission of light below a determined frequency. This allows the cockpit lighting to be designed and installed in a manner that does not adversely affect NVG performance.

2.1.2.1 Class A

Class A or “minus blue” NVGs incorporate a filter, which generally imposes a 625 nanometer cut off. Thus, the use of colours in the cockpit (e.g., colour displays, colour warning lights, etc.) may be limited. The blue green region of the light spectrum is allowed through the filter.

2.1.2.2 Class B

Class B NVGs incorporate a filter that generally imposes a 665 nanometer cut off. Thus, the cockpit lighting design may incorporate more colors since the filter eliminates some yellows and oranges from entering the intensification process.

2.1.2.3 Modified class B

Modified Class B NVGs incorporate a variation of a Class B filter but also incorporates a notch filter in the green spectrum that allows a small percentage of light into the image intensification process. Therefore, a Modified Class B NVG allows pilots to view fixed head-up display (HUD) symbology through the NVG without the HUD energy adversely affecting NVG performance.

2.1.3 Generation
Generation refers to the technological design of an image intensifier. Systems incorporating these light-amplifying image intensifiers were first used during WWII and were operationally fielded by the US military during the Vietnam era. These systems were large, heavy and poorly performing devices that were unsuitable for aviation use, and were termed Generation I (Gen I). Gen II devices represented a significant technological advancement and provided a system that could be head-mounted for use in ground vehicles. Gen III devices represented another significant technological advancement in image intensification, and provided a system that was designed for aviation use. Although not yet fielded, there are prototype NVGs that include technological advances that may necessitate a Gen IV designation if placed into production. Because of the variations in interpretations as to generation, NVGs will not be referred to by the generation designation.

2.1.4 OMNIBUS

The term OMNIBUS refers to a US Army contract vehicle that has been used over the years to procure NVGs. Each successive OMNIBUS contract included NVGs that demonstrated improved performance. There have been five contracts since the mid-1980s, the most current being OMNIBUS V. There may be several variations of NVGs within a single OMNIBUS purchase, and some NVGs from previous OMNIBUS contracts have been upgraded in performance to match the performance of goggles from later contracts. Because of these variations, NVGs will not be referred to by the OMNIBUS designation.

2.1.5 Resolution and visual acuity

Resolution refers to the capability of the NVG to present an image that makes clear and distinguishable the separate components of a scene or object.

Visual acuity is the relative ability of the human eye to resolve detail and interpret an image.

2.2 Aviation night vision imaging system (NVIS)

The Night Vision Imaging System is the integration of all elements required to successfully and safely operate an aircraft with night vision goggles. The system includes at a minimum NVGs, NVIS lighting, other aircraft components, training, and continuing airworthiness.

2.2.1 Look under (under view)

Look under is the ability of pilots to look under or around the NVG to view inside and outside the aircraft.

2.3 NVIS lighting
An aircraft lighting system that has been modified or designed for use with NVGs and which does not degrade the performance of the NVG beyond acceptable standards, is designated as NVIS lighting. This can apply to both interior and exterior lighting.

2.3.1 Design considerations

As the choice of NVG filter drives the cockpit lighting design, it is important to know which goggle will be used in which cockpit. Since the filter in a Class A NVG allows wavelengths above 625 nanometers into the intensification process, it should not be used in a cockpit designed for Class B or Modified Class B NVGs. However, since the filter in a Class B and Modified Class B NVGs is more restrictive than that in a Class ANVG, the Class B or Modified Class B NVG can be used with either Class A or Class B cockpit lighting designs.

2.3.2 Compatible

Compatibility, with respect to an NVIS system, includes a number of different factors: compatibility of internal and external lighting with the NVG, compatibility of the NVG with the crew station design (e.g., proximity of the canopy or windows, proximity of overhead panels, operability of controls, etc.), compatibility of crew equipment with the NVG and compatibility with respect to colour discrimination and identification (e.g., caution and warning lights still maintain amber and red colours). The purpose of this paragraph is to discuss compatibility with respect to aircraft lighting. An NVIS lighting system, internal and external, is considered compatible if it adheres to the following requirements:

1. the internal and external lighting does not adversely affect the operation of the NVG during any phase of the NVIS operation;

2. the internal lighting provides adequate illumination of aircraft cockpit instruments, displays and controls for unaided operations and for “look-under” viewing during aided operations; and

3. The external lighting aids in the detection and separation by other aircraft.

NVIS lighting compatibility can be achieved in a variety of ways that can include, but is not limited to, modification of light sources, light filters or by virtue of location. Once aircraft lighting is modified for using NVGs, it is important to keep in mind that changes in the crew station (e.g., addition of new display) must be assessed relative to the effect on NVIS compatibility.

2.4. NVIS operation

A night flight wherein the pilot maintains visual surface reference using NVGs in an
aircraft that is NVIS approved

2.4.1 Aided

Aided flight is flight with NVGs in an operational position.

2.4.2 Unaided

Unaided flight is a flight without NVGs or a flight with NVGs in a non-operational position.

3. System Description

3.1 NVIS capabilities

NVIS generally provides the pilot an image of the outside scene that is enhanced compared to that provided by the unaided, dark-adapted eye. However, NVIS may not provide the user an image equal to that observed during daylight. Since the user has an enhanced visual capability, situational awareness is generally improved.

3.1.1 Critical elements

The following critical elements are the underlying assumptions in the system description for NVIS:

1. aircraft internal lighting has been modified or initially designed to be compatible;

2. environmental conditions are adequate for the use of NVIS (e.g. enough illumination is present, weather conditions are favourable, etc.);

3. the NVIS has been properly maintained in accordance with the minimum operational performance standards;

4. a proper pre-flight has been performed on the NVIS confirming operation in accordance with the continued airworthiness standards and training guidelines; and

5. the pilot(s) has been properly trained and meets recency of experience requirements.

Even when insuring that these conditions are met, there still are many variables that can adversely affect the safe and effective use of NVIS (e.g., flying towards a low angle moon, flying in a shadowed area, flying near extensive cultural lighting, flying over low contrast terrain, etc.). It is important to understand these
assumptions and limitations when discussing the capabilities provided by the use of NVIS.

3.1.2 Situation awareness

Situation awareness, being defined as the degree of perceptual accuracy achieved in the comprehension of all factors affecting an aircraft and crew at a given time, is improved at night when using NVG during NVIS operations. This is achieved by providing the pilot with more visual cues than is normally available under most conditions when operating an aircraft unaided at night. However, it is but one source of the factors necessary for maintaining an acceptable level of situational awareness.

3.1.2.1 Environment detection and identification
An advantage of using NVIS is the enhanced ability to detect, identify, and avoid terrain and/or obstacles that present a hazard to night operations. Correspondingly, NVIS aid in night navigation by allowing the aircrew to view waypoints and features.

Being able to visually locate and then (in some cases) identify objects or areas critical to operational success will also enhance operational effectiveness. Finally, use of NVIS may allow pilots to detect other aircraft more easily.

3.1.3 Emergency situations

NVIS generally improve situational awareness, facilitating the pilot’s workload during emergencies. Should an emergency arise that requires an immediate landing, NVIS may provide the pilot with a means of locating a suitable landing area and conducting a landing. The pilot must determine if the use of NVIS during emergencies is appropriate. In certain instances, it may be more advantageous for the pilot to remove the NVG during the performance of an emergency procedure.

3.2.1 NVG design characteristics

There are limitations inherent in the current NVG design.

3.2.1.1 Visual acuity

The pilot’s visual acuity with NVGs is less than normal daytime visual acuity.

3.2.1.2 Field of view

Unaided field of view (FOV) covers an elliptical area that is approximately 120° lateral by 80° vertical, whereas the field of view of current Type I NVG systems is nominally 40° and is circular. Both the reduced field of view of the image and the resultant decrease in peripheral vision can increase the pilot’s susceptibility to misperceptions and illusions. Proper scanning techniques must be employed to
reduce the susceptibility to misperception and illusions.

3.2.1.3 Field of regard

The NVG has a limited FOV but, because it is head-mounted, that FOV can be scanned when viewing the outside scene. The total area that the FOV can be scanned is called the field of regard (FOR). The FOR will vary depending on several factors: physiological limit of head movement, NVG design (e.g., protrusion of the binocular assembly, etc.) and cockpit design issues (e.g., proximity of canopy or window, seat location, canopy bow, etc.).

3.2.1.4 NVG weight & centre of gravity

The increased weight and forward CG projection of head supported devices may have detrimental effects on pilot performance due to neck muscle strain and fatigue. There also maybe an increased risk of neck injury in crashes.

3.2.1.5 Monochromatic image

The NVG image currently appears in shades of green. Since there is only one colour, the image is said to be “monochromatic”. This colour was chosen mostly because the human eye can see more detail at lower brightness levels when viewing shades of green. Colour differences between components in a scene helps one dis- criminate between objects and aids in object recognition, depth perception and distance estimation. The lack of colour variation in the NVG image will degrade these capabilities to varying degrees.

3.2.1.6 Ambient or artificial light

The NVG requires some degree of light (energy) in order to function. Low light levels, non-compatible aircraft lighting and poor windshield/window light transmissibility, diminish the performance capability of the NVG. It is the pilot’s responsibility to determine when to transition from aided to unaided due to unacceptable NVG performance.

3.2.2 Physiological and other conditions

3.2.2.1 Cockpit resource management

Due to the inherent limitations of NVIS operations, there is a requirement to place emphasis on NVIS related cockpit resource management (CRM). This applies to both single and multi-pilot cockpit environments. Consequently, NVIS flight requires effective CRM between the pilot(s), controlling agencies and other supporting personnel. An appropriate venue for addressing this issue is the pre-flight NVIS mission brief.

3.2.2.2 Fatigue
Physiological limitations that are prevalent during the hours of darkness along with the limitations associated with NVGs, may have a significant impact on NVIS operations. Some of these limitations are the effects of fatigue (both acute and chronic), stress, eyestrain, working outside the pilot’s normal circadian rhythm envelope, increased helmet weight, aggressive scanning techniques associated with NVIS, and various human factors engineering concerns that may have a direct influence on how the pilot works in the aircraft while wearing NVGs. These limitations may be mitigated through proper training and recognition, experience, adaptation, rest, risk management, and proper crew rest/duty cycles.

3.2.2.3 Over-confidence

Compared to other types of flight operations, there may be an increased tendency by the pilot to over-estimate the capabilities of the NVIS.

3.2.2.4 Spatial orientation

There are two types of vision used in maintaining spatial orientation: central (focal) vision and peripheral (ambient) vision. Focal vision requires conscious processing and is slow, whereas peripheral information is processed subconsciously at a very fast rate. During daytime, spatial orientation is maintained by inputs from both focal vision and peripheral vision, with peripheral vision providing the great majority of the information. When using NVGs, peripheral vision can be significantly degraded if not completely absent. In this case, the pilot must rely on focal vision to interpret the NVG image as well as the information from flight instruments in order to maintain spatial orientation and situation awareness. Even though maintaining spatial orientation requires more effort when using NVGs than during daytime, it is much improved over night unaided operations where the only information is obtained through flight instruments. However, anything that degrades the NVG image to a point where the horizon is not visualised and/or ground reference is lost or significantly degraded will necessitate a reversion to flight on instruments until adequate external visual references can be established. Making this transition quickly and effectively is vital in order to avoid spatial disorientation. Additionally, added focal task loading during the operation (e.g., communications, looking at displays, processing navigational information, etc.) will compete with the focal requirement for interpreting the NVG image and flight instruments. Spatial disorientation can result when the task loading increases to a point where the outside scene and/or the flight instruments are not properly scanned. This potential can be mitigated to some extent through effective training and experience.

3.2.2.5 Depth perception & distance estimation

When flying, it is important for pilots to be able to accurately employ depth perception and distance estimation techniques. To accomplish this, pilots use both
binocular and monocular vision. Binocular vision requires the use of both eyes working together, and, practically speaking, is useful only out to approximately 100 ft.

Binocular vision is particularly useful when flying close to the ground and/or near objects (e.g. landing a helicopter in a small landing zone). Monocular vision can be accomplished with either eye alone, and is the type of vision used for depth perception and distance estimation when viewing beyond approximately 100 ft. Monocular vision is the predominant type of vision used when flying fixed wing aircraft, and also when flying helicopters and using cues beyond 100 ft. When viewing an NVG image, the two eyes can no longer provide accurate binocular information, even though the NVG used when flying is a binocular system. This has to do with the way the eyes function physiologically (e.g. accommodation, stereopsis, etc.) and the design of the NVG (i.e. a binocular system with a fixed channel for each eye). Therefore, binocular depth perception and distance estimation tasking when viewing terrain or objects with an NVG within 100 ft is significantly degraded. Since monocular vision does not require both eyes working together, the adverse impact on depth perception and distance estimation is much less, and is mostly dependent on the quality of the NVG image. If the image is very good and there are objects in the scene to use for monocular cueing (especially objects with which the pilot is familiar), then distance estimation and depth perception tasking will remain accurate. However, if the image is degraded (e.g., low illumination, airborne obscurants, etc.) and/or there are few or unfamiliar objects in the scene, depth perception and distance estimation will be degraded to some extent. In summary, pilots using NVG will maintain the ability to accurately perceive depth and estimate distances, but it will depend on the distances used and the quality of the NVG image.

Pilots maintain some ability to perceive depth and distance when using NVGs by employing monocular cues. However, these capabilities may be degraded to varying degrees.

3.2.2.6 Instrument lighting brightness considerations

When viewing the NVG image, the brightness of the image will affect the amount of time it takes to adapt to the brightness level of the instrument lighting, thereby affecting the time it takes to interpret information provided by the instruments. For example, if the instrument lighting is fairly bright, the time it takes to interpret information provided by the instruments may be instantaneous. However, if the brightness of the lighting is set to a very low level, it may take several seconds to interpret the information, thus increasing the heads-down time and increasing the risk of spatial disorientation. It is important to ensure that instrument lighting is kept at a brightness level that makes it easy to rapidly interpret the information. This will likely be brighter than one is used to during unaided operations.
3.2.2.7 Dark adaptation time from NVG to unaided operations

When viewing an NVG image, both rods and cones are being stimulated (i.e., mesopic vision), but the brightness of the image is reducing the effectiveness of rod cells. If the outside scene is bright enough (e.g., urban area, bright landing pad, etc.), both rods and cones will continue to be stimulated. In this case there will be no improvement in acuity over time and the best acuity is essentially instantaneous. In some cases (e.g., rural area with scattered cultural lights), the outside scene will not be bright enough to stimulate the cones and some amount of time will be required for the rods to fully adapt. In this case it may take the rods one to two minutes to fully adapt for the best acuity to be realised. If the outside scene is very dark (e.g., no cultural lights and no moon), it may take up to five minutes to fully adapt to the outside scene after removing the NVGs. The preceding are general guidelines and the time required to fully adapt to the outside scene once removing the NVG depends on many variables: the length of time the NVG has been used, whether or not the pilot was dark adapted prior to flight, the brightness of the outside scene, the brightness of cockpit lighting, and variability in visual function among the population. It is important to understand the concept and to note the time requirements for the given operation.

3.2.2.8 Complacency

Pilots must understand the importance of avoiding complacency during NVG flights. Similar to other specialised flight operations, complacency may lead to an acceptance of situations that would normally not be permitted. Attention span and vigilance are reduced, important elements in a task series are overlooked, and scanning patterns, which are essential for situational awareness, break down (usually due to fixation on a single instrument, object or task). Critical but routine tasks are often skipped.

3.2.2.9 Experience

High levels of NVIS proficiency, along with a well-balanced NVIS experience base, will help to offset many of the visual performance degradations associated with night operations. NVIS experience is a result of proper training coupled with numerous NVIS operations. An experienced NVIS pilot is acutely aware of the NVIS operational envelope and its correlation to various operational effects, visual illusions and performance limitations. This experience base is gained (and maintained) over time through a continual, holistic NVIS training programme that exposes the pilot to NVIS operations conducted under various moon angles, percentage of available illumination, contrast levels, visibility levels, and varying degrees of cloud coverage. A pilot should be exposed to as many of these variations as practicable during the initial NVIS qualification programme. Continued exposure during the NVIS recurrent training will help strengthen and solidify this experience base.
4. operations

Operations procedures should accommodate the capabilities and limitations of the systems described in Section 3 of this GM as well as the restraints of the operational environment.

All NVG operations should fulfill all applicable requirements in accordance with Mauritius Civil Aviation Regulations and MCAR AOCR.

4.1 Pilot eligibility

About 54% of the civil pilot population wears some sort of ophthalmic device to correct vision necessary to safely operate an aircraft. The use of inappropriate ophthalmic devices with NVGs may result in vision performance decrement, fatigue, and other human factor problems, which could result in increased risk for aviation accidents and incidents.

4.2 Operating environment considerations

4.2.1 Weather and atmospheric obscurants

Any atmospheric condition, which absorbs, scatters, or refracts illumination, either before or after it strikes terrain, may reduce the usable energy available to the NVG.

4.2.1.1 Weather

During NVIS operations, pilots can see areas of moisture that are dense (e.g., clouds, thick fog, etc.) but may not see areas that are less dense (e.g., thin fog, light rain showers, etc.). The inability to see some areas of moisture may lead to hazardous flight conditions during NVIS operations and will be discussed separately in the next section.

The different types of moisture will have varying effects and it is important to understand these effects and how they apply to NVIS operations. For example:

1. It is important to know when and where fog may form in the flying area. Typically, coastal, low-lying river, and mountainous areas are most susceptible.

2. Light rain or mist may not be observed with NVIS but will affect contrast, distance estimation, and depth perception. Heavy rain is more easily perceived due to large droplet size and energy attenuation.

3. Snow occurs in a wide range of particle sizes, shapes, and densities. As with clouds, rain, and fog, the denser the airborne snow, the greater the
effect on NVG performance. On the ground, snow has mixed effect depending on terrain type and the illumination level. In mountainous terrain, snow may add contrast, especially if trees and rocks protrude through the snow. In flatter terrain, snow may cover high contrast areas, reducing them to areas of low contrast. On low illumination nights, snow may reflect the available energy better than the terrain it covers and thus increase the level of illumination.

All atmospheric conditions reduce the illumination level to some degree and recognition of this reduction with NVGs can be difficult. Thus, a good weather briefing, familiarity with the local weather patterns and understanding the effects on NVG performance are important for a successful NVIS flight.

4.2.1.2 Deteriorating weather

It is important to remain cognizant of changes in the weather when using NVGs. It is possible to “see through” areas of light moisture when using NVGs, thus increasing the risk of inadvertently entering IMC. Some ways to help reduce this possibility include the following:

1. Be attentive to changes in the NVG image. Halos may become larger and more diffuse due to diffraction of light in moisture. Scintillation in the image may increase due to a lowering of the illumination level caused by the increased atmospheric moisture. Loss of scene detail may be secondary to the lowering illumination caused by the changing moisture conditions.

2. Obtain a thorough weather brief with emphasis on NVG effects prior to flight.

3. Be familiar with weather patterns in the flying area.

4. Occasionally scan the outside scene. The unaided eye may detect weather conditions that are not detectable to the NVG.

Despite the many methods of inadvertent instrument meteorological conditions (IMC) prevention, one should have established IMC recovery procedures and be familiar with them.

4.2.1.3 Airborne obscurants

In addition to weather, there may be other obscurants in the atmosphere that could block energy from reaching the NVG, such as haze, dust, sand, or smoke. As with moisture, the size and concentration of the particles will determine the degree of impact. Examples of these effects include the following:

1. high winds during the day can place a lot of dust in the air that will still be
present at night when the wind may have reduced in intensity;

2. forest fires produce heavy volumes of smoke that may cover areas well away from the fire itself;

3. the effects of rotor wash may be more pronounced when using NVGs depending on the material (e.g. sand, snow, dust, etc.); and

4. pollution in and around major cultural areas may have an adverse effect on NVG performance.

4.2.1.4 Winter operations

Using NVGs during winter conditions provide unique issues and challenges to pilots.

4.2.1.4.1 Snow

Due to the reflective nature of snow, it presents pilots with significant visual challenges both en-route and in the terminal area. During the en-route phase of a flight the snow may cause distractions to the flying pilot if any aircraft external lights (e.g., anti-collision beacons/strobes, position lights, landing lights, etc.) are not compatible with NVGs. In the terminal area, whiteout landings can create the greatest hazard to unaided night operations. With NVGs the hazard is not lessened, and can be more disorienting due to lights reflecting from the snow that is swirling around the aircraft during the landing phase. Any emergency vehicle lighting or other airport lighting in the terminal area may exaggerate the effects.

4.2.1.4.2 Ice fog

Ice fog presents the pilot with hazards normally associated with IMC in addition to problems associated with snow operations. The highly reflective nature of ice fog will further aggravate any lighting problems. Ice fog conditions can be generated by aircraft operations under extremely cold temperatures and the right environmental conditions.

4.2.1.4.3 Icing

Airframe ice is difficult to detect while looking through NVGs. The pilot will need to develop a proper crosscheck to ensure airframe icing does not exceed operating limits for that aircraft. Pilots should already be aware of icing indicator points on their aircraft. These areas require consistent oversight to properly determine environmental conditions.

4.2.1.4.4 Low ambient temperatures
Depending on the cockpit heating system, fogging of the NVGs can be a problem and this will significantly reduce the goggle effectiveness. Another issue with cockpit temperatures is the reduced battery duration. Operations in a cold environment may require additional battery resources.

4.2.2 Illumination

NVGs require illumination, either natural or artificial, to produce an image. Although current NVG technology has significantly improved low light level performance, some illumination, whether natural or artificial, is still required to provide the best possible image.

4.2.2.1 Natural illumination

The main sources of natural illumination include the moon and stars. Other sources can include sky glow, the aurora borealis, and ionisation processes that take place in the upper atmosphere.

4.2.2.1.1 Moon phase

The moon provides the greatest source of natural illumination during night time. Moon phase and elevation determines how much moonlight will be available, while moonrise and moonset times determine when it will be available. Lunar illumination is reported in terms of percent illumination, 100% illumination being full moon. It should be noted that this is different from the moon phase (e.g., 25% illumination does not mean the same thing as a quarter moon). Currently, percent lunar illumination can only be obtained from sources on the Inter- net, military weather facilities and some publications (e.g. Farmers Almanac).

4.2.2.1.2 Lunar azimuth and elevation

The moon can have a detrimental effect on night operations depending on its relationship to the flight path. When the moon is on the same azimuth as the flight path, and low enough to be within or near the NVG field of view, the effect on NVG performance will be similar to that caused by the sun on the unaided eye during day- time. The brightness of the moon drives the NVG gain down, thus reducing image detail. This can also occur with the moon at relatively high elevations. For example, it is possible to bring the moon near the NVG field of view when climbing to cross a ridgeline or other obstacle, even when the moon is at a relatively high elevation. It is important to consider lunar azimuth and elevation during pre-flight planning. Shadowing, another effect of lunar azimuth and elevation, will be discussed separately.

4.2.2.1.3 Shadowing
Moonlight creates shadows during night time just as sunlight creates shadows during daytime. However, night time shadows contain very little energy for the NVG to use in forming an image. Consequently, image quality within a shadow will be degraded relative to that obtained outside the shadowed area. Shadows can be beneficial or can be a disadvantage to operations depending on the situation.

4.2.2.1.3.1 Benefits of shadows

Shadows alert aircrew to subtle terrain features that may not otherwise be noted due to the reduced resolution in the NVG image. This may be particularly important in areas where there is little contrast differentiation; such as flat featureless deserts, where large dry washes and high sand dunes may go unnoticed if there is no contrast to note their presence. The contrast provided by shadows helps make the NVG scene appear more natural.

4.2.2.1.3.2 Disadvantages due to shadows

When within a shadow, terrain detail can be significantly degraded, and objects can be regarding flight in or around shadowed areas is the pilot’s response to loss of terrain detail. During flight under good illumination conditions, a pilot expects to see a certain level of detail. If flight into a shadow occurs while the pilot is preoccupied with other matters (e.g., communication, radar, etc.), it is possible that the loss in terrain detail may not have been immediately noted. Once looking outside again, the pilot may think the reduced detail is due to an increase in flight altitude and thus begin a descent - even though already at a low altitude. Consideration should be given during mission planning to such factors as lunar azimuth and elevation, terrain type (e.g., mountainous, flat, etc.), and the location of items significant to operation success (e.g., ridgelines, pylons, targets, waypoints, etc.). Consideration of these factors will help predict the location of shadows and the potential adverse effects.

4.2.2.1.4 Sky glow

Sky glow is an effect caused by solar light and continues until the sun is approximately 18 degrees below the horizon. When viewing in the direction of sky glow there may be enough energy present to adversely affect the NVG image (i.e., reduce image quality). For the middle latitudes the effect on NVG performance may last up to an hour after official sunset. For more northern and southern latitudes the effect may last for extended periods of times (e.g., days to weeks) during seasons when the sun does not travel far below the horizon. This is an important point to remember if planning NVG operations in those areas. Unlike sky glow after sunset, the sky glow associated with sunrise does not have an obvious effect on NVG performance until fairly close to official sunrise. The difference has to do with the length of time the atmosphere is exposed to the sun's irradiation, which causes ionisation processes that release near-IR energy. It
is important to know the difference in these effects for planning purposes.

4.2.2.2 Artificial illumination

Since the NVGs are sensitive to any source of energy in the visible and near infrared spectrums, there are also many types of artificial illumination sources (e.g., flares, IR searchlights, cultural lighting, etc.). As with any illumination source, these can have both positive and detrimental effects on NVG utilisation. For example, viewing a scene indirectly illuminated by a searchlight can enable the pilot to more clearly view the scene; conversely, viewing the same scene with the searchlight near or within the NVG field of view will reduce the available visual cues. It is important to be familiar with the effects of cultural lighting in the flying area in order to be able to avoid the associated problems and to be able to use the advantages provided. Also, it is important to know how to properly use artificial light sources (e.g., aircraft IR spotlight). It should be noted that artificial light sources may not always be available or dependable, and this should be taken into consideration during flight planning.

4.2.3 Terrain contrast

Contrast is one of the more important influences on the ability to correctly interpret the NVG image, particularly in areas where there are few cultural features. Any terrain that contains varying albedos (e.g., forests, cultivated fields, etc.) will likely increase the level of contrast in a NVG image, thus enhancing detail. The more detail in the image, the more visual information aircrews have for manoeuvring and navigating. Low contrast terrain (e.g., flat featureless desert, snow-covered fields, water, etc.) contains few albedo variations, thus the NVG image will contain fewer levels of contrast and less detail.

4.3 Aircraft considerations

4.3.1 Lighting

Factors such as aircraft internal and external lighting have the potential to adversely impact NVG gain and thus image quality. How well the windshield, canopy, or window panels transmit near infrared energy can also affect the image. Cleanliness of the windshield directly impacts this issue.

4.3.2 Cockpit ergonomics

While wearing NVGs, the pilot may have limited range of head movement in the aircraft. For example, switches on the overhead console may be difficult to read while wearing NVGs. Instruments, controls, and switches that are ordinarily accessible, may now be more difficult to access due to the extended mass (fore/aft) associated with NVGs.
In addition, scanning may require a more concentrated effort due to limited field of view. Lateral viewing motion can be hindered by cockpit obstructions (i.e. door post or seat back design).

4.3.3 Windshield reflectivity

Consideration within the cockpit and cabin should be given to the reflectivity of materials and equipment upon the windshield. Light that is reflected may interfere with a clear and unobstructed view. Items such as flight suits, helmets, and charts, if of a light colour such as white, yellow, and orange, can produce significant reflections. Colours that impart the least reflection are black, purple, and blue. This phenomenon is not limited to windshields but may include side windows, chin bubbles, canopies, etc.

4.4 Generic operating considerations

This section lists operating topics and procedures, which should be considered when employing NVIS. The list and associated comments are not to be considered all inclusive. NVIS operations vary in scope widely and this section is not intended to instruct a prospective operator on how to implement an NVIS programme.

4.4.1 Normal procedures

4.4.1.1 Scanning

When using NVGs there are three different scan patterns to consider and each is used for different reasons: instrument scan, aided scan outside, and unaided scan outside. Normally, all three are integrated and there is a continuous transition from one to the other depending on the mission, environmental conditions, immediate tasking, flight altitude and many other variables. For example, scanning with the NVG will allow early detection of external lights. However, the bloom caused by the lights will mask the aircraft until fairly close or until the lighting scheme is changed. Once close to the aircraft (e.g., approximately one-half mile for smaller aircraft), visual acquisition can possibly be made unaided or with the NVG. Whether to use the NVG or unaided vision depends on many variables (e.g., external lighting configuration, distance to aircraft, size of aircraft, environmental conditions, etc.). The points to be made are that a proper scan depends on the situation and variables present, and that scanning outside is critical when close to another aircraft. Additionally, for a multi-crew environment, coordination of scan responsibilities is vital.

4.4.1.1.1 Instrument crosscheck scan

In order to effect a proper and effective instrument scan, it is important to predict when it will be important. A start can be made during pre-flight planning when critical phases of flight can be identified and prepared for. For example, it may be possible when flying over water or featureless terrain to employ a good instrument crosscheck. However, the most important task is to make the
appropriate decision during flight as conditions and events change. In this case, experience, training and constant attention to the situation are vital contributors to the pilot’s assessment of the situation.

4.4.1.1.2 NVG scan

To counteract the limited field of view, pilots should continually scan throughout the field of regard. This allows aircrew to build a mental image of the surrounding environment. How quickly the outside scene is scanned to update the mental image is determined by many variables. For example, when flying over flat terrain where the highest obstacle is below the flight path, the scan may be fairly slow. However, if flying low altitude in mountainous terrain, the scan will be more aggressive and rapid due to the presence of more information and the increased risk. How much of the field of regard to scan is also determined by many variables. For example, if a pilot is anticipating a turn, more attention may be placed in the area around the turn point, or in the direction of the new heading. In this situation, the scan will be limited briefly to only a portion of the field of regard.

As with the instrument scan, it is very important to plan ahead. It may, for example, be possible to determine when the scan may be interrupted due to other tasks, when it may be possible to become fixated on a specific task, or when it is important to maximise the outside scan. An important lesson to learn regarding the NVG scan is when not to rely on visual information. It is easy to overestimate how well one can see with NVGs, especially on high illumination nights, and it is vital to maintain a constant awareness regarding their limitations. This should be pointed out often during training and, as a reminder, should be included as a briefing item for NVG flights.

4.4.1.1.3 Unaided scan

Under certain conditions, this scan can be as important as the others can. For example, it may be possible to detect distance and/or closure to another aircraft more easily using unaided vision, especially if the halo caused by the external lights is masking aircraft detail on the NVG image. Additionally, there are other times when unaided information can be used in lieu of or can augment NVG and instrument information.

4.4.1.1.4 Scan patterns

Environmental factors will influence scan by limiting what may be seen in specific directions or by degrading the overall image. If the image is degraded, aircrew may scan more aggressively in a subconscious attempt to obtain more information, or to avoid the chance of missing information that suddenly appears and/or disappears. The operation itself may influence the scan pattern. For example, looking for another aircraft, landing zone, or airport may require focusing
the scan in a particular direction. In some cases, the operation may require aircrew in a multi place aircraft to assign particular pilots responsibility for scanning specific sectors.

The restrictions to scan and the variables affecting the scan pattern are not specific to night operations or the use of NVGs, but, due to the NVG's limited field of view, the degree of impact is magnified.

4.4.1.2 Pre-flight planning

4.4.1.2.1 Illumination criteria

The pilot should provide a means for forecasting the illumination levels in the operational area. The pilot should make the effort to request at least the following information in addition to that normally requested for night VFR: cloud cover and visibility during all phases of flight, sunset, civil and nautical twilight, moon phase, moon-rise and moonset, and moon and/or lux illumination levels, and unlit tower NOTAMS.

4.4.1.2.2 NVIS operations

An inspection of the power pack, visor, mount, power cable and the binocular assembly should be performed in accordance with the operations manual.

To ensure maximum performance of the NVGs, proper alignment and focus must be accomplished following the equipment inspection. Improper alignment and focus may degrade NVIS performance.

4.4.1.2.3 Aircraft pre-flight

A normal pre-flight inspection should be conducted prior to an NVIS flight with emphasis on proper operation of the NVIS lighting. The aircraft windshield must also be clean and free of major defects, which might degrade NVIS performance.

4.4.1.2.4 Equipment

The basic equipment required for NVIS operations should be those instruments and equipment specified within the current applicable regulations for VFR night operations. Additional equipment required for NVIS operations, e.g. NVIS lighting system and a radio altimeter must be installed and operational. All NVIS equipment, including any subsequent modifications, shall be approved.

4.4.1.2.5 Risk assessment

A risk assessment is suggested prior to any NVIS operation. The risk assessment should include as a minimum:
1. illumination level
2. weather
3. pilot recency of experience
4. pilot experience with NVG operations
5. pilot vision
6. pilot rest condition and health
7. windshield/window condition
8. NVG tube performance
9. NVG battery condition
10. types of operations allowed
11. external lighting environment.

4.4.1.3 Flight operations

4.4.1.3.1 Elevated terrain

Safety may be enhanced by NVGs during operations near elevated terrain at night. The obscuration of elevated terrain is more easily detected with NVGs thereby allowing the pilot to make alternate flight path decisions.

4.4.1.3.2 Over-water

Flying over large bodies of water with NVGs is difficult because of the lack of contrast in terrain features. Reflections of the moon or starlight may cause disorientation with the natural horizon. The radio altimeter must be used as a reference to maintain altitude.

4.4.1.4 Remote area considerations

A remote area is a site that does not qualify as an aerodrome as defined by the applicable regulations. Remote area landing sites do not have the same features as an aerodrome, so extra care must be given to locating any obstacles that may be in the approach/departure path.

A reconnaissance must be made prior to descending at an unlighted remote site. Some features or objects may be easy to detect and interpret with the unaided eye.
Other objects will be invisible to the unaided eye, yet easily detected and evaluated with NVGs.

4.4.1.5 Reconnaissance

The reconnaissance phase should involve the coordinated use of NVGs and white lights. The aircraft’s external white lights such as landing lights, searchlights, and floodlights, should be used during this phase of flight. The pilot should select and evaluate approach and departure paths to the site considering wind speed and direction, and obstacles or signs of obstacles.

4.4.1.6 Sources of high illumination

Sources of direct high illumination may have the potential to reduce the effectiveness of the NVGs. In addition, certain colour lights, such as red, will appear brighter, closer and may display large halos.

4.4.2 Emergency procedures

No modification for NVG operations is necessary to the aircraft emergency procedures as approved in the operations manual or approved checklist. Special training may be required to accomplish the appropriate procedures.

4.4.3 Inadvertent IMC

Some ways to help reduce the potential for inadvertent flight into IMC conditions are:

1. obtaining a thorough weather brief (including pilot reports);
2. being familiar with weather patterns in the local flying area; and
3. by looking beneath the NVG at the outside scene.

However, even with thorough planning a risk still exists. To help mitigate this risk it is important to know how to recognise subtle changes to the NVG image that occur during entry into IMC conditions. Some of these include the onset of scintillation, loss of scene detail, and changes in the appearance of halos.

5. Training

To provide an appropriate level of safety, training procedures must accommodate the capabilities and limitations of the systems described in Section 3 of this GM as well as the restraints of the operational environment.

To be effective, the NVIS training philosophy would be based on a two-tiered
approach: basic and advanced NVIS training. The basic NVIS training would serve as the baseline standard for all individuals seeking an NVIS endorsement. The content of this initial training would not be dependent on any operational requirements. The advanced training would build on the basic training by focusing on developing specialised skills required to operate an aircraft during NVIS operations in a particular operational environment. Furthermore, while there is a need to stipulate minimum flight hour requirements for an NVIS endorsement, the training must also be event based. This necessitates that pilots be exposed to all of the relevant aspects, or events, of NVIS flight in addition to acquiring a minimum number of flight hours.

6. Continuing airworthiness

The reliability of the NVIS and safety of operations are dependent on the pilots adhering to the instructions for continuing airworthiness. Personnel who conduct the maintenance and inspection on the NVIS must be qualified and possess the appropriate tools and facilities to perform the maintenance.

ACRONYMS USED IN THIS GM

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<td>VA</td>
<td>visual acuity</td>
</tr>
<tr>
<td>VFR</td>
<td>visual flight rules</td>
</tr>
<tr>
<td>VMC</td>
<td>visual meteorological conditions</td>
</tr>
</tbody>
</table>

**Glossary of terms used in this GM**

1. ‘Absorptance’: the ratio of the radiant energy absorbed by a body to that incident upon it.

2. ‘Albedo’: the ratio of the amount of light reflected from a surface to the
amount of incident light.

3. ‘Automatic brightness control (ABC)’: one of the automatic gain control circuits found in second and third generation NVG devices. It attempts to provide consistent image output brightness by automatic control of the micro channel plate voltage.

4. ‘Automatic gain control (AGC)’: comprised of the automatic brightness control and bright source protection circuits. Is designed to maintain image brightness and protect the user and the image tube from excessive light levels. This is accomplished by controlling the gain of the intensifier tube.

5. ‘Blackbody’: an ideal body of surface that completely absorbs all radiant energy falling upon with no reflection.

6. ‘Blooming’: common term used to denote the “washing out” of all or part of the NVG image due to de-gaining of the image intensifier tube when a bright light source is in or near the NVG field of view.

7. ‘Bright source protection (BSP)’: protective feature associated with second and third generation NVGs that protects the intensifier tube and the user by controlling the voltage at the photo cathode.

8. ‘Brownout’: condition created by blowing sand, dust, etc., which can cause the pilots to lose sight of the ground. This is most commonly associated with landings in the desert or in dusty LZs.

9. ‘Civil nautical twilight’: the time when the true altitude of the center of the sun is six degrees below the horizon. Illuminance level is approximately 3.40 lux and is above the usable level for NVG operations.

10. ‘Diopter’: a measure of the refractive (light bending) power of a lens.

11. ‘Electro-optics (EO)’: the term used to describe the interaction between optics and electronics, leading to transformation of electrical energy into light or vice versa.

12. ‘Electroluminescent (EL)’: referring to light emission that occurs from application of an alternating current to a layer of phosphor.

13. ‘Foot-candle’: a measure of illuminance; specifically, the illuminance of a surface upon which one lumen is falling per square foot.

14. ‘Foot-Lambert’: a measure of luminance; specifically the luminance of a surface that is receiving an illuminance of one foot-candle.

15. ‘Gain’: when referring to an image intensification tube, the ratio of the
brightness of the output in units of foot-lambert, compared to the illumination of the input in foot-candles. A typical value for a GEN III tube is 25,000 to 30,000 Fl/fc. A “tube gain” of 30,000 Fl/fc provides an approximate “system gain” of 3,000. This means that the intensified NVG image is 3,000 times brighter to the aided eye than that of the unaided eye.

16. ‘Illuminance’: also referred to as illumination. The amount, ratio or density of light that strikes a surface at any given point.

17. ‘Image intensifier’: an electro-optic device used to detect and intensify optical images in the visible and near infrared region of the electromagnetic spectrum for the purpose of providing visible images. The component that actually performs the intensification process in a NVG. This component is composed of the photo cathode, MCP, screen optic, and power supply. It does not include the objective and eyepiece lenses.

18. ‘Incandescent’: refers to a source that emits light based on thermal excitation, i.e., heating by an electrical current, resulting in a very broad spectrum of energy that is dependent primarily on the temperature of the filament.

19. ‘Infrared’: that portion of the electromagnetic spectrum in which wavelengths range from 0.7 microns to 1 mm. This segment is further divided into near infrared (0.7-3.0 microns), mid infrared (3.0-6.0 microns), far infrared (6.0-15 microns), and extreme infrared (15 microns-1 mm). A NVG is sensitive to near infrared wavelengths approaching 0.9 microns.

20. ‘Irradiance’: the radiant flux density incident on a surface. For the purpose of this document the terms irradiance and illuminance shall be interchangeable.

21. ‘Lumen’: a measurement of luminous flux equal to the light emitted in a unit solid angle by a uniform point source of one candle intensity.

22. ‘Luminance’: the luminous intensity (reflected light) of a surface in a given direction per unit of projected area. This is the energy used by NVGs.

23. ‘Lux’: a unit measurement of illumination. The illuminance produced on a surface that is one-meter square, from a uniform point source of one candle intensity, or one lumen per square meter.

24. ‘Microchannel plate’: a wafer containing between 3 and 6 million specially treated microscopic glass tubes designed to multiply electrons passing from the photo cathode to the phosphor screen in second and third generation intensifier tubes.
25. ‘Micron’: a unit of measure commonly used to express wavelength in the infrared region; equal to one millionth of a meter.

26. ‘Nanometer (nm)’: a unit of measure commonly used to express wavelength in the visible and near infra-red region; equal to one billionth of a meter.

27. ‘Night vision device (NVD)’: an electro-optical device used to provide a visible image using the electro-magnetic energy available at night.

28. ‘Photon’: a quantum (basic unit) of radiant energy (light).

29. ‘Photopic vision’: vision produced as a result of the response of the cones in the retina as the eye achieves a light adapted state (commonly referred to as day vision).

30. ‘Radiance’: the flux density of radiant energy reflected from a surface. For the purposes of this manual the terms radiance and luminance shall be interchangeable.

31. ‘Reflectivity’: the fraction of energy reflected from a surface.

32. ‘Scotopic vision’: that vision produced as a result of the response of the rods in the retina as the eye achieves a dark-adapted state (commonly referred to as night vision).

33. ‘Situational awareness (SA)’: degree of perceptual accuracy achieved in the comprehension of all factors affecting an aircraft and crew at a given time.

34. ‘Starlight’: the illuminance provided by the available (observable) stars in a subject hemisphere. The stars provide approximately 0.00022 lux ground illuminance on a clear night. This illuminance is equivalent to about one-quarter of the actual light from the night sky with no moon.

35. ‘Stereopsis’: visual system binocular cues that are used for distance estimation and depth perception. Three dimensional visual perception of objects. The use of NVGs seriously degrades this aspect of near-depth perception.

36. ‘Transmittance’: the fraction of radiant energy that is transmitted through a layer of absorbing material placed in its path.

37. ‘Ultraviolet’: that portion of the electromagnetic spectrum in which wavelengths range between 0.1 and 0.4 microns.

38. ‘Wavelength’: the distance in the line of advance of a wave from any one
point to the next point of corresponding phase; is used to express electromagnetic energy including IR and visible light.

39. ‘Whiteout’: a condition similar to brownout but caused by blowing snow.

References


15. Simpson, Carol Dr., William, Doug., Gardner, Donald., Haworth, Loran., Analysis

C HELICOPTER HOIST OPERATIONS

AOCR.SPA.HHO.100 Helicopter hoist operations (HHO)

(a) Helicopters shall only be operated for the purpose of CAT hoist operations if the operator has been approved by the Authority.

(b) To obtain such approval by the Authority, the operator shall:

(1) operate in Commercial Air Transport and hold an AOC in accordance with MCAR AOCR

(2) demonstrate to the Authority compliance with the requirements contained in this Subpart.

AOCR.SPA.HHO.110 Equipment Requirements For HHO

(a) The installation of all helicopter hoist equipment, including any radio equipment to comply with AOCR.SPA.HHO.115, and any subsequent modifications, shall have an airworthiness approval appropriate to the intended function. Ancillary equipment shall be designed and tested to the appropriate standard as required by the Authority.

(b) Maintenance instructions for HHO equipment and systems shall be established by the operator in liaison with the manufacturer and included in the operator’s helicopter maintenance programme as required by MCAR-PART M.

AMC1 AOCR.SPA.HHO.110 (a) Equipment Requirements For HHO

AIRWORTHINESS APPROVAL FOR HUMAN EXTERNAL CARGO

(a) Hoist installations that have been certificated according to any of the following standards should be considered to satisfy the airworthiness criteria for human external cargo (HEC) operations:

(1) CS 27.865 or CS 29.865;

(2) JAR 27 Amendment 2 (27.865) or JAR 29 Amendment 2 (29.865) or later;

(3) FAR 27 Amendment 36 (27.865) or later - including compliance with CS 27.865(c) (6); or

(4) FAR 29 Amendment 43 (29.865) or later.
(b) Hoist installations that have been certified prior to the issuance of the airworthiness criteria for HEC as defined in (a) may be considered as eligible for HHO provided that following a risk assessment either:

(1) the service history of the hoist installation is found satisfactory to the Authority; or

(1) for hoist installations with an unsatisfactory service history, additional substantiation to allow acceptance by the Authority should be provided by the hoist installation certificate holder (type certificate (TC) or supplemental type certificate (STC)) on the basis of the following requirements:

(i) The hoist installation should withstand a force equal to a limit static load factor of 3.5, or some lower load factor, not less than 2.5, demonstrated to be the maximum load factor expected during hoist operations, multiplied by the maximum authorised external load.

(ii) The reliability of the primary and back-up quick release systems at helicopter level should be established and failure mode and effect analysis at equipment level should be available. The assessment of the design of the primary and back-up quick release systems should consider any failure that could be induced by a failure mode of any other electrical or mechanical rotorcraft system.

(iii) The operations or flight manual contains one-engine-inoperative (OEI) hover performance data and procedures for the weights, altitudes, and temperatures throughout the flight envelope for which hoist operations are accepted.

(iv) Information concerning the inspection intervals and retirement life of the hoist cable should be provided in the instructions for continued airworthiness.

(v) Any airworthiness issue reported from incidents or accidents and not addressed by (i), (ii), (iii) and (iv) should be addressed.

**AOCR.SPA.HHO.115 HHO Communication**

Two-way radio communication shall be established with the organisation for
which the HHO is being provided and, where possible, a means of communicating with ground personnel at the HHO site for:

(a) day and night offshore operations;

(b) night onshore operations, except for HHO at a helicopter emergency medical services (HEMS) operating site.

**AOCR.SPA.HHO.125 Performance Requirements For HHO**

Except for HHO at a HEMS operating site, HHO shall be capable of sustaining a critical engine failure with the remaining engine(s) at the appropriate power setting without hazard to the suspended person(s)/cargo, third parties or property.

**AOCR.SPA.HHO.130 Crew Requirements For HHO**

(a) Selection. The operator shall establish criteria for the selection of flight crew members for the HHO task, taking previous experience into account.

(b) Experience. The minimum experience level for the commander conducting HHO flights shall not be less than:

1. **Offshore:**
   
   (i) 1 000 hours as pilot-in-command/commander of helicopters, or 1 000 hours as co-pilot in HHO of which 200 hours is as pilot-in-command under supervision; and

   (ii) 50 hoist cycles conducted offshore, of which 20 cycles shall be at night if night operations are being conducted, where a hoist cycle means one down-and-up cycle of the hoist hook.

2. **Onshore:**

   (i) 500 hours as pilot-in-command/commander of helicopters, or 500 hours as co-pilot in HHO of which 100 hours is as pilot-in-command under supervision;

   (ii) 200 hours operating experience in helicopters gained in an operational environment similar to the intended operation; and

   (iii) 50 hoist cycles, of which 20 cycles shall be at night if night operations are being conducted.
Operational training and experience. Successful completion of training in accordance with the HHO procedures contained in the operations manual and relevant experience in the role and environment under which HHO are conducted.

Recency. All pilots and HHO crew members conducting HHO shall have completed in the last 90 days:

(1) when operating by day: any combination of three day or night hoist cycles, each of which shall include a transition to and from the hover;

(2) when operating by night: three night hoist cycles, each of which shall include a transition to and from the hover.

Crew composition. The minimum crew for day or night operations shall be as stated in the operations manual. The minimum crew will be dependent on the type of helicopter, the weather conditions, the type of task, and, in addition for offshore operations, the HHO site environment, the sea state and the movement of the vessel. In no case shall the minimum crew be less than one pilot and one HHO crew member.

Training and checking

(1) Training and checking shall be conducted in accordance with a detailed syllabus approved by the Authority and included in the operations manual.

(2) Crew members

(i) Crew training programmes shall: improve knowledge of the HHO working environment and equipment; improve crew coordination; and include measures to minimise the risks associated with HHO normal and emergency procedures and static discharge.

(ii) The measures referred to in (f)(2)(i) shall be assessed during visual meteorological conditions (VMC) day proficiency checks, or VMC night proficiency checks when night HHO are undertaken by the operator.
RELEVANT EXPERIENCE

The experience considered should take into account the geographical characteristics (sea, mountain, big cities with heavy traffic, etc.).

**AMC1 AOCR.SPA.HHO.130 (e)  Crew Requirements For HHO**

**CRITERIA FOR TWO PILOT HHO**

A crew of two pilots should be used when:

(a) the weather conditions are below VFR minima at the offshore vessel or structure;

(b) there are adverse weather conditions at the HHO site (i.e. turbulence, vessel movement, visibility); and

(c) the type of helicopter requires a second pilot to be carried because of:

   (1) cockpit visibility;

   (2) handling characteristics; or

   (3) lack of automatic flight control systems.

**AMC1 AOCR.SPA.HHO.130 (f) (1)  Crew Requirements For HHO**

**TRAINING AND CHECKING SYLLABUS**

(a) The flight crew training syllabus should include the following items:

   (1) fitting and use of the hoist;

   (2) preparing the helicopter and hoist equipment for HHO;

   (3) normal and emergency hoist procedures by day and, when required, by night;

   (4) crew coordination concepts specific to HHO;

   (5) practice of HHO procedures; and

   (6) the dangers of static electricity discharge.

(b) The flight crew checking syllabus should include:
(1) proficiency checks, which should include procedures likely to be used at HHO sites with special emphasis on:

(i) local area meteorology;
(ii) HHO flight planning;
(iii) HHO departures;
(iv) a transition to and from the hover at the HHO site;
(v) normal and simulated emergency HHO procedures; and
(vi) crew coordination.

(c) HHO technical crew members should be trained and checked in the following items:

(1) duties in the HHO role;
(2) fitting and use of the hoist;
(3) operation of hoist equipment;
(4) preparing the helicopter and specialist equipment for HHO;
(5) normal and emergency procedures;
(6) crew coordination concepts specific to HHO;
(7) operation of inter-communication and radio equipment;
(8) knowledge of emergency hoist equipment;
(9) techniques for handling HHO passengers;
(10) effect of the movement of personnel on the centre of gravity and mass during HHO;
(11) effect of the movement of personnel on performance during normal and emergency flight conditions;
(12) techniques for guiding pilots over HHO sites;
(13) awareness of specific dangers relating to the operating environment; and
(14) the dangers of static electricity discharge.

**AOCR.SPA.HHO.135  HHO Passenger Briefing**

Prior to any HHO flight, or series of flights, HHO passengers shall have been briefed and made aware of the dangers of static electricity discharge and other HHO considerations.

**AOCR.SPA.HHO.140  Information And Documentation**

(a) The operator shall ensure that, as part of its risk analysis and management process, risks associated with the HHO environment are minimised by specifying in the operations manual: selection, composition and training of crews; levels of equipment and dispatch criteria; and operating procedures and minima, such that normal and likely abnormal operations are described and adequately mitigated.

(b) Relevant extracts from the operations manual shall be available to the organisation for which the HHO is being provided.

**AMC1 AOCR.SPA.HHO.140  Information And Documentation**

**OPERATIONS MANUAL**

The operations manual should include:

(a) performance criteria;

(b) if applicable, the conditions under which offshore HHO transfer may be conducted including the relevant limitations on vessel movement and wind speed;

(c) the weather limitations for HHO;

(d) the criteria for determining the minimum size of the HHO site, appropriate to the task;

(e) the procedures for determining minimum crew; and

(f) the method by which crew members record hoist cycles.
D HELICOPTER EMERGENCY MEDICAL SERVICES

AOCR.SPA.HEMS.100 Helicopter Emergency Medical Service (HEMS) Operations

(a) Helicopters shall only be operated for the purpose of HEMS operations if the operator has been approved by the Authority.

(b) To obtain such approval by the Authority, the operator shall:

(1) operate in CAT and hold a AOC in accordance with MCAR AOCR

(2) demonstrate to the Authority compliance with the requirements contained in this Subpart.

GM1 AOCR.SPA.HEMS.100 (a) Helicopter emergency medical service (Hems) operations

THE HEMS PHILOSOPHY (a) Introduction

This GM outlines the HEMS philosophy. Starting with a description of acceptable risk and introducing a taxonomy used in other industries, it describes how risk has been addressed in this Subpart to provide a system of safety to the appropriate standard. It discusses the difference between HEMS and air ambulance - in regulatory terms. It also discusses the application of operations to public interest sites in the HEMS context.

(b) Acceptable risk

The broad aim of any aviation legislation is to permit the widest spectrum of operations with the mini- mum risk. In fact it may be worth considering who/what is at risk and who/what is being protected. In this view three groups are being protected:

(1) third parties (including property) - highest protection;

(2) passengers (including patients); and

(2) crew members (including technical crew members) – lowest.

It is for the Legislator to facilitate a method for the assessment of risk - or as it is more commonly known, safety management.

(c) Risk management

Safety management textbooks describe four different approaches to the
management of risk. All but the first have been used in the production of this section and, if it is considered that the engine failure accountability of performance class 1 equates to zero risk, then all four are used (this of course is not strictly true as there are a number of helicopter parts - such as the tail rotor which, due to a lack of redundancy, cannot satisfy the criteria):

(1) Applying the taxonomy to HEMS gives:

(i) zero risk; no risk of accident with a harmful consequence – performance class 1 (within the qualification stated above) - the HEMS operating base;

(ii) de minimise; minimised to an acceptable safety target - for example the exposure time concept where the target is less than $5 \times 10^{-5}$ (in the case of elevated final approach and take-off areas (elevated FATO) at hospitals in a congested hostile environment the risk is contained to the deck edge strike case - and so in effect minimised to an exposure of seconds);

(iii) comparative risk; comparison to other exposure - the carriage of a patient with a spinal injury in an ambulance that is subject to ground effect compared to the risk of a HEMS flight (consequential and comparative risk);

(iv) as low as reasonably practicable; where additional controls are not economically or reason- ably practicable - operations at the HEMS operating site (the accident site).

(2) HEMS operations are conducted in accordance with the requirements contained in MCAR AOCR, except for the variations contained in AOCR.SPA.HEMS, for which a specific approval is required. In simple terms there are three areas in HEMS operations where risk, beyond that allowed in MCAR AOCR, are identified and related risks accepted:

(i) in the en-route phase, where alleviation is given from height and visibility rules;

(ii) at the accident site, where alleviation is given from the performance and size requirement; and

(iii) at an elevated hospital site in a congested hostile environment, where alleviation is given from the deck edge
strike - providing elements of the AOCR.POL.H.305 are satisfied.

In mitigation against these additional and considered risks, experience levels are set, specialist training is required (such as instrument training to compensate for the increased risk of inadvertent entry into cloud) and operation with two crew (two pilots, or one pilot and a HEMS technical crew member) is mandated. (HEMS crews and medical passengers are also expected to operate in accordance with good crew resource management (CRM) principles.

(d) Air ambulance

In regulatory terms, air ambulance is considered to be a normal transport task where the risk is no higher than for operations to the full MCAR AOCR compliance. This is not intended to contradict/complement medical terminology but is simply a statement of policy; none of the risk elements of HEMS should be extant and therefore none of the additional requirements of HEMS need be applied.

To provide a road ambulance analogy:

(1) if called to an emergency: an ambulance would proceed at great speed, sounding its siren and proceeding against traffic lights - thus matching the risk of operation to the risk of a potential death (= HEMS operations);

(2) for a transfer of a patient (or equipment) where life and death (or consequential injury of ground transport) is not an issue: the journey would be conducted without sirens and within normal rules of motoring once again matching the risk to the task (= air ambulance operations).

The underlying principle is that the aviation risk should be proportionate to the task.

It is for the medical professional to decide between HEMS or air ambulance - not the pilot. For that reason, medical staff who undertake to task medical sorties should be fully aware of the additional risks that are (potentially) present under HEMS operations (and the pre-requisite for the operator to hold a HEMS approval). (For example in some countries, hospitals have principal and alternative sites. The patient may be landed at the safer alternative site (usually in the grounds of the hospital) thus eliminating risk - against the small inconvenience of a short ambulance transfer from the site to the hospital.)
Once the decision between HEMS or air ambulance has been taken by the medical professional, the commander makes an operational judgement over the conduct of the flight.

Simplistically, the above type of air ambulance operations could be conducted by any operator holding an AOC (HEMS operators hold an AOC) - and usually are when the carriage of medical supplies (equipment, blood, organs, drugs etc.) is undertaken and when urgency is not an issue.

(e) Operating under a HEMS approval

There are only two possibilities: transportation as passengers or cargo under the full auspices of OPS.CAT and Part-ORO (this does not permit any of the alleviations of SPA. HEMS - landing and take-off performance should be in compliance with the performance Subparts of Part-CAT), or operations under a HEMS approval as contained in this Subpart.

(f) HEMS operational sites

The HEMS philosophy attributes the appropriate levels of risk for each operational site; this is derived from practical considerations and in consideration of the probability of use. The risk is expected to be inversely proportional to the amount of use of the site. The types of site are as follows:

(1) HEMS operating base: from which all operations will start and finish. There is a high probability of a large number of take-offs and landings at this HEMS operating base and for that reason no alleviation from operating procedures or performance rules are contained in this Subpart.

(2) HEMS operating site: because this is the primary pick-up site related to an incident or accident, its use can never be pre-planned and therefore attracts alleviations from operating procedures and performance rules, when appropriate.

(3) The hospital site: is usually at ground level in hospital grounds or, if elevated, on a hospital building. It may have been established during a period when performance criteria were not a consideration. The amount of use of such sites depends on their location and their facilities; normally, it will be greater than that of the HEMS operating site but less than for a HEMS operating base. Such sites attract some alleviation under this Subpart.

(g) Problems with hospital sites
During implementation of the original HEMS rules contained in JAR-OPS 3, it was established that a number of States had encountered problems with the impact of performance rules where helicopters were operated for HEMS. Although States accept that progress should be made towards operations where risks associated with a critical engine failure are eliminated, or limited by the exposure time concept, a number of landing sites exist that do not (or never can) allow operations to performance class 1 or 2 requirements.

These sites are generally found in a congested hostile environment:

(1) in the grounds of hospitals; or

(2) on hospital buildings.

The problem of hospital sites is mainly historical and, whilst the authority could insist that such sites are not used - or used at such a low weight that critical engine failure performance is assured it would seriously curtail a number of existing operations.

Even though the rule for the use of such sites in hospital grounds for HEMS operations attracts alleviation, it is only partial and will still impact upon present operations.

Because such operations are performed in the public interest, it was felt that the authority should be able to exercise its discretion so as to allow continued use of such sites provided that it is satisfied that an adequate level of safety can be maintained - notwithstanding that the site does not allow operations to performance class 1 or 2 standards. However, it is in the interest of continuing improvements in safety that the alleviation of such operations be constrained to existing sites, and for a limited period.

It is felt that the use of public interest sites should be controlled. This will require that a State directory of sites be kept and approval given only when the operator has an entry in the route manual section of the operations manual.

The directory (and the entry in the operations manual) should contain for each approved site:

(i) the dimensions;

(ii) any non-conformance with ICAO Annex 14;

(iii) the main risks; and
(iv) the contingency plan should an incident occur.

Each entry should also contain a diagram (or annotated photograph) showing the main aspects of the site.

(h) Summary

In summary, the following points are considered to be pertinent to the HEMS philosophy and HEMS regulations:

1. absolute levels of safety are conditioned by society;
2. potential risk must only be to a level proportionate to the task;
3. protection is afforded at levels appropriate to the occupants;
4. this Subpart addresses a number of risk areas and mitigation is built in;
5. only HEMS operations are dealt with by this Subpart;
6. there are three main categories of HEMS sites and each is addressed appropriately; and
7. State alleviation from the requirement at a hospital site is available but such alleviations should be strictly controlled by a system of registration.

AOCR.SPA.HEMS.110 Equipment Requirements For HEMS Operations

The installation of all helicopter dedicated medical equipment and any subsequent modifications and, where appropriate, its operation shall be approved in accordance with MCAR-PART-21

AOCR.SPA.HEMS.115 Communication

In addition to that required by CAT.IDE.H, helicopters conducting HEMS flights shall have communication equipment capable of conducting two-way communication with the organisation for which the HEMS is being conducted and, where possible, to communicate with ground emergency service personnel.

AOCR.SPA.HEMS.120 HEMS operating minima

(a) HEMS flights operated in performance class 1 and 2 shall comply with the weather minima in Table 1 for dispatch and en-route phase of the HEMS flight. In the event that during the en-route phase the weather conditions
fall below the cloud base or visibility minima shown, helicopters certified for flights only under VMC shall abandon the flight or return to base. Helicopters equipped and certified for instrument meteorological conditions (IMC) operations may abandon the flight, return to base or convert in all respects to a flight conducted under instrument flight rules (IFR), provided the flight crew are suitably qualified.

Table 1: Hems Operating Minima

<table>
<thead>
<tr>
<th>2 pilots</th>
<th>1 pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DAY</strong></td>
<td></td>
</tr>
<tr>
<td>Ceiling</td>
<td>Visibility</td>
</tr>
<tr>
<td>500 ft and above</td>
<td>As defined by the applicable airspace VFR minima</td>
</tr>
<tr>
<td>499 – 400 ft</td>
<td>1 000 m*</td>
</tr>
<tr>
<td>399 – 300 ft</td>
<td>2 000 m</td>
</tr>
<tr>
<td><strong>NIGHT</strong></td>
<td></td>
</tr>
<tr>
<td>Cloud base</td>
<td>Visibility</td>
</tr>
<tr>
<td>1 200 ft**</td>
<td>2 500 m</td>
</tr>
</tbody>
</table>

* During the en-route phase visibility may be reduced to 800 m for short periods when in sight of land if the helicopter is manoeuvred at a speed that will give adequate opportunity to observe any obstacles in time to avoid a collision.

** During the en-route phase, cloud base may be reduced to 1 000 ft for short periods.

(b) The weather minima for the dispatch and en-route phase of a HEMS flight operated in performance class 3 shall be a cloud ceiling of 600 ft and a visibility of 1 500 m. Visibility may be reduced to 800 m for short periods when in sight of land if the helicopter is manoeuvred at a speed that will give adequate opportunity to observe any obstacle and avoid a collision.

**GM1 SPA.HEMS.120 HEMS Operating Minima**

**REDUCED VISIBILITY**
(a) In the rule the ability to reduce the visibility for short periods has been included. This will allow the commander to assess the risk of flying temporarily into reduced visibility against the need to provide emergency medical service, taking into account the advisory speeds included in Table 1. Since every situation is different it was not felt appropriate to define the short period in terms of absolute figures. It is for the commander to assess the aviation risk to third parties, the crew and the aircraft such that it is proportionate to the task, using the principles of GM1 AOCR.SPA.HEMS.100.

(b) 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 so as to allow adequate opportunity to see and avoid obstacles (see table below).

Table 1: Operating Minima – Reduced Visibility

<table>
<thead>
<tr>
<th>Visibility (m)</th>
<th>Advisory Speed (Kt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>800</td>
<td>50</td>
</tr>
<tr>
<td>1 500</td>
<td>100</td>
</tr>
<tr>
<td>2 000</td>
<td>120</td>
</tr>
</tbody>
</table>

AOCR.SPA.HEMS.125 Performance Requirements For HEMS Operations

(a) Performance class 3 operations shall not be conducted over a hostile environment.

(b) Take-off and landing

(1) Helicopters conducting operations to/from a final approach and take-off area (FATO) at a hospital that is located in a congested hostile environment and that is used as a HEMS operating base shall be operated in accordance with performance class 1.

(2) Helicopters conducting operations to/from a FATO at a hospital that is located in a congested hostile environment and that is not a HEMS operating base shall be operated in accordance with performance class 1, except when the operator holds an approval in accordance with AOCR.POL.H.225.

(3) Helicopters conducting operations to/from a HEMS operating site located in a hostile environment shall be operated in accordance with performance class 2 and be exempt from the approval.
required by AOCR.POL.H.305 (a), provided compliance is shown with AOCR.POL.H.305 (b)(2) and (b)(3).

(4) The HEMS operating site shall be big enough to provide adequate clearance from all obstructions. For night operations, the site shall be illuminated to enable the site and any obstructions to be identified.

**GM1 AOCR.SPA.HEMS.125 (b) (3) Performance Requirements For HEMS Operations**

**PERFORMANCE CLASS 2 OPERATIONS AT A HEMS OPERATING SITE**

As the risk profile at a HEMS operating site is already well known, operations without an assured safe forced landing capability do not need a separate approval and the requirements does not call for the additional risk assessment that is specified in AOCR.POL.H.305 (b)(1).

**AMC1 AOCR.SPA.HEMS.125 (b) (4) Performance Requirements For HEMS Operations**

**HEMS OPERATING SITE DIMENSIONS**

(a) When selecting a HEMS operating site it should have a minimum dimension of at least 2 x D (the largest dimensions of the helicopter when the rotors are turning). For night operations, unsurveyed HEMS operating sites should have dimensions of at least 4 x Din length and 2 x Din width.

(b) For night operations, the illumination may be either from the ground or from the helicopter.

**AOCR.SPA.HEMS.130 Crew Requirements**

(a) Selection. The operator shall establish criteria for the selection of flight crew members for the HEMS task, taking previous experience into account.

(b) Experience. The minimum experience level for the commander conducting HEMS flights shall not be less than:

(1) either:

   (i) 1000 hours as pilot-in-command/commander of aircraft of which 500 hours are as pilot-in- command/commander on helicopters; or
(ii) 1000 hours as co-pilot in HEMS operations of which 500 hours are as pilot-in-command under supervision and 100 hours pilot-in-command/commander of helicopters;

(2) 500 hours’ operating experience in helicopters, gained in an operational environment similar to the intended operation; and

(3) for pilots engaged in night operations, 20 hours of VMC at night as pilot-in-command/commander.

(c) Operational training. Successful completion of operational training in accordance with the HEMS procedures contained in the operations manual.

(d) Recency. All pilots conducting HEMS operations shall have completed a minimum of 30 minutes’ flight by sole reference to instruments in a helicopter or in an FSTD within the last 6 months.

(e) Crew composition

(1) Day flight. The minimum crew by day shall be one pilot and one HEMS technical crew member.

(i) This may be reduced to one pilot only when:

(A) at a HEMS operating site the commander is required to fetch additional medical supplies. In such case the HEMS technical crew member may be left to give assistance to ill or injured persons while the commander undertakes this flight;

(B) after arriving at the HEMS operating site, the installation of the stretcher precludes the HEMS technical crew member from occupying the front seat; or

(C) the medical passenger requires the assistance of the HEMS technical crew member in flight.

(ii) In the cases described in (i), the operational minima shall be as defined by the applicable air-space requirements; the HEMS operating minima contained in Table 1 of SPA.HEMS.120 shall not be used.

(iii) Only in the case described in (i) (A) may the commander land
at a HEMS operating site with-out the technical crew member assisting from the front seat.

(2) Night flight. The minimum crew by night shall be:

(i) two pilots; or

(ii) one pilot and one HEMS technical crew member in specific geographical areas defined by the operator in the operations manual taking into account the following:

(A) adequate ground reference;

(B) flight following system for the duration of the HEMS mission;

(C) reliability of weather reporting facilities;

(D) HEMS minimum equipment list;

(E) continuity of a crew concept;

(F) minimum crew qualification, initial and recurrent training;

(G) operating procedures, including crew coordination;

(H) weather minima; and

(I) additional considerations due to specific local conditions.

(f) Crew training and checking

(1) Training and checking shall be conducted in accordance with a detailed syllabus approved by the Authority and included in the operations manual.

(2) Crew members

(i) Crew training programmes shall: improve knowledge of the HEMS working environment and equipment; improve crew coordination; and include measures to minimise the risks associated with en-route transit in low visibility conditions, selection of HEMS operating sites and approach
and departure profiles.

(ii) The measures referred to in (f) (2) (i) shall be assessed during:

(A) VMC day proficiency checks, or VMC night proficiency checks when night HEMS operations are undertaken by the operator; and

(B) line checks.

**AMC1 AOCR.SPA.HEMS.130 (b) (2) Crew Requirements**

**EXPERIENCE**

The minimum experience level for a commander conducting HEMS flights should take into account the geo-graphical characteristics of the operation (sea, mountain, big cities with heavy traffic, etc.).

**AMC1 AOCR.SPA.HEMS.130 (d) Crew Requirements**

**RECENCY**

This recency may be obtained in a visual flight rules (VFR) helicopter using vision limiting devices such as goggles or screens, or in an FSTD.

**AMC1 AOCR.SPA.HEMS.130 (e) Crew Requirements**

HEMS TECHNICAL CREW MEMBER

(a) When the crew is composed of one pilot and one HEMS technical crew member, the latter should be seated in the front seat (co-pilot seat) during the flight, so as to be able to carry out his/her primary task of assisting the commander in:

(1) collision avoidance;

(2) the selection of the landing site; and

(3) the detection of obstacles during approach and take-off phases.

(b) The commander may delegate other aviation tasks to the HEMS technical crew member, as necessary:

(1) assistance in navigation;
(2) assistance in radio communication/radio navigation means selection;

(3) reading of checklists; and

(4) monitoring of parameters.

(c) The commander may also delegate to the HEMS technical crew member tasks on the ground:

(1) assistance in preparing the helicopter and dedicated medical specialist equipment for subsequent HEMS departure; or

(2) assistance in the application of safety measures during ground operations with rotors turning (including: crowd control, embarking and disembarking of passengers, refuelling etc.).

(d) There may be exceptional circumstances when it is not possible for the HEMS technical crew member to carry out his/her primary task as defined under (a).

This is to be regarded as exceptional and is only to be conducted at the discretion of the commander, taking into account the dimensions and environment of the HEMS operating site.)

(e) When two pilots are carried, there is no requirement for a HEMS technical crew member, provided that the pilot monitoring performs the aviation tasks of a technical crew member.

GM1 AOCR.SPA.HEMS.130 (e) (2) (ii) Crew requirements

SPECIFIC GEOGRAPHICAL AREAS

In defining those specific geographical areas, the operator should take account of the cultural lighting and topography. In those areas where the cultural lighting an topography make it unlikely that the visual cues would degrade sufficiently to make flying of the aircraft problematical, the HEMS technical crew member is assumed to be able to sufficiently assist the pilot, since under such circumstances instrument and control monitoring would not be required. In those cases where instrument and control monitoring would be required the operations should be conducted with two pilots.

AMC1 AOCR.SPA.HEMS.130 (e) (2) (ii) (8) Crew requirements

FLIGHT FOLLOWING SYSTEM

A flight following system is a system providing contact with the helicopter throughout its operational area.
AMC1 AOCR.SPA.HEMS.130 (F) (1) Crew requirements

TRAINING AND CHECKING SYLLABUS

(a) The flight crew training syllabus should include the following items:

(1) meteorological training concentrating on the understanding and interpretation of available weather information;

(2) preparing the helicopter and specialist medical equipment for subsequent HEMS departure;

(3) practice of HEMS departures;

(4) the assessment from the air of the suitability of HEMS operating sites; and

(5) the medical effects air transport may have on the patient.

(b) The flight crew checking syllabus should include:

(1) proficiency checks, which should include landing and take-off profiles likely to be used at HEMS operating sites; and

(2) line checks, with special emphasis on the following:

<table>
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<tr>
<th>(c)</th>
<th>HEM</th>
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<tbody>
<tr>
<td>(1)</td>
<td>S technical crew members should be trained and checked in the following items: duties in the HEMS role;</td>
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<tr>
<td>(2)</td>
<td>map reading, navigation aid principles and use;</td>
<td></td>
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<tr>
<td>(3)</td>
<td>operation of radio equipment;</td>
<td></td>
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<tr>
<td>(4)</td>
<td>use of on-board medical equipment;</td>
<td></td>
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<tr>
<td>(5)</td>
<td>preparing the helicopter and specialist medical equipment for subsequent HEMS departure;</td>
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<td>(6)</td>
<td>instrument reading, warnings, use of normal and emergency checklists in assistance of the pilot as required;</td>
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<tr>
<td>(7)</td>
<td>basic understanding of the helicopter type in terms of location and design of normal and emergency systems and equipment;</td>
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<tr>
<td>(8)</td>
<td>crew coordination;</td>
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<td>(9)</td>
<td>practice of response to HEMS call out;</td>
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<tr>
<td>(10)</td>
<td>conducting refuelling and rotors running refuelling;</td>
<td></td>
</tr>
<tr>
<td>(11)</td>
<td>HEMS operating site selection and use;</td>
<td></td>
</tr>
<tr>
<td>(12)</td>
<td>techniques for handling patients, the medical consequences of air transport and some knowledge of hospital casualty reception;</td>
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</table>
helicopter departures;

(iv) the selection from the air of HEMS operating sites;

(v) low level flight in poor weather; and

(vi) familiarity with established HEMS operating sites in the operator’s local area register.

AMC1 AOCR.SPA.HEMS.130 (f) (2) (ii) (B) Crew requirements

LINE CHECKS

Where due to the size, the configuration, or the performance of the helicopter, the line check cannot be conducted on an operational flight, it may be conducted on a specially arranged representative flight. This flight may be immediately adjacent to, but not simultaneous with, one of the biannual proficiency checks.

AOCR.SPA.HEMS.135 HEMS Medical Passenger And Other Personnel Briefing

(a) Medical passenger. Prior to any HEMS flight, or series of flights, medical passengers shall have been briefed to ensure that they are familiar with the HEMS working environment and equipment, can operate on-board medical and emergency equipment and can take part in normal and emergency entry and exit procedures.

(b) Ground emergency service personnel. The operator shall take all reasonable measures to ensure that ground emergency service personnel are familiar with the HEMS working environment and equipment and the risks associated with ground operations at a HEMS operating site.
(c) Medical patient. Notwithstanding AOCR.OP.MPA.170, a briefing shall only be conducted if the medical condition makes this practicable.

**AMC1 AOCR.SPA.HEMS.135 (A) HEMS Medical Passenger And Other Personnel Briefing**

**HEMS MEDICAL PASSENGER BRIEFING**

The briefing should ensure that the medical passenger understands his/her role in the operation, which includes:

(a) familiarisation with the helicopter type(s) operated;
(b) entry and exit under normal and emergency conditions both for self and patients;
(c) use of the relevant on-board specialist medical equipment;
(d) the need for the commander’s approval prior to use of specialised equipment;
(e) method of supervision of other medical staff;
(f) the use of helicopter inter-communication systems; and
(g) location and use of on board fire extinguishers.

**AMC1.1 AOCR.SPA.HEMS.135 (A) HEMS Medical Passenger And Other Personnel Briefing**

Another means of complying with the rule as compared to that contained in AMC1-SPA.HEMS.135 (a) is to make use of a training programme as mentioned in AMC1.1 CAT.OP.MPA.170.

**AMC1 AOCR.SPA.HEMS.135 (b) HEMS Medical Passenger And Other Personnel Briefing**

**GROUND EMERGENCY SERVICE PERSONNEL**

(a) The task of training large numbers of emergency service personnel is formidable. Wherever possible, helicopter operators should afford every assistance to those persons responsible for training emergency service personnel in HEMS support. This can be achieved by various means, such as, but not limited to, the production of flyers, publication of relevant
information on the operator’s web site and provision of extracts from the operations manual.

(b) The elements that should be covered include:

(1) two-way radio communication procedures with helicopters;
(2) the selection of suitable HEMS operating sites for HEMS flights;
(3) the physical danger areas of helicopters;
(4) crowd control in respect of helicopter operations; and
(5) the evacuation of helicopter occupants following an on-site helicopter accident.

**AOCR.SPA.HEMS.140 Information And Documentation**

(a) The operator shall ensure that, as part of its risk analysis and management process, risks associated with the HEMS environment are minimised by specifying in the operations manual: selection, composition and training of crews; levels of equipment and dispatch criteria; and operating procedures and minima, such that normal and likely abnormal operations are described and adequately mitigated.

(b) Relevant extracts from the operations manual shall be made available to the organisation for which the HEMS is being provided.

**AMC1 AOCR.SPA.HEMS.140 Information And Documentation**

**OPERATIONS MANUAL**

The operations manual should include:

(a) the use of portable equipment on board;
(b) guidance on take-off and landing procedures at previously unsurveyed HEMS operating sites;
(c) the final reserve fuel, in accordance with AOCR.SPA.HEMS.150;
(d) operating minima;
(e) recommended routes for regular flights to surveyed sites, including the minimum flight altitude;
(f) guidance for the selection of the HEMS operating site in case of a flight to an unsurveyed site;

(g) the safety altitude for the area overflown; and

(h) procedures to be followed in case of inadvertent entry into cloud.

**AOCR.SPA.HEMS.145 HEMS Operating Base Facilities**

(a) If crew members are required to be on standby with a reaction time of less than 45 minutes, dedicated suitable accommodation shall be provided close to each operating base.

(b) At each operating base the pilots shall be provided with facilities for obtaining current and forecast weather information and shall be provided with satisfactory communications with the appropriate air traffic services (ATS) unit. Adequate facilities shall be available for the planning of all tasks.

**AOCR.SPA.HEMS.150 Fuel Supply**

(a) When the HEMS mission is conducted under VFR within a local and defined geographical area, standard fuel planning can be employed provided the operator establishes final reserve fuel to ensure that, on completion of the mission the fuel remaining is not less than an amount of fuel sufficient for:

(1) 30 minutes of flying time at normal cruising conditions; or

(2) when operating within an area providing continuous and suitable precautionary landing sites, 20 minutes of flying time at normal cruising speed.

**AOCR.SPA.HEMS.155 Refuelling With Passengers Embarking, On Board Or Disembarking**

When the commander considers refuelling with passengers on board to be necessary, it can be undertaken either rotors stopped or rotors turning provided the following requirements are met:

(a) door(s) on the refuelling side of the helicopter shall remain closed;

(b) door(s) on the non-refuelling side of the helicopter shall remain open,
weather permitting;

(c) firefighting facilities of the appropriate scale shall be positioned so as to be immediately available in the event of a fire; and

(d) sufficient personnel shall be immediately available to move patients clear of the helicopter in the event of a fire.