

International Standards
and Recommended Practices



Annex 6
to the Convention on
International Civil Aviation

Operation of Aircraft

Part III
International Operations — Helicopters

This edition incorporates all amendments adopted by the Council prior to 27 February 2010 and supersedes, on 18 November 2010, all previous editions of Part III of Annex 6.

For information regarding the applicability of the Standards and Recommended Practices, see Foreword.

Seventh Edition
July 2010

International Civil Aviation Organization

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ABBREVIATIONS AND SYMBOLS*(used in this Annex)**Abbreviations*

ACAS	Airborne collision avoidance systems
ADRS	Aircraft data recording system
ADS-C	Automatic dependent surveillance — contract
AFCS	Automatic flight control system
AIR	Airborne image recorder
AIRS	Airborne image recording system
AOC	Air operator certificate
ATC	Air traffic control
ATM	Air traffic management
ATN	Aeronautical telecommunication network
ATS	Air traffic services
CAA	Civil Aviation Authority
CARS	Cockpit audio recording system
CAT I	Category I
CAT II	Category II
CAT III	Category III
CAT IIIA	Category IIIA
CAT IIIB	Category IIIB
CAT IIIC	Category IIIC
CFIT	Controlled flight into terrain
cm	Centimetre
CPDLC	Controller-pilot data link communications
CVR	Cockpit voice recorder
CVS	Combined vision system
DA	Decision altitude
DA/H	Decision altitude/height
DH	Decision height
DLR	Data link recorder
DLRS	Data link recording system
DME	Distance measuring equipment
EFB	Electronic flight bag
EFIS	Electronic flight instrument system
EGT	Exhaust gas temperature
EICAS	Engine indication and crew alerting system
ELT	Emergency locator transmitter
ELT(AD)	Automatic deployable ELT
ELT(AF)	Automatic fixed ELT
ELT(AP)	Automatic portable ELT
ELT(S)	Survival ELT
EPR	Engine pressure ratio
EUROCAE	European Organisation for Civil Aviation Equipment
EVS	Enhanced vision system
FANS	Future air navigation system

FATO	Final approach and take-off area
FDR	Flight data recorder
FM	Frequency modulation
ft	Foot
g	Normal acceleration
hPa	Hectopascal
HUD	Head-up display
IFR	Instrument flight rules
ILS	Instrument landing system
IMC	Instrument meteorological conditions
in-Hg	Inch of mercury
kg	Kilogram
km	Kilometre
kN	Kilonewton
kt	Knot
LDAH	Landing distance available
LDP	Landing decision point
LDRH	Landing distance required
LED	Light emitting diode
m	Metre
mb	Millibar
MDA	Minimum descent altitude
MDA/H	Minimum descent altitude/height
MDH	Minimum descent height
MEL	Minimum equipment list
MHz	Megahertz
MLS	Microwave landing system
MMEL	Master minimum equipment list
MOPS	Minimum operational performance specification
N_1	Low pressure compressor speed (two-stage compressor); fan speed (three-stage compressor)
NM	Nautical mile
NVIS	Night vision imaging systems
OCA	Obstacle clearance altitude
OCA/H	Obstacle clearance altitude/height
OCH	Obstacle clearance height
PANS	Procedures for Air Navigation Services
PBN	Performance-based navigation
PNR	Point of no return
psi	Pound per square inch
R	Rotor radius
RCP	Required communication performance
RNAV	Area navigation
RNP	Required navigation performance

RTCA	Radio Technical Commission for Aeronautics
RVR	Runway visual range
SI	International System of Units
SOP	Standard operating procedure
SVS	Synthetic vision system
T ₄	Engine exhaust gas temperature
TDP	Take-off decision point
TIT	Turbine inlet temperature
TLOF	Touchdown and lift-off area
TODAH	Take-off distance available
TODRH	Take-off distance required
UTC	Coordinated universal time
VFR	Visual flight rules
VMC	Visual meteorological conditions
VNAV	Vertical navigation
V _{TOSS}	Take-off safety speed
V _y	Best rate of climb speed

Symbols

°C	Degrees Celsius
%	Per cent

PUBLICATIONS
(referred to in this Annex)

ICAO Publications

Convention and Related Acts

Convention on International Civil Aviation (Doc 7300)

Protocol Relating to an Amendment to the Convention on International Civil Aviation (Article 83 bis) (Doc 9318)

Annexes to the Convention on International Civil Aviation

Annex 1 — *Personnel Licensing*

Annex 2 — *Rules of the Air*

Annex 3 — *Meteorological Service for International Air Navigation*

Annex 4 — *Aeronautical Charts*

Annex 5 — *Units of Measurement to be Used in Air and Ground Operations*

Annex 6 — *Operation of Aircraft*

Part I — *International Commercial Air Transport — Aeroplanes*

Part II — *International General Aviation — Aeroplanes*

Annex 8 — *Airworthiness of Aircraft*

Annex 9 — *Facilitation*

Annex 10 — *Aeronautical Telecommunications*

Volume III — *Communication Systems* (Part I — *Digital Data Communication Systems*; Part II — *Voice Communication Systems*)

Volume IV — *Surveillance and Collision Avoidance Systems*

Annex 11 — *Air Traffic Services*

Annex 12 — *Search and Rescue*

Annex 13 — *Aircraft Accident and Incident Investigation*

Annex 14 — *Aerodromes*

Volume I — *Aerodrome Design and Operations*

Volume II — *Heliports*

Annex 15 — *Aeronautical Information Services*

Annex 16 — *Environmental Protection*

Volume I — *Aircraft Noise*

Annex 18 — *The Safe Transport of Dangerous Goods by Air*

Annex 19 — *Safety Management*

Procedures for Air Navigation Services

ATM — Air Traffic Management (Doc 4444)

OPS — Aircraft Operations (Doc 8168)

Volume I — *Flight Procedures*

Volume II — *Construction of Visual and Instrument Flight Procedures*

TRG — Training (Doc 9868)

Regional Supplementary Procedures (Doc 7030)

Manuals¹

Airport Services Manual (Doc 9137)

Part 1 — *Rescue and Fire Fighting*

Part 8 — *Airport Operational Services*

Airworthiness Manual (Doc 9760)

Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods (Doc 9481)

Human Factors Training Manual (Doc 9683)

Manual of Aircraft Ground De-icing/Anti-icing Operations (Doc 9640)

Manual of All-Weather Operations (Doc 9365)

Manual of Evidence-based Training (Doc 9995)

Manual of Procedures for Operations Inspection, Certification and Continued Surveillance (Doc 8335)

Manual of Procedures for Establishment and Management of a State's Personnel Licensing System (Doc 9379)

Manual on Electronic Flight Bags (Doc 10020)

Manual on Flight Data Analysis Programmes (FDAP) (Doc 10000)

Manual on Required Communications Performance (RCP) (Doc 9869)

Performance-based Navigation (PBN) Manual (Doc 9613)

Policy and Guidance Material on the Economic Regulation of International Air Transport (Doc 9587)

Preparation of an Operations Manual (Doc 9376)

1. The manuals referenced will be updated as necessary to harmonize the terminology with that used in the new Annex 19.

Safety Management Manual (SMM) (Doc 9859)

Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284)

Training Manual (Doc 7192)

Part D-3 — Flight Operations Officers/Flight Dispatchers

Circular

Guidance on the Implementation of Article 83 bis of the Convention on International Civil Aviation (Cir 295)

Other Publications

European Organisation for Civil Aviation Equipment (EUROCAE) Documents ED-55, ED-56A, ED-112, ED-112A and ED-155

ANNEX 6 — PART III

INTERNATIONAL OPERATIONS — HELICOPTERS

FOREWORD

Historical background

Standards and Recommended Practices for the Operation of Aircraft were first adopted by the Council, pursuant to the provisions of Article 37 of the Convention on International Civil Aviation (Chicago 1944), on 10 December 1948 for International Air Transport and on 2 December 1968 for International General Aviation. The documents containing these Standards and Recommended Practices are now designated as Annex 6, Parts I and II, respectively, to the Convention. In general, Parts I and II address aeroplane operations; neither part is specifically applicable to helicopter operations.

Therefore, Part III was introduced as a means of including provisions for helicopter operations. Initially, provisions related to flight data recorders and cockpit voice recorders for helicopters were developed by the Air Navigation Commission following Recommendation 10/1 of the Accident Prevention and Investigation Meeting AIG (1979) and adopted by the Council on 14 March 1986. They became effective on 27 July 1986 and applicable on 20 November 1986. Subsequently, proposals for comprehensive Standards and Recommended Practices covering other aspects of helicopter operations were developed with the assistance of the Helicopter Operations Panel; these provisions, incorporated in Amendment 1, were adopted by the Council on 21 March 1990. The amendment became effective on 30 July 1990 and applicable on 15 November 1990.

Table A shows the origin of subsequent amendments together with a list of the principal subjects involved and the dates on which the Annex and the amendments were adopted by the Council, when they became effective and when they became applicable.

Applicability

The Standards and Recommended Practices included in Annex 6 — *Operation of Aircraft*, Parts I and II, cover the operation of all aeroplanes in international civil aviation, except where specifically excluded. Similarly, the Standards and Recommended Practices in Annex 6, Part III, cover the operation of all helicopters in international civil aviation, general aviation as well as commercial air transport operations.

Action by Contracting States

Notification of differences. The attention of Contracting States is drawn to the obligation imposed by Article 38 of the Convention by which Contracting States are required to notify the Organization of any differences between their national regulations and practices and the International Standards contained in this Annex and any amendments thereto. Contracting States are invited to extend such notification to any differences from the Recommended Practices contained in this Annex, and any amendments thereto when the notification of such differences is important for the safety of air navigation. Further, Contracting States are invited to keep the Organization currently informed of any differences which may subsequently occur or of the withdrawal of any differences previously notified. A specific request for notification of differences will be sent to Contracting States immediately after the adoption of each Amendment to this Annex.

Attention of States is also drawn to the provision of Annex 15 related to the publication of differences between their national regulations and practices and the related ICAO Standards and Recommended Practices through the Aeronautical Information Service, in addition to the obligation of States under Article 38 of the Convention.

Promulgation of information. The establishment and withdrawal of and changes to facilities, services and procedures affecting aircraft operations provided in accordance with the Standards and Recommended Practices specified in this Annex should be notified and take effect in accordance with the provisions of Annex 15.

Status of Annex components

An Annex is made up of the following component parts, not all of which, however, are necessarily found in every Annex; they have the status indicated.

1. — Material comprising the Annex proper

- a) *Standards and Recommended Practices* adopted by the Council under the provisions of the Convention. They are defined as follows:

Standard: Any specification for physical characteristics, configuration, matériel, performance, personnel or procedure, the uniform application of which is recognized as necessary for the safety or regularity of international air navigation and to which Contracting States will conform in accordance with the Convention; in the event of impossibility of compliance, notification to the Council is compulsory under Article 38.

Recommended Practice: Any specification for physical characteristics, configuration, matériel, performance, personnel or procedure, the uniform application of which is recognized as desirable in the interest of safety, regularity or efficiency of international air navigation, and to which Contracting States will endeavour to conform in accordance with the Convention.

- b) *Appendices* comprising material grouped separately for convenience but forming part of the Standards and Recommended Practices adopted by the Council.
- c) *Definitions* of terms used in the Standards and Recommended Practices which are not self-explanatory in that they do not have accepted dictionary meanings. A definition does not have an independent status but is an essential part of each Standard and Recommended Practice in which the term is used, since a change in the meaning of the term would affect the specification.
- d) *Tables and Figures* which add to or illustrate a Standard or Recommended Practice and which are referred to therein, form part of the associated Standard or Recommended Practice and have the same status.

It is to be noted that some Standards in this Annex may incorporate, by reference, other specifications having the status of Recommended Practices. In such case, the text of the Recommended Practice becomes part of the Standard.

2. — Material approved by the Council for publication in association with the Standards and Recommended Practices

- a) *Forewords* comprising historical and explanatory material based on the action of the Council and including an explanation of the obligations of States with regard to the application of the Standards and Recommended Practices ensuing from the Convention and the Resolution of Adoption;
- b) *Introductions* comprising explanatory material introduced at the beginning of parts, chapters or sections of the Annex to assist in the understanding of the application of the text;

- c) *Notes* included in the text, where appropriate, to give factual information or references bearing on the Standards or Recommended Practices in question but not constituting part of the Standards or Recommended Practices;
- d) *Attachments* comprising material supplementary to the Standards and Recommended Practices or included as a guide to their application.

Selection of language

This Annex has been adopted in six languages — English, Arabic, Chinese, French, Russian and Spanish. Each Contracting State is requested to select one of those texts for the purpose of national implementation and for other effects provided for in the Convention, either through direct use or through translation into its own national language, and to notify the Organization accordingly.

Editorial practices

The following practice has been adhered to in order to indicate at a glance the status of each statement: *Standards* have been printed in light face roman; *Recommended Practices* have been printed in light face italics, the status being indicated by the prefix **Recommendation**; *Notes* have been printed in light face italics, the status being indicated by the prefix *Note*.

The following editorial practice has been followed in the writing of specifications: for Standards the operative verb “shall” is used, and for Recommended Practices the operative verb “should” is used.

The units of measurement used in this document are in accordance with the International System of Units (SI) as specified in Annex 5 to the Convention on International Civil Aviation. Where Annex 5 permits the use of non-SI alternative units, these are shown in parentheses following the basic units. Where two sets of units are quoted it must not be assumed that the pairs of values are equal and interchangeable. It may, however, be inferred that an equivalent level of safety is achieved when either set of units is used exclusively.

Any reference to a portion of this document, which is identified by a number and/or title, includes all subdivisions of that portion.

Throughout this Annex, the use of the male gender should be understood to include male and female persons.

Table A. Amendments to Annex 6, Part III

<i>Amendment</i>	<i>Source</i>	<i>Subject(s)</i>	<i>Adopted Effective Applicable</i>
1st Edition	Accident Prevention and Investigation Divisional Meeting AIG (1979)	Provisions for flight recorders in helicopters.	14 March 1986 27 July 1986 20 November 1986
1 (2nd Edition)	Fourth meeting of the Helicopter Operations Panel. Amendments consequential to 1990 amendments to Annex 6, Parts I and II. Air Navigation Commission — directed studies	<p>a) Introduction of provisions pertaining to helicopter operations, similar in scope to those contained in Annex 6, Parts I and II, for aeroplanes. These provisions, together with the flight recorder provisions previously introduced in the First Edition of Annex 6, Part III, complete the initial development of Standards and Recommended Practices for helicopter operations;</p> <p>b) introduction of provisions pertaining to the air operator certificate, minimum equipment lists, the operations manual, and some new definitions. These provisions serve to preserve the parallelism among the three parts of Annex 6;</p> <p>c) introduction of guidance material concerning recording on FDRs of operational flight information for those helicopters equipped with electronic displays.</p>	21 March 1990 30 July 1990 15 November 1990
2	Fifth meeting of the Operations Panel, Eighth meeting of the Review of the General Concept of Separation Panel, Accident Investigation Divisional Meeting (AIG/1992), Air Navigation Commission studies	<p>a) Revision of definitions of heliport operating minima, decision altitude/height, minimum descent altitude/height and introduction of definition of obstacle clearance altitude/height;</p> <p>b) introduction of new definitions for emergency locator transmitters (ELTs), required navigation performance (RNP) and RNP type;</p> <p>c) introduction of a requirement concerning the use of engraving metal foil flight data recorders;</p> <p>d) introduction of carriage requirements for emergency locator transmitters (ELTs) to replace provisions regarding survival radio equipment and emergency location beacon;</p> <p>e) introduction of a requirement that the navigation equipment carried shall enable the aircraft to proceed in accordance with RNP types prescribed for the intended route(s) or areas(s).</p>	21 March 1994 25 July 1994 10 November 1994
3 (3rd Edition)	Air Navigation Commission studies, Fourteenth meeting of the Dangerous Goods Panel, editorial amendment, text alignment with Annex 6, Part I and/or Part II, consequential amendment	<p>a) Introduction of new and revised definitions;</p> <p>b) new provisions concerning accident prevention and flight safety programmes;</p> <p>c) revision of the provisions concerning operating facilities, in-flight simulation of emergency situations, minimum flight altitudes, flight time, flight duty periods and rest periods for crew members, flight preparation, oxygen supply, flight crew members at duty stations, duties of flight operations officers and new provisions for carry-on baggage;</p> <p>d) revision of provisions concerning mass limitations and medical supplies;</p> <p>e) new provisions related to oxygen equipment, revision of the provisions for helicopters operated in accordance with the visual flight rules (VFR) and the instrument flight rules (IFR);</p>	10 March 1995 24 July 1995 9 November 1995

<i>Amendment</i>	<i>Source</i>	<i>Subject(s)</i>	<i>Adopted Effective Applicable</i>
		<ul style="list-style-type: none"> f) new requirements for the flight crew training programme concerning knowledge and skills related to human performance and limitations; g) revision of the denomination of flight operations officers to align with Annex 1; h) revision of the contents of the operations manual; new provisions concerning heliport operating minima, oxygen supply, flight and duty time limitations, procedures and checklists used by flight crew, specifications for the operational flight plan, the flight crew training programme, the cabin attendant duties training programme, security instruction and guidance, accident prevention and flight safety programme, departure contingency procedures and instructions for mass and balance control; i) new provisions on flight time, flight duty periods and rest periods for cabin attendants and revision of the provisions concerning training; j) revision of the provisions concerning first-aid medical supplies; and k) new provisions concerning the minimum equipment list (MEL). 	
4	Fourth meeting of the Secondary Surveillance Radar Improvements and Collision Avoidance Systems Panel (SICASP/4)	Requirement for helicopters to be equipped with pressure-altitude reporting transponders.	19 February 1996 15 July 1996 7 November 1996
5 (4th Edition)	First meeting of the Flight Recorder Panel, ICAO and Industry CFIT Task Force, Air Navigation Commission studies, Amendment 162 to Annex 1, Amendment 38 to Annex 11, editorial amendment	<ul style="list-style-type: none"> a) Introduction of new and revised definitions for aircraft operating manual, configuration deviation list, Human Factors principles, human performance, master minimum equipment list, psychoactive substances and required navigation performance; b) revision of the notes concerning lease and interchange; c) introduction of a note concerning the use of psychoactive substances; d) new and revised requirements concerning flight recorders; e) new and revised provisions concerning the content of an operations manual relocated in an appendix; f) new provisions concerning the responsibility of States with regard to supervision of operations subject to an air operator certificate, acceptance of an operations manual and establishment of a system for certification and continued surveillance of the operator; g) new provisions related to the de/anti-icing of aircraft on the ground, aeroplane performance operating limitations, mass limitations, sensitive pressure altimeters and recent experience of the co-pilot; h) revised provisions concerning pressure-altitude reporting transponders; and i) new provisions concerning Human Factors. 	20 March 1998 20 July 1998 5 November 1998

<i>Amendment</i>	<i>Source</i>	<i>Subject(s)</i>	<i>Adopted Effective Applicable</i>
6	Second meeting of the Flight Recorder Panel, 32nd Session of the Assembly, Air Navigation Commission studies	<ul style="list-style-type: none"> a) Change of terminology from “cabin attendant” to “cabin crew”; b) revised definitions; and c) new provisions concerning the mandatory carriage of ELTs operating on 406 MHz and 121.5 MHz, pressure-altitude reporting transponders and the introduction of an implementation date for the recording of digital communications. 	15 March 1999 19 July 1999 4 November 1999
7	Air Navigation Commission studies	<ul style="list-style-type: none"> a) Revised definitions and introduction of the definition for instrument approach and landing operations; and b) introduction of requirements for the provision of RVR information and criteria for instrument approach operations, revision of the duties of the pilot-in-command. 	15 March 2000 17 July 2000 2 November 2000
8 (5th Edition)	Second meeting of the Flight Recorder Panel, Third meeting of the Global Navigation Satellite System Panel, Fifth meeting of the Continuing Airworthiness Panel, Air Navigation Commission studies	<ul style="list-style-type: none"> a) Update the provisions concerning flight recorders, including the recording of digital communications; FDR requirements for new aircraft; revised parameter listings; introduction of two-hour-duration CVRs; b) amendment of the classification of instrument approach and landing operations; c) new provisions pertaining to approach with vertical guidance (APV) operations; d) new definitions and update of provisions pertaining to maintenance-related requirements; and e) translation in the English language for documents attesting noise certification. 	12 March 2001 16 July 2001 1 November 2001
9	Separation and Airspace Safety Panel and Air Navigation Commission studies	<ul style="list-style-type: none"> a) New provisions concerning language proficiency requirements; b) new definition and provision concerning an operator’s flight safety documents system; c) new definition and provisions concerning the safety aspects of ground handling arrangements; and d) authorization by the State of Operator or State of Registry for en-route operations in RNP airspace. 	13 March 2003 14 July 2003 27 November 2003
10	Sixth meeting of the Committee on Aviation Environmental Protection	New provisions concerning references to noise certification.	9 March 2005 11 July 2005 24 November 2005
11	Second meeting of the Flight Crew Licensing and Training Panel, Fourteenth meeting of the Obstacle Clearance Panel, a proposal by the United States, Council request, 35th Session of the Assembly, and the Eleventh Air Navigation Conference	<ul style="list-style-type: none"> a) Pilot recent experience and proficiency check requirements, cross-crew qualification and cross-crediting of experience, evaluation of competency, threat and error management, and the biannual pilot proficiency check; b) pilot awareness of operational requirements determined by procedure design; c) qualifications for flight operations officers/flight dispatchers and the critical elements of a State regulatory system; d) the carriage of a copy of the air operator certificate in aircraft; and e) safety management provisions and references to new guidance material on the concept of acceptable level of safety. 	14 March 2006 17 July 2006 23 November 2006

<i>Amendment</i>	<i>Source</i>	<i>Subject(s)</i>	<i>Adopted Effective Applicable</i>
12 (6th Edition)	Air Navigation Commission study, First meeting of the Operational Data Link Panel (OPLINKP/1), and Secretariat study assisted by the Helicopter Tilt-Rotor Study Group	<p>a) Amendments to Standards to facilitate implementation of the available technology in relation to the use of automatic dependant surveillance — contract (ADS-C) and to the introduction of required communication performance (RCP) in the provision of air traffic services (ATS);</p> <p>b) a closer alignment of the provisions of Annex 6, Part III, with recognized regulatory practices;</p> <p>c) a change to the definitions of performance classes;</p> <p>d) a change to permit appropriate consideration for achieving a safe forced landing in the event of an engine failure for operations in performance Classes 2 and 3;</p> <p>e) the addition of new provisions relating to commercial operations under instrument meteorological conditions;</p> <p>f) a new definition of the term “operation”;</p> <p>g) the introduction of the concept of “offshore operations”; and</p> <p>h) mandatory carriage requirements for emergency locator transmitters (ELTs) as of 1 July 2008).</p>	14 March 2007 16 July 2007 22 November 2007 1 July 2008
13	Secretariat; Secretariat with the assistance of the Required Navigation Performance and Special Operational Requirements (RNPSOR) Study Group	<p>a) Amendments to definitions and Standards and Recommended Practices to strengthen the oversight and requirements of foreign operators and to harmonize the air operator certificate in content and, as of 1 January 2010, in layout; and</p> <p>b) amendments to definitions and Standards to align required navigation performance (RNP) and area navigation (RNAV) terminology with the performance-based navigation concept.</p>	3 March 2008 20 July 2008 20 November 2008 1 January 2010
14-A	Seventh meeting of the Operations Panel (OPSP/7); Secretariat with the assistance of the Medical Provisions Study Group (MPSG)	<p>a) amendment to the definition of “approach and landing operations using instrument approach procedures” to show a reduced RVR requirement for CAT II and CAT IIIA and B;</p> <p>b) clarification of training requirements for cabin crews in the awareness of dangerous goods;</p> <p>c) harmonization of the provisions on the use of a simulator for the maintenance of recent experience for a helicopter pilot-in-command and co-pilot with the provisions in Annex 6, Part I; and</p> <p>d) amendment introducing changes to Annex 6 in order to better reflect the contemporary needs regarding on-board medical supplies.</p>	2 March 2009 20 July 2009 19 November 2009
14-B	Secretariat	Amendment concerning the development of harmonized provisions relating to safety management by introducing a framework for the implementation and maintenance of a State safety programme as of 18 November 2010.	2 March 2009 20 July 2009 18 November 2010

<i>Amendment</i>	<i>Source</i>	<i>Subject(s)</i>	<i>Adopted Effective Applicable</i>
15 (7th Edition)	Ninth meeting of the Operations Panel Working Group of the Whole (OPSP/WG/WHL/9); twelfth meeting of the Airworthiness Panel Working Group of the Whole (AIRP/WG/WHL/12); Secretariat, with the assistance of the second meeting of the Flight Recorder Panel Working Group of the Whole (FLIRECP/WG/WHL/2)	a) new provisions for head-up displays (HUD)/enhanced vision systems (EVS); b) amendment to provisions to provide consistency in propulsion terminology; and c) new and updated provisions regarding flight recorders.	26 February 2010 12 July 2010 18 November 2010
16	Secretariat, in order to implement the Council mandate, pursuant to Assembly Resolution A37-9	The use of a halon replacement agent in lavatory fire extinguishers on or after 31 December 2011 and 31 December 2016 for hand-held fire extinguishers.	13 June 2011 30 October 2011 15 December 2011
17	Secretariat, with the assistance of the third meeting of the Flight Recorder Panel Working Group of the Whole (FLIRECP/WG/WHL/3)	Amendment concerning carriage requirements for flight recorders.	7 March 2012 16 July 2012 15 November 2012
18-A	Twelfth meeting of the Operations Panel Working Group of the Whole (OPSP/WG/WHL/12); Special Meeting of the Safety Management Panel (SMP/SM/1)	Amendment concerning: a) timepiece requirements and approach ban; b) the transfer of safety management provisions to Annex 19.	25 February 2013 15 July 2013 14 November 2013
18-B	Secretariat supported by the Approach Classification Task Force (ACTF) in coordination with the Aerodromes Panel (AP), the Instrument Flight Procedure Panel (IFPP), the Navigation Systems Panel (NSP) and the Operations Panel (OPSP)	Amendment concerning provisions related to instrument approach operations and procedures as a result of the new approach classification.	25 February 2013 15 July 2013 13 November 2014

<i>Amendment</i>	<i>Source</i>	<i>Subject(s)</i>	<i>Adopted Effective Applicable</i>
19	Seventh, eighth, ninth, tenth and eleventh meetings of the Instrument Flight Procedures Panel Working Group of the Whole (IFPP/WG-WHL/7, 8, 9, 10 and 11); fifteenth meeting of the Operations Panel Working Group of the Whole (OPSP/WG/WHL/15); fifth meeting of the Flight Recorder Panel Working Group of the Whole (FLIRECP/WG/WHL/5)	Amendment concerning: <ul style="list-style-type: none"> a) procedure design criteria and charting requirements to support PBN as well as helicopter PinS approach and departure operations; b) harmonization of provisions concerning EFBS, HUDs and vision systems, and fuel use; c) flight recorder requirements to: reference updated EUROCAE Minimum Operational Performance Specifications (MOPS); align underwater location device (ULD) requirements with Annex 6, Part I; and include less stringent inspection requirements for flight recorder systems. 	3 March 2014 14 July 2014 13 November 2014

ANNEX 6 — PART III

SECTION I

GENERAL

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

CHAPTER 1. DEFINITIONS

When the following terms are used in the Standards and Recommended Practices for international operations with helicopters, they have the following meanings:

Aerial work. An aircraft operation in which an aircraft is used for specialized services such as agriculture, construction, photography, surveying, observation and patrol, search and rescue, aerial advertisement, etc.

Aerodrome. A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

Aircraft. Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

Aircraft operating manual. A manual, acceptable to the State of the Operator, containing normal, abnormal and emergency procedures, checklists, limitations, performance information, details of the aircraft systems and other material relevant to the operation of the aircraft.

Note.— The aircraft operating manual is part of the operations manual.

Air operator certificate (AOC). A certificate authorizing an operator to carry out specified commercial air transport operations.

Airworthy. The status of an aircraft, engine, propeller or part when it conforms to its approved design and is in a condition for safe operation.

Alternate heliport. A heliport to which a helicopter may proceed when it becomes either impossible or inadvisable to proceed to or to land at the heliport of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and which is operational at the expected time of use. Alternate heliports include the following:

Take-off alternate. An alternate heliport at which a helicopter would be able to land should this become necessary shortly after take-off and it is not possible to use the heliport of departure.

En-route alternate. An alternate heliport at which a helicopter would be able to land in the event that a diversion becomes necessary while en route.

Destination alternate. An alternate heliport at which a helicopter would be able to land should it become either impossible or inadvisable to land at the heliport of intended landing.

Note.— The heliport from which a flight departs may be an en-route or a destination alternate heliport for that flight.

Approach and landing phase — helicopters. That part of the flight from 300 m (1 000 ft) above the elevation of the FATO, if the flight is planned to exceed this height, or from the commencement of the descent in the other cases, to landing or to the balked landing point.

Area navigation (RNAV). A method of navigation which permits aircraft operation on any desired flight path within the coverage of ground- or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

Note.— Area navigation includes performance-based navigation as well as other operations that do not meet the definition of performance-based navigation.

Cabin crew member. A crew member who performs, in the interest of safety of passengers, duties assigned by the operator or the pilot-in-command of the aircraft, but who shall not act as a flight crew member.

Combined vision system (CVS). A system to display images from a combination of an enhanced vision system (EVS) and a synthetic vision system (SVS).

Commercial air transport operation. An aircraft operation involving the transport of passengers, cargo or mail for remuneration or hire.

Configuration deviation list (CDL). A list established by the organization responsible for the type design with the approval of the State of Design which identifies any external parts of an aircraft type which may be missing at the commencement of a flight, and which contains, where necessary, any information on associated operating limitations and performance correction.

Congested area. In relation to a city, town or settlement, any area which is substantially used for residential, commercial or recreational purposes.

Congested hostile environment. A hostile environment within a congested area.

Continuing airworthiness. The set of processes by which an aircraft, engine, rotor or part complies with the applicable airworthiness requirements and remains in a condition for safe operation throughout its operating life.

Continuous descent final approach (CDFA). A technique, consistent with stabilized approach procedures, for flying the final approach segment of a non-precision instrument approach procedure as a continuous descent, without level-off, from an altitude/height at or above the final approach fix altitude/height to a point approximately 15 m (50 ft) above the landing runway threshold or the point where the flare manoeuvre should begin for the type of aircraft flown.

Crew member. A person assigned by an operator to duty on an aircraft during a flight duty period.

Dangerous goods. Articles or substances which are capable of posing a risk to health, safety, property or the environment and which are shown in the list of dangerous goods in the Technical Instructions or which are classified according to those Instructions.

Note.— Dangerous goods are classified in Annex 18, Chapter 3.

Decision altitude (DA) or decision height (DH). A specified altitude or height in a three-dimensional (3D) instrument approach operation at which a missed approach must be initiated if the required visual reference to continue the approach has not been established.

Note 1.— Decision altitude (DA) is referenced to mean sea level and decision height (DH) is referenced to the threshold elevation.

Note 2.— The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path. In Category III operations with a decision height the required visual reference is that specified for the particular procedure and operation.

Note 3.— For convenience where both expressions are used they may be written in the form “decision altitude/height” and abbreviated “DA/H”.

Defined point after take-off (DPATO). The point, within the take-off and initial climb phase, before which the helicopter’s ability to continue the flight safely, with one engine inoperative, is not assured and a forced landing may be required.

Note.— Defined points apply to helicopters operating in performance Class 2 only.

Defined point before landing (DPBL). The point, within the approach and landing phase, after which the helicopter’s ability to continue the flight safely, with one engine inoperative, is not assured and a forced landing may be required.

Note.— Defined points apply to helicopters operating in performance Class 2 only.

Electronic flight bag (EFB). An electronic information system, comprised of equipment and applications for flight crew, which allows for the storing, updating, displaying and processing of EFB functions to support flight operations or duties.

Elevated heliport. A heliport located on a raised structure on land.

Emergency locator transmitter (ELT). A generic term describing equipment which broadcast distinctive signals on designated frequencies and, depending on application, may be automatically activated by impact or be manually activated. An ELT may be any of the following:

Automatic fixed ELT (ELT(AF)). An automatically activated ELT which is permanently attached to an aircraft.

Automatic portable ELT (ELT(AP)). An automatically activated ELT which is rigidly attached to an aircraft but readily removable from the aircraft.

Automatic deployable ELT (ELT(AD)). An ELT which is rigidly attached to an aircraft and which is automatically deployed and activated by impact, and, in some cases, also by hydrostatic sensors. Manual deployment is also provided.

Survival ELT (ELT(S)). An ELT which is removable from an aircraft, stowed so as to facilitate its ready use in an emergency, and manually activated by survivors.

Engine. A unit used or intended to be used for aircraft propulsion. It consists of at least those components and equipment necessary for functioning and control, but excludes the propeller/rotors (if applicable).

Enhanced vision system (EVS). A system to display electronic real-time images of the external scene achieved through the use of image sensors.

Note.— EVS does not include night vision imaging systems (NVIS).

En-route phase. That part of the flight from the end of the take-off and initial climb phase to the commencement of the approach and landing phase.

Note.— Where adequate obstacle clearance cannot be guaranteed visually, flights must be planned to ensure that obstacles can be cleared by an appropriate margin. In the event of failure of the critical engine, operators may need to adopt alternative procedures.

Final approach and take-off area (FATO). A defined area over which the final phase of the approach manoeuvre to hover or landing is completed and from which the take-off manoeuvre is commenced. Where the FATO is to be used by helicopters operating in performance Class 1, the defined area includes the rejected take-off area available.

Final approach segment (FAS). That segment of an instrument approach procedure in which alignment and descent for landing are accomplished.

Flight crew member. A licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period.

Flight duty period. The total time from the moment a flight crew member commences duty, immediately subsequent to a rest period and prior to making a flight or a series of flights, to the moment the flight crew member is relieved of all duties having completed such flight or series of flights.

Flight manual. A manual, associated with the certificate of airworthiness, containing limitations within which the aircraft is to be considered airworthy, and instructions and information necessary to the flight crew members for the safe operation of the aircraft.

Flight operations officer/flight dispatcher. A person designated by the operator to engage in the control and supervision of flight operations, whether licensed or not, suitably qualified in accordance with Annex 1, who supports, briefs and/or assists the pilot-in-command in the safe conduct of the flight.

Flight plan. Specified information provided to air traffic services units, relative to an intended flight or portion of a flight of an aircraft.

Flight recorder. Any type of recorder installed in the aircraft for the purpose of complementing accident/incident investigation.

Flight safety documents system. A set of interrelated documentation established by the operator, compiling and organizing information necessary for flight and ground operations, and comprising, as a minimum, the operations manual and the operator's maintenance control manual.

Flight simulation training device. Any one of the following three types of apparatus in which flight conditions are simulated on the ground:

A flight simulator, which provides an accurate representation of the flight deck of a particular aircraft type to the extent that the mechanical, electrical, electronic, etc. aircraft systems control functions, the normal environment of flight crew members, and the performance and flight characteristics of that type of aircraft are realistically simulated;

A flight procedures trainer, which provides a realistic flight deck environment, and which simulates instrument responses, simple control functions of mechanical, electrical, electronic, etc. aircraft systems, and the performance and flight characteristics of aircraft of a particular class;

A basic instrument flight trainer, which is equipped with appropriate instruments, and which simulates the flight deck environment of an aircraft in flight in instrument flight conditions.

Flight time — helicopters. The total time from the moment a helicopter's rotor blades start turning until the moment the helicopter finally comes to rest at the end of the flight, and the rotor blades are stopped.

Note 1.— The State may provide guidance in those cases where the definition of flight time does not describe or permit normal practices. Examples are: crew change without stopping the rotors; and rotors running engine wash procedure following a flight. In any case, the time when rotors are running between sectors of a flight is included within the calculation of flight time.

Note 2.— This definition is intended only for the purpose of flight and duty time regulations.

General aviation operation. An aircraft operation other than a commercial air transport operation or an aerial work operation.

Ground handling. Services necessary for an aircraft's arrival at, and departure from, an airport, other than air traffic services.

Head-up display (HUD). A display system that presents flight information into the pilot's forward external field of view.

Helicopter. A heavier-than-air aircraft supported in flight chiefly by the reactions of the air on one or more power-driven rotors on substantially vertical axes.

Note.— Some States use the term “rotorcraft” as an alternative to “helicopter”.

Helideck. A heliport located on a floating or fixed offshore structure.

Heliport. An aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.

Note 1.— Throughout this Part, when the term “heliport” is used, it is intended that the term also applies to aerodromes primarily meant for the use of aeroplanes.

Note 2.— Helicopters may be operated to and from areas other than heliports.

Heliport operating minima. The limits of usability of a heliport for:

- a) take-off, expressed in terms of runway visual range and/or visibility and, if necessary, cloud conditions;
- b) landing in 2D instrument approach operations, expressed in terms of visibility and/or runway visual range, minimum descent altitude/height (MDA/H) and, if necessary, cloud conditions; and
- c) landing in 3D instrument approach operations, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H) as appropriate to the type and/or category of the operation.

Hostile environment. An environment in which:

- a) a safe forced landing cannot be accomplished because the surface and surrounding environment are inadequate; or
- b) the helicopter occupants cannot be adequately protected from the elements; or
- c) search and rescue response/capability is not provided consistent with anticipated exposure; or
- d) there is an unacceptable risk of endangering persons or property on the ground.

Human Factors principles. Principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance.

Human performance. Human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations.

Instrument approach operations. An approach and landing using instruments for navigation guidance based on an instrument approach procedure. There are two methods for executing instrument approach operations:

- a) a two-dimensional (2D) instrument approach operation, using lateral navigation guidance only; and

- b) a three-dimensional (3D) instrument approach operation, using both lateral and vertical navigation guidance.

Note.— Lateral and vertical navigation guidance refers to the guidance provided either by:

- a) a ground-based radio navigation aid; or
- b) computer-generated navigation data from ground-based, space-based, self-contained navigation aids or a combination of these.

Instrument approach procedure (IAP). A series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply. Instrument approach procedures are classified as follows:

Non-precision approach (NPA) procedure. An instrument approach procedure designed for 2D instrument approach operations Type A.

Note.— Non-precision approach procedures may be flown using a continuous descent final approach (CDFA) technique. CDFAs with advisory VNAV guidance calculated by on-board equipment (see PANS-OPS (Doc 8168), Volume I, Part I, Section 4, Chapter 1, paragraph 1.8.1) are considered 3D instrument approach operations. CDFAs with manual calculation of the required rate of descent are considered 2D instrument approach operations. For more information on CDFAs, refer to PANS-OPS (Doc 8168), Volume I, Part I, Section 4, Chapter 1, paragraphs 1.7 and 1.8.

Approach procedure with vertical guidance (APV). A performance-based navigation (PBN) instrument approach procedure designed for 3D instrument approach operations Type A.

Precision approach (PA) procedure. An instrument approach procedure based on navigation systems (ILS, MLS, GLS and SBAS CAT I) designed for 3D instrument approach operations Type A or B.

Note.— Refer to Section II, Chapter 2, 2.2.8.3, for instrument approach operation types.

Instrument meteorological conditions (IMC). Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling*, less than the minima specified for visual meteorological conditions.

Note.— The specified minima for visual meteorological conditions are contained in Chapter 4 of Annex 2.

Integrated survival suit. A survival suit which meets the combined requirements of the survival suit and life jacket.

Landing decision point (LDP). The point used in determining landing performance from which, an engine failure occurring at this point, the landing may be safely continued or a bailed landing initiated.

Note.— LDP applies only to helicopters operating in performance Class 1.

Maintenance. The performance of tasks required to ensure the continuing airworthiness of an aircraft, including any one or combination of overhaul, inspection, replacement, defect rectification, and the embodiment of a modification or repair.

Maintenance organization's procedures manual. A document endorsed by the head of the maintenance organization which details the maintenance organization's structure and management responsibilities, scope of work, description of facilities, maintenance procedures and quality assurance or inspection systems.

* As defined in Annex 2.

Maintenance programme. A document which describes the specific scheduled maintenance tasks and their frequency of completion and related procedures, such as a reliability programme, necessary for the safe operation of those aircraft to which it applies.

Maintenance release. A document which contains a certification confirming that the maintenance work to which it relates has been completed in a satisfactory manner, either in accordance with the approved data and the procedures described in the maintenance organization's procedures manual or under an equivalent system.

Master minimum equipment list (MMEL). A list established for a particular aircraft type by the organization responsible for the type design with the approval of the State of Design containing items, one or more of which is permitted to be unserviceable at the commencement of a flight. The MMEL may be associated with special operating conditions, limitations or procedures.

Maximum mass. Maximum certificated take-off mass.

Minimum descent altitude (MDA) or minimum descent height (MDH). A specified altitude or height in a 2D instrument approach operation or circling approach operation below which descent must not be made without the required visual reference.

Note 1.— Minimum descent altitude (MDA) is referenced to mean sea level and minimum descent height (MDH) is referenced to the aerodrome elevation or to the threshold elevation if that is more than 2 m (7 ft) below the aerodrome elevation. A minimum descent height for a circling approach is referenced to the aerodrome elevation.

Note 2.— The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path. In the case of a circling approach the required visual reference is the runway environment.

Note 3.— For convenience when both expressions are used they may be written in the form “minimum descent altitude/height” and abbreviated “MDA/H”.

Minimum equipment list (MEL). A list which provides for the operation of aircraft, subject to specified conditions, with particular equipment inoperative, prepared by an operator in conformity with, or more restrictive than, the MMEL established for the aircraft type.

Navigation specification. A set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace. There are two kinds of navigation specifications:

Required navigation performance (RNP) specification. A navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH.

Area navigation (RNAV) specification. A navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1.

Note 1.— The Performance-based Navigation (PBN) Manual (Doc 9613), Volume II, contains detailed guidance on navigation specifications.

Note 2.— The term RNP, previously defined as “a statement of the navigation performance necessary for operation within a defined airspace”, has been removed from this Annex as the concept of RNP has been overtaken by the concept of PBN. The term RNP in this Annex is now solely used in the context of navigation specifications that require performance monitoring and alerting, e.g. RNP 4 refers to the aircraft and operating requirements, including a 4 NM lateral performance with on-board performance monitoring and alerting that are detailed in Doc 9613.

Night. The hours between the end of evening civil twilight and the beginning of morning civil twilight or such other period between sunset and sunrise, as may be prescribed by the appropriate authority.

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

Non-congested hostile environment. A hostile environment outside a congested area.

Non-hostile environment. An environment in which:

- a) a safe forced landing can be accomplished because the surface and surrounding environment are adequate;
- b) the helicopter occupants can be adequately protected from the elements;
- c) search and rescue response/capability is provided consistent with anticipated exposure; and
- d) the assessed risk of endangering persons or property on the ground is acceptable.

Note.— Those parts of a congested area satisfying the above requirements are considered non-hostile.

Obstacle clearance altitude (OCA) or obstacle clearance height (OCH). The lowest altitude or the lowest height above the elevation of the relevant runway threshold or the aerodrome elevation as applicable, used in establishing compliance with appropriate obstacle clearance criteria.

Note 1.— Obstacle clearance altitude is referenced to mean sea level and obstacle clearance height is referenced to the threshold elevation or in the case of non-precision approach procedures to the aerodrome elevation or the threshold elevation if that is more than 2 m (7 ft) below the aerodrome elevation. An obstacle clearance height for a circling approach procedure is referenced to the aerodrome elevation.

Note 2.— For convenience when both expressions are used they may be written in the form “obstacle clearance altitude/height” and abbreviated “OCA/H”.

Offshore operations. Operations which routinely have a substantial proportion of the flight conducted over sea areas to or from offshore locations. Such operations include, but are not limited to, support of offshore oil, gas and mineral exploitation and sea-pilot transfer.

Operation. An activity or group of activities which are subject to the same or similar hazards and which require a set of equipment to be specified, or the achievement and maintenance of a set of pilot competencies, to eliminate or mitigate the risk of such hazards.

Note.— Such activities could include, but would not be limited to, offshore operations, heli-hoist operations or emergency medical service.

Operational control. The exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of the flight.

Operational flight plan. The operator's plan for the safe conduct of the flight based on considerations of helicopter performance, other operating limitations and relevant expected conditions on the route to be followed and at the heliports concerned.

Operations in performance Class 1. Operations with performance such that, in the event of a critical engine failure, performance is available to enable the helicopter to safely continue the flight to an appropriate landing area, unless the failure occurs prior to reaching the take-off decision point (TDP) or after passing the landing decision point (LDP), in which cases the helicopter must be able to land within the rejected take-off or landing area.

Operations in performance Class 2. Operations with performance such that, in the event of critical engine failure, performance is available to enable the helicopter to safely continue the flight to an appropriate landing area, except when the failure occurs early during the take-off manoeuvre or late in the landing manoeuvre, in which cases a forced landing may be required.

Operations in performance Class 3. Operations with performance such that, in the event of an engine failure at any time during the flight, a forced landing will be required.

Operations manual. A manual containing procedures, instructions and guidance for use by operational personnel in the execution of their duties.

Operations specifications. The authorizations, conditions and limitations associated with the air operator certificate and subject to the conditions in the operations manual.

Operator. A person, organization or enterprise engaged in or offering to engage in an aircraft operation.

Operator's maintenance control manual. A document which describes the operator's procedures necessary to ensure that all scheduled and unscheduled maintenance is performed on the operator's aircraft on time and in a controlled and satisfactory manner.

Performance-based navigation (PBN). Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

Note.— Performance requirements are expressed in navigation specifications (RNAV specification, RNP specification) in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept.

Pilot-in-command. The pilot designated by the operator, or in the case of general aviation, the owner, as being in command and charged with the safe conduct of a flight.

Psychoactive substances. Alcohol, opioids, cannabinoids, sedatives and hypnotics, cocaine, other psychostimulants, hallucinogens, and volatile solvents, whereas coffee and tobacco are excluded.

Repair. The restoration of an aeronautical product to an airworthy condition to ensure that the aircraft continues to comply with the design aspects of the appropriate airworthiness requirements used for the issuance of the type certificate for the respective aircraft type, after it has been damaged or subjected to wear.

Required communication performance (RCP). A statement of the performance requirements for operational communication in support of specific ATM functions.

Required communication performance type (RCP type). A label (e.g. RCP 240) that represents the values assigned to RCP parameters for communication transaction time, continuity, availability and integrity.

Runway visual range (RVR). The range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.

Safe forced landing. Unavoidable landing or ditching with a reasonable expectancy of no injuries to persons in the aircraft or on the surface.

Safety management system (SMS). A systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures.

Series of flights. Series of flights are consecutive flights that:

- a) begin and end within a period of 24 hours; and
- b) are all conducted by the same pilot-in-command.

State of Registry. The State on whose register the aircraft is entered.

Note.— In the case of the registration of aircraft of an international operating agency on other than a national basis, the States constituting the agency are jointly and severally bound to assume the obligations which, under the Chicago Convention, attach to a State of Registry. See, in this regard, the Council Resolution of 14 December 1967 on Nationality and Registration of Aircraft Operated by International Operating Agencies which can be found in Policy and Guidance Material on the Economic Regulation of International Air Transport (Doc 9587).

State of the Aerodrome. The State in whose territory the aerodrome is located.

Note.— State of the Aerodrome includes heliports and landing locations.

State of the Operator. The State in which the operator's principal place of business is located or, if there is no such place of business, the operator's permanent residence.

Synthetic vision system (SVS). A system to display data-derived synthetic images of the external scene from the perspective of the flight deck.

Take-off and initial climb phase. That part of the flight from the start of take-off to 300 m (1 000 ft) above the elevation of the FATO, if the flight is planned to exceed this height, or to the end of the climb in the other cases.

Take-off decision point (TDP). The point used in determining take-off performance from which, an engine failure occurring at this point, either a rejected take-off may be made or a take-off safely continued.

Note.— TDP applies only to helicopters operating in performance Class 1.

Visual meteorological conditions (VMC). Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling,* equal to or better than specified minima.

Note.— The specified minima are contained in Chapter 4 of Annex 2.

V_{Toss} . The minimum speed at which climb shall be achieved with the critical engine inoperative, the remaining engines operating within approved operating limits.

Note.— The speed referred to above may be measured by instrument indications or achieved by a procedure specified in the flight manual.

* As defined in Annex 2.

CHAPTER 2. APPLICABILITY

The Standards and Recommended Practices contained in Annex 6, Part III, shall be applicable to all helicopters engaged in international commercial air transport operations or in international general aviation operations, except that these Standards and Recommended Practices are not applicable to helicopters engaged in aerial work.

Note 1.— Standards and Recommended Practices applicable to the operation of aeroplanes by operators authorized to conduct international commercial air transport operations are to be found in Annex 6, Part I.

Note 2.— Standards and Recommended Practices applicable to international general aviation operations with aeroplanes are to be found in Annex 6, Part II.

ANNEX 6 — PART III

SECTION II

INTERNATIONAL COMMERCIAL AIR TRANSPORT

CHAPTER 1. GENERAL

Note 1.— Although the Convention on International Civil Aviation allocates to the State of Registry certain functions which that State is entitled to discharge, or obligated to discharge, as the case may be, the Assembly recognized, in Resolution A23-13 that the State of Registry may be unable to fulfil its responsibilities adequately in instances where aircraft are leased, chartered or interchanged — in particular without crew — by an operator of another State and that the Convention may not adequately specify the rights and obligations of the State of an operator in such instances until such time as Article 83 bis of the Convention enters into force. Accordingly, the Council urged that if, in the above-mentioned instances, the State of Registry finds itself unable to discharge adequately the functions allocated to it by the Convention, it delegate to the State of the Operator, subject to acceptance by the latter State, those functions of the State of Registry that can more adequately be discharged by the State of the Operator. It was understood that pending entry into force of Article 83 bis of the Convention the foregoing action would only be a matter of practical convenience and would not affect either the provisions of the Chicago Convention prescribing the duties of the State of Registry or any third State. However, as Article 83 bis of the Convention entered into force on 20 June 1997, such transfer agreements will have effect in respect of Contracting States which have ratified the related Protocol (Doc 9318) upon fulfilment of the conditions established in Article 83 bis.

Note 2.— In the case of international operations effected jointly with helicopters not all of which are registered in the same Contracting State, nothing in this Part of the Annex prevents the States concerned entering into an agreement for the joint exercise of the functions placed upon the State of Registry by the provisions of the relevant Annexes.

1.1 Compliance with laws, regulations and procedures

1.1.1 Operators shall ensure that their employees when abroad know that they must comply with the laws, regulations and procedures of the States in which their helicopters are operated.

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

Note.— Information for pilots and flight operations personnel on flight procedure parameters and operational procedures is contained in PANS-OPS (Doc 8168), Volume I. Criteria for the construction of visual and instrument flight procedures are contained in PANS-OPS (Doc 8168), Volume II. Obstacle clearance criteria and procedures used in certain States may differ from PANS-OPS, and knowledge of these differences is important for safety reasons.

1.1.3 Operators shall ensure that flight crew members demonstrate the ability to speak and understand the language used for radiotelephony communications as specified in Annex 1.

1.1.4 An operator or a designated representative shall have responsibility for operational control.

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

1.1.5 Responsibility for operational control shall be delegated only to the pilot-in-command and to a flight operations officer/flight dispatcher if an operator's approved method of control and supervision of flight operations requires the use of flight operations officer/flight dispatcher personnel.

Note.— Guidance on the operational control organization and the role of the flight operations officer/flight dispatcher is contained in the Manual of Procedures for Operations Inspection, Certification and Continued Surveillance (Doc 8335). Detailed guidance on the authorization, duties and responsibilities of the flight operations officer/flight dispatcher is contained in the manual Preparation of an Operations Manual (Doc 9376). The requirements for age, skill, knowledge and experience for licensed flight operations officers/flight dispatchers are contained in Annex 1.

1.1.6 If an emergency situation which endangers the safety of the helicopter or persons becomes known first to the flight operations officer/flight dispatcher, action by that person in accordance with 2.6.1 shall include, where necessary, notification to the appropriate authorities of the nature of the situation without delay, and requests for assistance if required.

1.1.7 If an emergency situation which endangers the safety of the helicopter or persons necessitates the taking of action which involves a violation of local regulations or procedures, the pilot-in-command shall notify the appropriate local authority without delay. If required by the State in which the incident occurs, the pilot-in-command shall submit a report on any such violation to the appropriate authority of such State; in that event, the pilot-in-command shall also submit a copy of it to the State of the Operator. Such reports shall be submitted as soon as possible and normally within ten days.

1.1.8 Operators shall ensure that pilots-in-command have available on board the helicopter all the essential information concerning the search and rescue services in the area over which the helicopter will be flown.

Note.— This information may be made available to the pilot by means of the operations manual or such other means as is considered appropriate.

1.2 Compliance by a foreign operator with laws, regulations and procedures of a State

1.2.1 When a State identifies a case of non-compliance or suspected non-compliance by a foreign operator with laws, regulations and procedures applicable within that State's territory, or a similar serious safety issue with that operator, that State shall immediately notify the operator and, if the issue warrants it, the State of the Operator. Where the State of the Operator and the State of Registry are different, such notification shall also be made to the State of Registry, if the issue falls within the responsibilities of that State and warrants a notification.

1.2.2 In the case of notification to States as specified in 1.2.1, if the issue and its resolution warrant it, the State in which the operation is conducted shall engage in consultations with the State of the Operator and the State of Registry, as applicable, concerning the safety standards maintained by the operator.

Note.— The Manual of Procedures for Operations Inspection, Certification and Continued Surveillance (Doc 8335) provides guidance on the surveillance of operations by foreign operators. The manual also contains guidance on the consultations and related activities, as specified in 1.2.2, including the ICAO model clause on aviation safety, which, if included in a bilateral or multilateral agreement, provides for consultations among States, when safety issues are identified by any of the parties to a bilateral or multilateral agreement on air services.

1.3 Safety management

Note.— Annex 19 includes safety management provisions for air operators. Further guidance is contained in the Safety Management Manual (SMM) (Doc 9859).

1.3.1 **Recommendation.**— *An operator of a helicopter of a certified take-off mass in excess of 7 000 kg or having a passenger seating configuration of more than 9 and fitted with a flight data recorder should establish and maintain a flight data analysis programme as part of its safety management system.*

Note.— *An operator may contract the operation of a flight data analysis programme to another party while retaining overall responsibility for the maintenance of such a programme.*

1.3.2 A flight data analysis programme shall be non-punitive and contain adequate safeguards to protect the source(s) of the data.

Note 1.— *Guidance on the establishment of flight data analysis programmes is included in the Manual on Flight Data Analysis Programmes (FDAP) (Doc 10000).*

Note 2.— *Legal guidance for the protection of information from safety data collection and processing systems is contained in Attachment B to Annex 19.*

1.3.3 An operator shall establish a flight safety documents system, for the use and guidance of operational personnel, as part of its safety management system.

Note.— *Guidance on the development and organization of a flight safety documents system is provided in Attachment F.*

1.4 Dangerous goods

Note 1.— *Provisions for carriage of dangerous goods are contained in Annex 18.*

Note 2.— *Article 35 of the Convention refers to certain classes of cargo restrictions.*

1.5 Use of psychoactive substances

Note.— *Provisions concerning the use of psychoactive substances are contained in Annex 1, 1.2.7 and Annex 2, 2.5.*

CHAPTER 2. FLIGHT OPERATIONS

2.1 Operating facilities

2.1.1 An operator shall ensure that a flight will not be commenced unless it has been ascertained by every reasonable means available that the ground and/or water facilities available and directly required on such flight, for the safe operation of the helicopter and the protection of the passengers, are adequate for the type of operation under which the flight is to be conducted and are adequately operated for this purpose.

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

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

2.2 Operational certification and supervision

2.2.1 The air operator certificate

2.2.1.1 An operator shall not engage in commercial air transport operations unless in possession of a valid air operator certificate issued by the State of the Operator.

2.2.1.2 The air operator certificate shall authorize the operator to conduct commercial air transport operations in accordance with the operations specifications.

Note.— Provisions for the content of the air operator certificate and its associated operations specifications are contained in 2.2.1.5 and 2.2.1.6.

2.2.1.3 The issue of an air operator certificate by the State of the Operator shall be dependent upon the operator demonstrating an adequate organization, method of control and supervision of flight operations, training programme as well as ground handling and maintenance arrangements consistent with the nature and extent of the operations specified.

Note.— Attachment E contains guidance on the issue of an air operator certificate.

2.2.1.4 The continued validity of an air operator certificate shall depend upon the operator maintaining the requirements of 2.2.1.3 under the supervision of the State of the Operator.

2.2.1.5 The air operator certificate shall contain at least the following information and, from 1 January 2010, shall follow the layout of Appendix 3, paragraph 2:

- a) the State of the Operator and the issuing authority;
- b) the air operator certificate number and its expiration date;
- c) the operator name, trading name (if different) and address of the principal place of business;
- d) the date of issue and the name, signature and title of the authority representative; and

- e) the location, in a controlled document carried on board, where the contact details of operational management can be found.

2.2.1.6 The operations specifications associated with the air operator certificate shall contain at least the information listed in Appendix 3, paragraph 3, and, from 1 January 2010, shall follow the layout of Appendix 3, paragraph 3.

Note.— Attachment E, paragraph 3.2.2, contains additional information that may be listed in the operations specifications associated with the air operator certificate.

2.2.1.7 Air operator certificates and their associated operations specifications first issued from 20 November 2008 shall follow the layouts of Appendix 3, paragraphs 2 and 3.

2.2.1.8 The State of the Operator shall establish a system for both the certification and the continued surveillance of the operator in accordance with Appendix 1 to this Annex and Appendix 1 to Annex 19 to ensure that the required standards of operations established in 2.2 are maintained.

2.2.2 Surveillance of operations by a foreign operator

2.2.2.1 Contracting States shall recognize as valid an air operator certificate issued by another Contracting State provided that the requirements under which the certificate was issued are at least equal to the applicable Standards specified in this Annex and in Annex 19.

2.2.2.2 States shall establish a programme with procedures for the surveillance of operations in their territory by a foreign operator and for taking appropriate action when necessary to preserve safety.

2.2.2.3 An operator shall meet and maintain the requirements established by the States in which the operations are conducted.

Note.— Guidance on the surveillance of operations by foreign operators may be found in the Manual of Procedures for Operations Inspection, Certification and Continued Surveillance (Doc 8335).

2.2.3 Operations manual

2.2.3.1 An operator shall make available, for the use and guidance of operations personnel concerned, an operations manual constructed using the guidance contained in Attachment G. The operations manual shall be amended or revised as is necessary to ensure that the information contained therein is kept up to date. All such amendments or revisions shall be notified to all personnel that are required to use this manual.

2.2.3.2 The State of the Operator shall establish a requirement for the operator to provide a copy of the operations manual together with all amendments and/or revisions, for review and acceptance and, where required, approval. The operator shall incorporate in the operations manual such mandatory material as the State of the Operator may require.

Note 1.— Guidance for the organization and contents of an operations manual is provided in Attachment G.

Note 2.— Specific items in an operations manual require the approval of the State of the Operator in accordance with the Standards in 2.2.8, 4.1.3, 7.3.1 and 10.3.

2.2.4 Operating instructions — general

2.2.4.1 An operator shall ensure that all operations personnel are properly instructed in their particular duties and responsibilities and the relationship of such duties to the operation as a whole.

2.2.4.2 A helicopter rotor shall not be turned under power, for the purpose of flight, without a qualified pilot at the controls. The operator shall provide appropriately specific training and procedures to be followed for all personnel, other than qualified pilots, who are likely to carry out the turning of a rotor under power for purposes other than flight.

2.2.4.3 **Recommendation.**— *The operator should issue operating instructions and provide information on helicopter climb performance with all engines operating to enable the pilot-in-command to determine the climb gradient that can be achieved during the take-off and initial climb phase for the existing take-off conditions and intended take-off technique. This information should be based on the helicopter manufacturer's or other data, acceptable to the State of the Operator, and should be included in the operations manual.*

2.2.5 In-flight simulation of emergency situations

An operator shall ensure that when passengers or cargo are being carried, no emergency or abnormal situations shall be simulated.

2.2.6 Checklists

The checklists provided in accordance with 4.1.4 shall be used by flight crews prior to, during and after all phases of operations, and in emergency, to ensure compliance with the operating procedures contained in the aircraft operating manual, the flight manual or other documents associated with the certificate of airworthiness and otherwise in the operations manual. The design and utilization of checklists shall observe Human Factors principles.

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

2.2.7 Minimum flight altitudes (operations under IFR)

2.2.7.1 An operator shall be permitted to establish minimum flight altitudes for those routes flown for which minimum flight altitudes have been established by the State flown over or the responsible State, provided that they shall not be less than those established by that State, unless specifically approved.

2.2.7.2 An operator shall specify the method by which it is intended to determine minimum flight altitudes for operations conducted over routes for which minimum flight altitudes have not been established by the State flown over, or the responsible State, and shall include this method in the operations manual. The minimum flight altitudes determined in accordance with the above method shall not be lower than specified in Annex 2.

2.2.7.3 **Recommendation.**— *The method for establishing the minimum flight altitudes should be approved by the State of the Operator.*

2.2.7.4 **Recommendation.**— *The State of the Operator should approve such method only after careful consideration of the probable effects of the following factors on the safety of the operation in question:*

- a) *the accuracy and reliability with which the position of the helicopter can be determined;*
- b) *the inaccuracies in the indications of the altimeters used;*
- c) *the characteristics of the terrain (e.g. sudden changes in the elevation);*
- d) *the probability of encountering unfavourable meteorological conditions (e.g. severe turbulence and descending air currents);*

- e) possible inaccuracies in aeronautical charts; and
- f) airspace restrictions.

2.2.8 Heliport or landing location operating minima (operations under IFR)

2.2.8.1 The State of the Operator shall require that the operator establish operating minima for each heliport or landing location to be used in operations and shall approve the method of determination of such minima. Such minima shall not be lower than any that may be established for such heliports or landing locations by the State of the Aerodrome, except when specifically approved by that State.

Note.— This Standard does not require the State of the Aerodrome to establish operating minima.

2.2.8.1.1 The State of the Operator may approve operational credit(s) for operations with helicopters equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS. Such approvals shall not affect the classification of the instrument approach procedure.

Note 1.— Operational credit includes:

- a) for the purposes of an approach ban (2.4.1.2), a minima below the heliport or landing location operating minima;
- b) reducing or satisfying the visibility requirements; or
- c) requiring fewer ground facilities as compensated for by airborne capabilities.

Note 2.— Guidance on operational credit for aircraft equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS and CVS is contained in Attachment I and in the Manual of All-Weather Operations (Doc 9365).

Note 3.— Information regarding a HUD or equivalent displays, including references to RTCA and EUROCAE documents, is contained in the Manual of All-Weather Operations (Doc 9365).

Note 4.— Automatic landing system — helicopter is an automatic approach using airborne systems which provide automatic control of the flight path, to a point aligned with the landing surface, from which the pilot can transition to a safe landing by means of natural vision without the use of automatic control.

2.2.8.2 The State of the Operator shall require that in establishing the operating minima for each heliport or landing location which will apply to any particular operation, full account shall be taken of:

- a) the type, performance and handling characteristics of the helicopter;
- b) the composition of the flight crew, their competence and experience;
- c) the physical characteristics of the heliport, and direction of approach;
- d) the adequacy and performance of the available visual and non-visual ground aids;
- e) the equipment available on the helicopter for the purpose of navigation, acquisition of visual references and/or control of the flight path during the approach, landing and missed approach;
- f) the obstacles in the approach and missed approach areas and the obstacle clearance altitude/height for the instrument approach procedures;

- g) the means used to determine and report meteorological conditions; and
- h) the obstacles in the climb-out areas and necessary clearance margins.

2.2.8.3 Instrument approach operations shall be classified based on the designed lowest operating minima below which an approach operation shall only be continued with the required visual reference as follows:

- a) Type A: a minimum descent height or decision height at or above 75 m (250 ft); and
- b) Type B: a decision height below 75 m (250 ft). Type B instrument approach operations are categorized as:
 - 1) Category I (CAT I): a decision height not lower than 60 m (200 ft) and with either a visibility not less than 800 m or a runway visual range not less than 550 m;
 - 2) Category II (CAT II): a decision height lower than 60 m (200 ft), but not lower than 30 m (100 ft) and a runway visual range not less than 300 m;
 - 3) Category IIIA (CAT IIIA): a decision height lower than 30 m (100 ft) or no decision height and a runway visual range not less than 175 m;
 - 4) Category IIIB (CAT IIIB): a decision height lower than 15 m (50 ft), or no decision height and a runway visual range less than 175 m but not less than 50 m; and
 - 5) Category IIIC (CAT IIIC): no decision height and no runway visual range limitations.

Note 1.— Where decision height (DH) and runway visual range (RVR) fall into different categories of operation, the instrument approach operation would be conducted in accordance with the requirements of the most demanding category (e.g. an operation with a DH in the range of CAT IIIA but with an RVR in the range of CAT IIIB would be considered a CAT IIIB operation or an operation with a DH in the range of CAT II but with an RVR in the range of CAT I would be considered a CAT II operation).

Note 2.— The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path. In the case of a circling approach operation the required visual reference is the runway environment.

Note 3.— Guidance on approach classification as it relates to instrument approach operations, procedures, runways and navigation systems is contained in the Manual of All-Weather Operations (Doc 9365).

2.2.8.4 Category II and Category III instrument approach operations shall not be authorized unless RVR information is provided.

2.2.8.5 **Recommendation.**— *For instrument approach operations, heliport or landing location operating minima below 800 m visibility should not be authorized unless RVR information or an accurate measurement or observation of visibility is provided.*

Note.— Guidance on the operationally desirable and currently attainable accuracy of measurement or observation is given in Annex 3, Attachment B.

2.2.8.6 The operating minima for 2D instrument approach operations using instrument approach procedures shall be determined by establishing a minimum descent altitude (MDA) or minimum descent height (MDH), minimum visibility and, if necessary, cloud conditions.

Note.— For guidance on applying a continuous descent final approach (CDFA) flight technique on non-precision approach procedures refer to PANS-OPS (Doc 8168) Volume I, Part I, Section 4, Chapter 1, paragraph 1.7.

2.2.8.7 The operating minima for 3D instrument approach operations using instrument approach procedures shall be determined by establishing a decision altitude (DA) or decision height (DH) and the minimum visibility or RVR.

2.2.9 Fuel and oil records

2.2.9.1 An operator shall maintain fuel and oil records to enable the State of the Operator to ascertain that, for each flight, the requirements of 2.3.6 have been complied with.

2.2.9.2 Fuel and oil records shall be retained by the operator for a period of three months.

2.2.10 Crew

2.2.10.1 *Pilot-in-command.* For each flight, the operator shall designate one pilot to act as pilot-in-command.

2.2.10.2 *Flight time, flight duty periods and rest periods.* An operator shall formulate rules to limit flight time and flight duty periods and for the provision of adequate rest periods for all its crew members. These rules shall be in accordance with the regulations established by the State of the Operator, or approved by that State, and included in the operations manual.

Note.— Guidance on the establishment of limitations is given in Attachment B.

2.2.10.3 An operator shall maintain current records of the flight time, flight duty periods and rest periods of all its crew members.

2.2.11 Passengers

2.2.11.1 An operator shall ensure that passengers are made familiar with the location and use of:

- a) seat belts or harnesses;
- b) emergency exits;
- c) life jackets, if the carriage of life jackets is prescribed;
- d) oxygen dispensing equipment, if the provision of oxygen for the use of passengers is prescribed; and
- e) other emergency equipment provided for individual use, including passenger emergency briefing cards.

2.2.11.2 The operator shall ensure that the passengers are informed of the location and general manner of use of the principal emergency equipment carried for collective use.

2.2.11.3 In an emergency during flight, passengers shall be instructed in such emergency action as may be appropriate to the circumstances.

2.2.11.4 The operator shall ensure that, during take-off and landing and whenever considered necessary by reason of turbulence or any emergency occurring during flight, all passengers on board a helicopter shall be secured in their seats by means of the seat belts or harnesses provided.

2.2.12 Over-water flights

All helicopters on flights over water in a hostile environment in accordance with 4.5.1 shall be certificated for ditching. Sea state shall be an integral part of ditching information.

2.3 Flight preparation

2.3.1 A flight, or series of flights, shall not be commenced until flight preparation forms have been completed certifying that the pilot-in-command is satisfied that:

- a) the helicopter is airworthy;
- b) the instruments and equipment prescribed in Chapter 4, for the particular type of operation to be undertaken, are installed and are sufficient for the flight;
- c) a maintenance release as prescribed in 6.7 has been issued in respect of the helicopter;
- d) the mass of the helicopter and centre of gravity location are such that the flight can be conducted safely, taking into account the flight conditions expected;
- e) any load carried is properly distributed and safely secured;
- f) a check has been completed indicating that the operating limitations of Chapter 3 can be complied with for the flight to be undertaken; and
- g) the Standards of 2.3.3 relating to operational flight planning have been complied with.

Note.— Series of flights are consecutive flights that:

- a) begin and end within a period of 24 hours; and*
- b) are all conducted by the same pilot-in-command.*

2.3.2 Completed flight preparation forms shall be kept by an operator for a period of three months.

2.3.3 Operational flight planning

2.3.3.1 An operational flight plan shall be completed for every intended flight or series of flights, and approved by the pilot-in-command, and shall be lodged with the appropriate authority. The operator shall determine the most efficient means of lodging the operational flight plan.

2.3.3.2 The operations manual shall describe the content and use of the operational flight plan.

2.3.4 Alternate heliports

2.3.4.1 Take-off alternate heliport

2.3.4.1.1 A take-off alternate heliport shall be selected and specified in the operational flight plan if the weather conditions at the heliport of departure are at or below the applicable heliport operating minima.

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

2.3.4.2 Destination alternate heliport

2.3.4.2.1 For a flight to be conducted in accordance with IFR, at least one destination alternate shall be specified in the operational flight plan and the flight plan, unless:

- a) the duration of the flight and the meteorological conditions prevailing are such that there is reasonable certainty that, at the estimated time of arrival at the heliport of intended landing, and for a reasonable period before and after such time, the approach and landing may be made under visual meteorological conditions as prescribed by the State of the Operator; or
- b) the heliport of intended landing is isolated and no suitable alternate is available. A point of no return (PNR) shall be determined.

2.3.4.2.2 For a heliport to be selected as a destination alternate, the available information shall indicate that, at the estimated time of use, the conditions will be at or above the heliport operating minima for that operation.

2.3.4.2.3 **Recommendation.**— *For a flight departing to a destination which is forecast to be below the heliport operating minima, two destination alternates should be selected. The first destination alternate should be at or above the heliport operating minima for destination and the second at or above the heliport operating minima for alternate.*

2.3.4.3 Suitable offshore alternates shall be specified subject to the following:

- a) the offshore alternates shall be used only after a PNR. Prior to a PNR, onshore alternates shall be used;
- b) mechanical reliability of critical control systems and critical components shall be considered and taken into account when determining the suitability of the alternates;
- c) one engine inoperative performance capability shall be attainable prior to arrival at the alternate;
- d) to the extent possible, deck availability shall be guaranteed; and
- e) weather information must be reliable and accurate.

Note.— *The landing technique specified in the flight manual following control system failure may preclude the nomination of certain helidecks as alternate heliports.*

2.3.4.4 **Recommendation.**— *Offshore alternates should not be used when it is possible to carry enough fuel to have an onshore alternate. Offshore alternates should not be used in a hostile environment.*

2.3.5 Weather conditions

2.3.5.1 A flight to be conducted in accordance with VFR shall not be commenced unless current meteorological reports or a combination of current reports and forecasts indicate that the meteorological conditions along the route or that part of the route to be flown or in the intended area of operations under VFR will, at the appropriate time, be such as to render compliance with these rules possible.

Note.— *When a flight is conducted in accordance with VFR, the use of night vision imaging systems (NVIS) or other vision enhancing systems does not diminish the requirement to comply with the provisions of 2.3.5.1.*

2.3.5.2 A flight to be conducted in accordance with IFR shall not be commenced unless the information is available which indicates that conditions at the heliport of intended landing or, when an alternate is required, at least one alternate heliport will, at the estimated time of arrival, be at or above the heliport operating minima.

Note.— It is the practice in some States to declare, for flight planning purposes, higher minima for a heliport when nominated as an alternate than for the same heliport when planned as that of intended landing.

2.3.5.3 A flight to be operated in known or expected icing conditions shall not be commenced unless the helicopter is certificated and equipped to cope with such conditions.

2.3.5.4 A flight to be planned or expected to operate in suspected or known ground icing conditions shall not be commenced unless the helicopter has been inspected for icing and, if necessary, has been given appropriate de-icing/anti-icing treatment. Accumulation of ice or other naturally occurring contaminants shall be removed so that the helicopter is kept in an airworthy condition prior to take-off.

Note.— Guidance material is given in the Manual of Aircraft Ground De-icing/Anti-icing Operations (Doc 9640).

2.3.6 Fuel and oil requirements

2.3.6.1 *All helicopters.* A flight shall not be commenced unless, taking into account both the meteorological conditions and any delays that are expected in flight, the helicopter carries sufficient fuel and oil to ensure that it can safely complete the flight. In addition, a reserve shall be carried to provide for contingencies.

2.3.6.2 *VFR operations.* The fuel and oil carried in order to comply with 2.3.6.1 shall, in the case of VFR operations, be at least the amount to allow the helicopter to:

- a) fly to the landing site to which the flight is planned;
- b) have final reserve fuel to fly thereafter for a period of 20 minutes at best-range speed; and
- c) have an additional amount of fuel to provide for the increased consumption on the occurrence of any of the potential contingencies specified by the operator to the satisfaction of the State of the Operator.

2.3.6.3 *IFR operations.* The fuel and oil carried in order to comply with 2.3.6.1 shall, in the case of IFR operations, be at least the amount to allow the helicopter:

2.3.6.3.1 When an alternate is not required, in terms of 2.3.4.2.1 a), to fly to and execute an approach at the heliport or landing location to which the flight is planned, and thereafter to have:

- a) final reserve fuel to fly 30 minutes at holding speed at 450 m (1 500 ft) above the destination heliport or landing location under standard temperature conditions and approach and land; and
- b) an additional amount of fuel to provide for the increased consumption on the occurrence of any of the potential contingencies specified by the operator to the satisfaction of the State of the Operator.

2.3.6.3.2 When an alternate is required, to fly to and execute an approach, and a missed approach, at the heliport or landing location to which the flight is planned, and thereafter:

- a) fly to and execute an approach at the alternate specified in the flight plan; and then
- b) have final reserve fuel to fly for 30 minutes at holding speed at 450 m (1 500 ft) above the alternate under standard temperature conditions, and approach and land; and

- c) have an additional amount of fuel to provide for the increased consumption on the occurrence of any of the potential contingencies specified by the operator to the satisfaction of the State of the Operator.

2.3.6.3.3 When no suitable alternate is available, in terms of 2.3.4.2.1 (e.g. the destination is isolated), sufficient fuel shall be carried to enable the helicopter to fly to the destination to which the flight is planned and thereafter for a period that will, based on geographic and environmental considerations, enable a safe landing to be made.

2.3.6.4 In computing the fuel and oil required in 2.3.6.1, at least the following shall be considered:

- a) meteorological conditions forecast;
- b) expected air traffic control routings and traffic delays;
- c) for IFR flight, one instrument approach at the destination heliport, including a missed approach;
- d) the procedures prescribed in the operations manual for loss of pressurization, where applicable, or failure of one engine while en route; and
- e) any other conditions that may delay the landing of the helicopter or increase fuel and/or oil consumption.

Note.— Nothing in 2.3.6 precludes amendment of a flight plan in flight in order to replan the flight to another heliport, provided that the requirements of 2.3.6 can be complied with from the point where the flight has been replanned.

2.3.6.5 The use of fuel after flight commencement for purposes other than originally intended during pre-flight planning shall require a re-analysis and, if applicable, adjustment of the planned operation.

2.3.7 Refuelling with passengers on board or rotors turning

Recommendation.— *A helicopter should not be refuelled when passengers are embarking, on board, disembarking or when the rotor is turning unless the operator is granted specific authorization by the State of the Operator setting forth the conditions under which such fuelling may be carried out.*

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

Note 2.— Additional precautions are required when refuelling with fuels other than aviation kerosene or when refuelling results in a mixture of aviation kerosene with other aviation turbine fuels, or when an open line is used.

2.3.8 Oxygen supply

Note.— Approximate altitudes in the Standard Atmosphere corresponding to the values of absolute pressure used in the text are as follows:

Absolute pressure	Metres	Feet
700 hPa	3 000	10 000
620 hPa	4 000	13 000
376 hPa	7 600	25 000

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

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

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

2.4 In-flight procedures

2.4.1 Heliport operating minima

2.4.1.1 A flight shall not be continued towards the heliport of intended landing, unless the latest available information indicates that at the expected time of arrival, a landing can be effected at that heliport, or at least one alternate heliport, in compliance with the operating minima established in accordance with 2.2.8.1.

2.4.1.2 An instrument approach shall not be continued below 300 m (1 000 ft) above the heliport elevation or into the final approach segment unless the reported visibility or controlling RVR is at or above the heliport operating minima.

Note.— Criteria for the final approach segment is contained in PANS-OPS (Doc 8168), Volume II.

2.4.1.3 If, after entering the final approach segment or after descending below 300 m (1 000 ft) above the heliport elevation, the reported visibility or controlling RVR falls below the specified minimum, the approach may be continued to DA/H or MDA/H. In any case, a helicopter shall not continue its approach-to-land at any heliport beyond a point at which the limits of the operating minima specified for that heliport would be infringed.

2.4.2 Meteorological observations

Note.— The procedures for making meteorological observations on board aircraft in flight and for recording and reporting them are contained in Annex 3, the PANS-ATM (Doc 4444) and the appropriate Regional Supplementary Procedures (Doc 7030).

2.4.3 Hazardous flight conditions

Hazardous flight conditions encountered, other than those associated with meteorological conditions, shall be reported to the appropriate aeronautical station as soon as possible. The reports so rendered shall give such details as may be pertinent to the safety of other aircraft.

2.4.4 Flight crew members at duty stations

2.4.4.1 *Take-off and landing.* All flight crew members required to be on flight deck duty shall be at their stations.

2.4.4.2 *En route.* All flight crew members required to be on flight deck duty shall remain at their stations except when their absence is necessary for the performance of duties in connection with the operation of the helicopter or for physiological needs.

2.4.4.3 *Seat belts.* All flight crew members shall keep their seat belt fastened when at their stations.

2.4.4.4 *Safety harness.* Any flight crew member occupying a pilot's seat shall keep the safety harness fastened during the take-off and landing phases; all other flight crew members shall keep their safety harness fastened during the take-off and landing phases unless the shoulder straps interfere with the performance of their duties, in which case the shoulder straps may be unfastened but the seat belt must remain fastened.

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

2.4.5 Use of oxygen

All flight crew members, when engaged in performing duties essential to the safe operation of a helicopter in flight, shall use breathing oxygen continuously whenever the circumstances prevail for which its supply has been required in 2.3.8.1 or 2.3.8.2.

2.4.6 Safeguarding of cabin crew and passengers in pressurized aircraft in the event of loss of pressurization

Recommendation.— *Cabin crew should be safeguarded so as to ensure reasonable probability of their retaining consciousness during any emergency descent which may be necessary in the event of loss of pressurization and, in addition, they should have such means of protection as will enable them to administer first aid to passengers during stabilized flight following the emergency. Passengers should be safeguarded by such devices or operational procedures as will ensure reasonable probability of their surviving the effects of hypoxia in the event of loss of pressurization.*

Note.— *It is not envisaged that cabin crew will always be able to provide assistance to passengers during emergency descent procedures which may be required in the event of loss of pressurization.*

2.4.7 Instrument flight procedures

2.4.7.1 One or more instrument approach procedures to serve each final approach and take-off area or heliport utilized for instrument flight operations shall be approved and promulgated by the State in which the heliport is located, or by the State which is responsible for the heliport when located outside the territory of any State.

2.4.7.2 All helicopters operated in accordance with IFR shall comply with the instrument approach procedures approved by the State in which the heliport is located, or by the State which is responsible for the heliport when located outside the territory of any State.

Note 1.— *Operational procedures recommended for the guidance of operations personnel involved in instrument flight operations are described in PANS-OPS (Doc 8168), Volume I.*

Note 2.— *Criteria for the construction of instrument flight procedures for the guidance of procedure specialists are provided in PANS-OPS (Doc 8168), Volume II. Obstacle clearance criteria and procedures used in certain States may differ from PANS-OPS, and knowledge of these differences is important for safety reasons (see Section II, Chapter 1, 1.1.1).*

2.4.8 Helicopter operating procedures for noise abatement

Recommendation.— *An operator should ensure that take-off and landing procedures take into account the need to minimize the effect of helicopter noise.*

2.4.9 In-flight fuel management

2.4.9.1 An operator shall establish policies and procedures, approved by the State of the Operator, to ensure that in-flight fuel checks and fuel management are performed.

2.4.9.2 The pilot-in-command shall monitor the amount of usable fuel remaining on board to ensure it is not less than the fuel required to proceed to a landing site where a safe landing can be made with the planned final reserve fuel remaining.

2.4.9.3 The pilot-in-command shall advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific landing site, the pilot calculates that any change to the existing clearance to that landing site, or other air traffic delays, may result in landing with less than the planned final reserve fuel.

Note 1.— The declaration of MINIMUM FUEL informs ATC that all planned landing site options have been reduced to a specific landing site of intended landing, that no precautionary landing site is available, and any change to the existing clearance, or air traffic delays, may result in landing with less than the planned final reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.

Note 2.— A precautionary landing site refers to a landing site, other than the site of intended landing, where it is expected that a safe landing can be made prior to the consumption of the planned final reserve fuel.

2.4.9.4 The pilot-in-command shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAY MAYDAY FUEL, when the usable fuel estimated to be available upon landing at the nearest landing site where a safe landing can be made is less than the required final reserve fuel in compliance with 2.3.6.

Note 1.— The planned final reserve fuel refers to the value calculated in 2.3.6 and is the minimum amount of fuel required upon landing at any landing site. The declaration of MAYDAY MAYDAY MAYDAY FUEL informs ATC that all available landing options have been reduced to a specific site and a portion of the final reserve fuel may be consumed prior to landing.

Note 2.— The pilot estimates with reasonable certainty that the fuel remaining upon landing at the nearest safe landing site will be less than the final reserve fuel taking into consideration the latest information available to the pilot, the area to be overflowed (i.e. with respect to the availability of precautionary landing areas), meteorological conditions and other reasonable contingencies.

Note 3.— The words “MAYDAY FUEL” describe the nature of the distress conditions as required in Annex 10, Volume II, 5.3.2.1.1, b) 3.

2.5 Duties of pilot-in-command

2.5.1 The pilot-in-command shall be responsible for the operation and safety of the helicopter and for the safety of all crew members, passengers and cargo on board, from the moment the engine(s) are started until the helicopter finally comes to rest at the end of the flight, with the engine(s) shut down and the rotor blades stopped.

2.5.2 The pilot-in-command shall ensure that the checklists specified in 2.2.6 are complied with in detail.

2.5.3 The pilot-in-command shall be responsible for notifying the nearest appropriate authority by the quickest available means of any accident involving the helicopter, resulting in serious injury or death of any person or substantial damage to the helicopter or property.

Note.— A definition of the term “serious injury” is contained in Annex 13.

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

2.5.5 The pilot-in-command shall be responsible for the journey log book or the general declaration containing the information listed in 9.4.1.

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

2.6 Duties of flight operations officer/flight dispatcher

2.6.1 A flight operations officer/flight dispatcher in conjunction with a method of control and supervision of flight operations in accordance with 2.2.1.3 shall:

- a) assist the pilot-in-command in flight preparation and provide the relevant information;
- b) assist the pilot-in-command in preparing the operational and ATS flight plans, sign when applicable and file the ATS flight plan with the appropriate ATS unit; and
- c) furnish the pilot-in-command while in flight, by appropriate means, with information which may be necessary for the safe conduct of the flight.

2.6.2 In the event of an emergency, a flight operations officer/flight dispatcher shall:

- a) initiate such procedures as outlined in the operations manual while avoiding taking any action that would conflict with ATC procedures; and
- b) convey safety-related information to the pilot-in-command that may be necessary for the safe conduct of the flight, including information related to any amendments to the flight plan that become necessary in the course of the flight.

Note.— It is equally important that the pilot-in-command also convey similar information to the flight operations officer/flight dispatcher during the course of a flight, particularly in the context of emergency situations.

2.7 Carry-on baggage

The operator shall ensure that all baggage carried onto a helicopter and taken into the passenger cabin is adequately and securely stowed.

CHAPTER 3. HELICOPTER PERFORMANCE OPERATING LIMITATIONS

3.1 General

3.1.1 Helicopters shall be operated in accordance with a code of performance established by the State of the Operator, in compliance with the applicable Standards of this chapter.

Note 1.— The code of performance reflects, for the conduct of operations, both the various phases of flight and the operational environment. Attachment A provides guidance to assist States in establishing a code of performance.

Note 2.— Concerning compliance with codes of performance, Chapter 1 of this Section requires operators to comply with the laws, regulations and procedures of the States in which their helicopters are operated. Article 11 of the Convention forms the basis for this requirement.

3.1.2 In conditions where the safe continuation of flight is not ensured in the event of a critical engine failure, helicopter operations shall be conducted in a manner that gives appropriate consideration for achieving a safe forced landing.

Note.— Guidance on “appropriate consideration” is contained in Attachment A, 2.4.

3.1.2.1 Where the State of the Operator permits IMC operations in performance Class 3, such operations shall be conducted in accordance with the provisions of 3.4.

3.1.3 **Recommendation.**— *For helicopters for which Part IV of Annex 8 is not applicable because of the exemption provided for in Article 41 of the Convention, the State of the Operator should ensure that the level of performance specified in 3.2 is met as far as practicable.*

3.1.4 Where helicopters are operated to or from heliports in a congested hostile environment, the competent authority of the State in which the heliport is situated shall specify the requirements to enable these operations to be conducted in a manner that gives appropriate consideration for the risk associated with an engine failure.

Note.— Guidance on “appropriate consideration” is contained in Attachment A, 2.4.

3.2 Applicable to helicopters certificated in accordance with Part IV of Annex 8

3.2.1 The Standards contained in 3.2.2 to 3.2.7 inclusive are applicable to the helicopters to which Part IV of Annex 8 is applicable.

Note.— The following Standards do not include quantitative specifications comparable to those found in national airworthiness codes. In accordance with 3.1.1, they are to be supplemented by national requirements prepared by Contracting States.

3.2.2 The level of performance defined by the appropriate parts of the code of performance referred to in 3.1.1 for the helicopters designated in 3.2.1 shall be consistent with the overall level embodied in the Standards of this chapter.

Note.— Attachment A contains guidance material which indicates, by an Example, the level of performance intended by the Standards and Recommended Practices of this chapter.

3.2.3 A helicopter shall be operated in compliance with the terms of its certificate of airworthiness and within the approved operating limitations contained in its flight manual.

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

3.2.5 A flight shall not be commenced unless the performance information provided in the flight manual indicates that the Standards of 3.2.6 and 3.2.7 can be complied with for the flight to be undertaken.

3.2.6 In applying the Standards of this chapter, account shall be taken of all factors that significantly affect the performance of the helicopter (such as: mass, operating procedures, the pressure-altitude appropriate to the elevation of the operating site, temperature, wind and condition of the surface). Such factors shall be taken into account directly as operational parameters or indirectly by means of allowances or margins, which may be provided in the scheduling of performance data or in the code of performance in accordance with which the helicopter is being operated.

3.2.7 Mass limitations

- a) The mass of the helicopter at the start of take-off shall not exceed the mass at which the code of performance referred to in 3.1.1 is complied with, allowing for expected reductions in mass as the flight proceeds and for such fuel jettisoning as is appropriate.
- b) In no case shall the mass at the start of take-off exceed the maximum take-off mass specified in the helicopter flight manual taking into account the factors specified in 3.2.6.
- c) In no case shall the estimated mass for the expected time of landing at the destination and at any alternate exceed the maximum landing mass specified in the helicopter flight manual taking into account the factors specified in 3.2.6.
- d) In no case shall the mass at the start of take-off, or at the expected time of landing at the destination and at any alternate, exceed the relevant maximum mass at which compliance has been demonstrated with the applicable noise certification Standards in Annex 16, Volume I, unless otherwise authorized in exceptional circumstances for a certain operating site where there is no noise disturbance problem, by the competent authority of the State in which the operating site is situated.

3.2.7.1 In developing a code of performance, the State of the Operator shall either apply a risk assessment methodology in accordance with the guidance in Attachment A or, for those States that choose not to apply a risk assessment methodology, the Standards of 3.2.7.2, 3.2.7.3 and 3.2.7.4 shall apply.

3.2.7.2 Take-off and initial climb phase

3.2.7.2.1 *Operations in performance Class 1.* The helicopter shall be able, in the event of the failure of the critical engine being recognized at or before the take-off decision point, to discontinue the take-off and stop within the rejected take-off area available or, in the event of the failure of the critical engine being recognized at or after the take-off decision point, to continue the take-off, clearing all obstacles along the flight path by an adequate margin until the helicopter is in a position to comply with 3.2.7.3.1.

3.2.7.2.2 *Operations in performance Class 2.* The helicopter shall be able, in the event of the failure of the critical engine at any time after reaching DPATO, to continue the take-off, clearing all obstacles along the flight path by an adequate margin until the helicopter is in a position to comply with 3.2.7.3.1. Before the DPATO, failure of the critical engine may cause the helicopter to force-land; therefore the conditions stated in 3.1.2 shall apply.

3.2.7.2.3 *Operations in performance Class 3.* At any point of the flight path, failure of an engine will cause the helicopter to force-land; therefore the conditions stated in 3.1.2 shall apply.

3.2.7.3 *En-route phase*

3.2.7.3.1 *Operations in performance Classes 1 and 2.* The helicopter shall be able, in the event of the failure of the critical engine at any point in the en-route phase, to continue the flight to a site at which the conditions of 3.2.7.4.1 for operations in performance Class 1, or the conditions of 3.2.7.4.2 for operations in performance Class 2 can be met, without flying below the appropriate minimum flight altitude at any point.

Note.— When the en-route phase is conducted over a hostile environment and the diversion time to an alternate would exceed two hours, it is recommended that the State of the Operator assess the risks associated with a second engine failure.

3.2.7.3.2 *Operations in performance Class 3.* The helicopter shall be able, with all engines operating, to continue along its intended route or planned diversions without flying at any point below the appropriate minimum flight altitude. At any point of the flight path, failure of an engine will cause the helicopter to force-land; therefore the conditions stated in 3.1.2 shall apply.

3.2.7.4 *Approach and landing phase*

3.2.7.4.1 *Operations in performance Class 1.* In the event of the failure of the critical engine being recognized at any point during the approach and landing phase, before the landing decision point, the helicopter shall, at the destination and at any alternate, after clearing all obstacles in the approach path, be able to land and stop within the landing distance available or to perform a bailed landing and clear all obstacles in the flight path by an adequate margin equivalent to that specified in 3.2.7.2.1. In case of the failure occurring after the landing decision point, the helicopter shall be able to land and stop within the landing distance available.

3.2.7.4.2 *Operations in performance Class 2.* In the event of the failure of the critical engine before the DPBL, the helicopter shall, at the destination and at any alternate, after clearing all obstacles in the approach path, be able either to land and stop within the landing distance available or to perform a bailed landing and clear all obstacles in the flight path by an adequate margin equivalent to that specified in 3.2.7.2.2. After the DPBL, failure of an engine may cause the helicopter to force-land; therefore the conditions stated in 3.1.2 shall apply.

3.2.7.4.3 *Operations in performance Class 3.* At any point of the flight path, failure of an engine will cause the helicopter to force-land; therefore the conditions stated in 3.1.2 shall apply.

3.3 **Obstacle data**

The operator shall use available obstacle data to develop procedures to comply with the take-off, initial climb, approach and landing phases detailed in the code of performance established by the State of the Operator.

3.4 **Additional requirements for operations of helicopters in performance Class 3 in IMC, except special VFR flights**

3.4.1 Operations in performance Class 3 in IMC shall be conducted only over a surface environment acceptable to the competent authority of the State over which the operations are performed.

3.4.2 In approving operations by helicopters operating in performance Class 3 in IMC, the State of the Operator shall ensure that the helicopter is certificated for flight under IFR and that the overall level of safety intended by the provisions of Annexes 6 and 8 is provided by:

- a) the reliability of the engines;
- b) the operator's maintenance procedures, operating practices and crew training programmes; and
- c) equipment and other requirements provided in accordance with Appendix 2.

Note.— Guidance on additional requirements for operations of helicopters in performance Class 3 in IMC is contained in Appendix 2.

3.4.3 Operators of helicopters operating in performance Class 3 in IMC shall have a programme for engine trend monitoring and shall utilize the engine and helicopter manufacturers' recommended instruments, systems and operational/maintenance procedures to monitor the engines.

3.4.4 **Recommendation.**— *In order to minimize the occurrence of mechanical failures, helicopters operating in IMC in performance Class 3 should utilize vibration health monitoring for the tail-rotor drive system.*

CHAPTER 4. HELICOPTER INSTRUMENTS, EQUIPMENT, AND FLIGHT DOCUMENTS

Note.— Specifications for the provision of helicopter communication and navigation equipment are contained in Chapter 5.

4.1 General

4.1.1 In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness, the instruments, equipment and flight documents prescribed in the following paragraphs shall be installed or carried, as appropriate, in helicopters according to the helicopter used and to the circumstances under which the flight is to be conducted. The prescribed instruments and equipment, including their installation, shall be approved or accepted by the State of Registry.

4.1.2 A helicopter shall carry a certified true copy of the air operator certificate specified in 2.2.1, and a copy of the operations specifications relevant to the helicopter type, issued in conjunction with the certificate. When the certificate and the associated operations specifications are issued by the State of the Operator in a language other than English, an English translation shall be included.

Note.— Provisions for the content of the air operator certificate and its associated operations specifications are contained in 2.2.1.5 and 2.2.1.6.

4.1.3 The operator shall include in the operations manual a minimum equipment list (MEL), approved by the State of the Operator which will enable the pilot-in-command to determine whether a flight may be commenced or continued from any intermediate stop should any instrument, equipment or systems become inoperative. Where the State of the Operator is not the State of Registry, the State of the Operator shall ensure that the MEL does not affect the helicopter's compliance with the airworthiness requirements applicable in the State of Registry.

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

4.1.4 The operator shall make available to operations staff and crew members an aircraft operating manual, for each aircraft type operated, containing the normal, abnormal and emergency procedures relating to the operation of the aircraft. The manual shall include details of the aircraft systems and of the checklists to be used. The design of the manual shall observe Human Factors principles. The manual shall be easily accessible to the flight crew during all flight operations.

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

4.2 All helicopters on all flights

4.2.1 A helicopter shall be equipped with instruments that will enable the flight crew to control the flight path of the helicopter, carry out any required procedural manoeuvres and observe the operating limitations of the helicopter in the expected operating conditions.

4.2.2 A helicopter shall be equipped with:

a) accessible and adequate medical supplies;

Recommendation.— *Medical supplies should comprise:*

- 1) *a first-aid kit; and*
- 2) *for helicopters required to carry cabin crew as part of the operating crew, a universal precaution kit, for the use of cabin crew in managing incidents of ill health associated with a case of suspected communicable disease, or in the case of illness involving contact with body fluids.*

Note.— *Guidance on the contents of first-aid and universal precaution kits is given in Attachment C.*

b) portable fire extinguishers of a type which, when discharged, will not cause dangerous contamination of the air within the helicopter. At least one shall be located in:

- 1) the pilot's compartment; and
- 2) each passenger compartment that is separate from the pilot's compartment and that is not readily accessible to the flight crew.

Note 1.— *Any portable fire extinguisher so fitted in accordance with the certificate of airworthiness of the helicopter may count as one prescribed.*

Note 2.— *Refer to 4.2.2.1 for fire extinguishing agents.*

c)

- 1) a seat or berth for each person over an age to be determined by the State of the Operator;
- 2) a seat belt for each seat and restraining belts for each berth; and
- 3) a safety harness for each flight crew seat. The safety harness for each pilot seat shall incorporate a device which will automatically restrain the occupant's torso in the event of rapid deceleration.

Recommendation.— *When dual controls are fitted, the safety harness for each pilot seat should incorporate a restraining device to prevent the upper body of an incapacitated occupant from interfering with the flight controls.*

Note 1.— *Depending on the design, the lock on an inertia reel device may suffice for this purpose.*

Note 2.— *Safety harness includes shoulder straps and a seat belt which may be used independently.*

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

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

e) if fuses are used, spare electrical fuses of appropriate ratings for replacement of those accessible in flight.

4.2.2.1 Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in a helicopter for which the individual certificate of airworthiness is first issued on or after 31 December 2011 and any extinguishing agent used in a portable fire extinguisher in a helicopter for which the individual certificate of airworthiness is first issued on or after 31 December 2016 shall:

- a) meet the applicable minimum performance requirements of the State of Registry; and
- b) not be of a type listed in the 1987 *Montreal Protocol on Substances that Deplete the Ozone Layer* as it appears in the Eighth Edition of the *Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer*, Annex A, Group II.

Note.— *Information concerning extinguishing agents is contained in the UNEP Halons Technical Options Committee Technical Note No. 1 – New Technology Halon Alternatives and FAA Report No. DOT/FAA/AR-99-63, Options to the Use of Halons for Aircraft Fire Suppression Systems.*

4.2.3 A helicopter shall carry:

- a) the operations manual prescribed in 2.2.2, or those parts of it that pertain to flight operations;
- b) the helicopter flight manual for the helicopter, or other documents containing performance data required for the application of Chapter 3 and any other information necessary for the operation of the helicopter within the terms of its certificate of airworthiness, unless these data are available in the operations manual; and
- c) current and suitable charts to cover the route of the proposed flight and any route along which it is reasonable to expect that the flight may be diverted.

4.2.4 Marking of break-in points

4.2.4.1 If areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on a helicopter, such areas shall be marked as shown below (see figure following). The colour of the markings shall be red or yellow, and if necessary they shall be outlined in white to contrast with the background.

4.2.4.2 If the corner markings are more than 2 m apart, intermediate lines 9 cm × 3 cm shall be inserted so that there is no more than 2 m between adjacent markings.

Note.— *This Standard does not require any helicopter to have break-in areas.*

4.3 Flight recorders

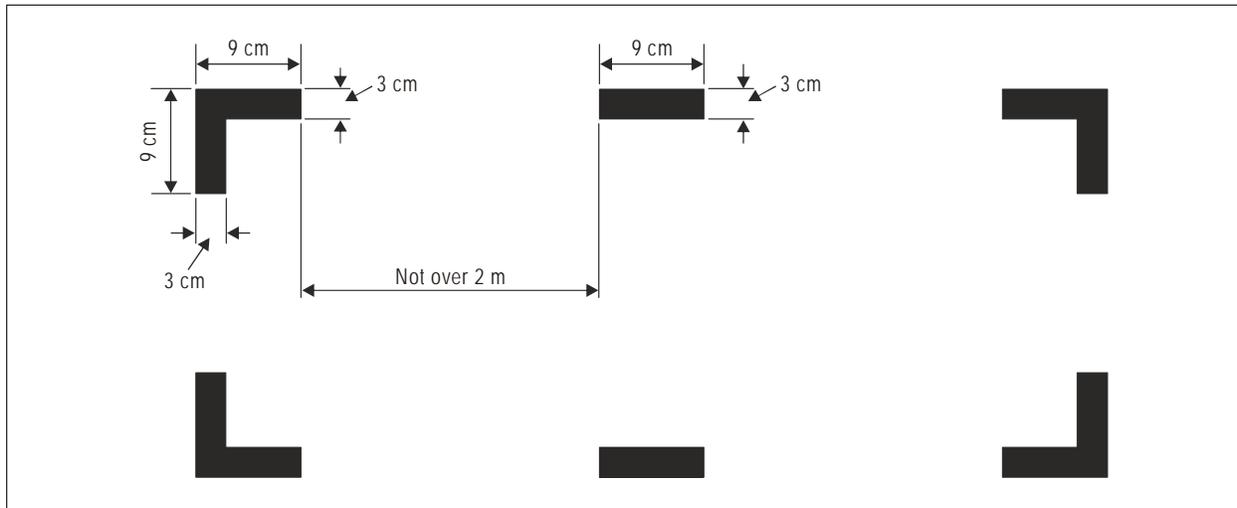
Note 1.— *Crash protected flight recorders comprise one or more of the following systems: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) and/or a data link recorder (DLR). Image and data link information may be recorded on either the CVR or the FDR.*

Note 2.— *Combination recorders (FDR/CVR) may be used to meet the flight recorder equipage requirements in this Annex.*

Note 3.— *Detailed guidance on flight recorders is contained in Appendix 4.*

Note 4.— *Lightweight flight recorders comprise one or more of the following systems: an aircraft data recording system (ADRS), a cockpit audio recording system (CARS), an airborne image recording system (AIRS) and/or a data link recording system (DLRS). Image and data link information may be recorded on either the CARS or the ADRS.*

Note 5.— *For helicopters for which the application for type certification is submitted to a Contracting State before 1 January 2016, specifications applicable to flight recorders may be found in EUROCAE ED-112, ED-56A, ED-55, Minimum Operational Performance Specifications (MOPS), or earlier equivalent documents.*



MARKING OF BREAK-IN POINTS (see 4.2.4)

Note 6.— For helicopters for which the application for type certification is submitted to a Contracting State on or after 1 January 2016, specifications applicable to flight recorders may be found in EUROCAE ED-112A, Minimum Operational Performance Specification (MOPS), or equivalent documents.

4.3.1 Flight data recorders and aircraft data recording systems

Note 1.— Parameters to be recorded are listed in Table A4-1 of Appendix 4.

Note 2.— ADRS performance requirements are as contained in the EUROCAE ED-155, Minimum Operational Performance Specification (MOPS) for Lightweight Flight Recorder Systems, or equivalent documents.

4.3.1.1 Types

4.3.1.1.1 A Type IV FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude, engine power and operation.

4.3.1.1.2 A Type IVA FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude, engine power, operation and configuration.

4.3.1.1.3 A Type V FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude and engine power.

4.3.1.2 Operation

4.3.1.2.1 All helicopters of a maximum certificated take-off mass of over 3 180 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2016 shall be equipped with a Type IVA FDR.

4.3.1.2.2 All helicopters of a maximum certificated take-off mass of over 7 000 kg, or having a passenger seating configuration of more than nineteen, for which the individual certificate of airworthiness is first issued on or after 1 January 1989 shall be equipped with a Type IV FDR.

4.3.1.2.3 **Recommendation.**— *All helicopters of a maximum certificated take-off mass of over 3 180 kg, up to and including 7 000 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1989, should be equipped with a Type V FDR.*

4.3.1.2.4 All turbine-engined helicopters of a maximum certificated take-off mass of over 2 250 kg, up to and including 3 180 kg for which the application for type certification was submitted to a Contracting State on or after 1 January 2018 shall be equipped with:

- a) a Type IV A FDR; or
- b) a Class C AIR capable of recording flight path and speed parameters displayed to the pilot(s); or
- c) an ADRS capable of recording the essential parameters defined in Table A4-3 of Appendix 4.

Note.— *The “application for type certification was submitted to a Contracting State” refers to the date of application of the original “Type Certificate” for the helicopter type, not the date of certification of particular helicopter variants or derivative models.*

4.3.1.2.5 **Recommendation.**— *All helicopters of a maximum certificated take-off mass of 3 180 kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 2018 should be equipped with:*

- a) a Type IV A FDR; or
- b) a Class C AIR capable of recording flight path and speed parameters displayed to the pilot(s); or
- c) an ADRS capable of recording the essential parameters defined in Table A4-3 of Appendix 4.

4.3.1.3 Discontinuation

4.3.1.3.1 The use of engraving metal foil FDRs shall be discontinued.

4.3.1.3.2 **Recommendation.**— *The use of analogue FDRs using frequency modulation (FM) should be discontinued.*

4.3.1.3.3 The use of photographic film FDRs shall be discontinued.

4.3.1.3.4 The use of analogue FDRs using frequency modulation (FM) shall be discontinued by 1 January 2012.

4.3.1.3.5 **Recommendation.**— *The use of magnetic tape FDRs should be discontinued by 1 January 2011.*

4.3.1.3.6 The use of magnetic tape FDRs shall be discontinued by 1 January 2016.

4.3.1.4 Duration

Types IV, IVA and V FDRs shall be capable of retaining the information recorded during at least the last ten hours of their operation.

4.3.2 Cockpit voice recorders

4.3.2.1 Operation

4.3.2.1.1 All helicopters of a maximum certificated take-off mass of over 7 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 shall be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on the CVR.

4.3.2.1.2 **Recommendation.**— *All helicopters of a maximum certificated take-off mass of over 3 180 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 should be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed should be recorded on the CVR.*

4.3.2.1.3 All helicopters of a maximum certificated take-off mass of over 7 000 kg for which the individual certificate of airworthiness was first issued before 1 January 1987 shall be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on the CVR.

4.3.2.2 Discontinuation

4.3.2.2.1 The use of magnetic tape and wire CVRs shall be discontinued by 1 January 2016.

4.3.2.2.2 **Recommendation.**— *The use of magnetic tape and wire CVRs should be discontinued by 1 January 2011.*

4.3.2.3 Duration

4.3.2.3.1 A CVR shall be capable of retaining the information recorded during at least the last 30 minutes of its operation.

4.3.2.3.2 From 1 January 2016, all helicopters required to be equipped with a CVR shall be equipped with a CVR capable of retaining the information recorded during the last two hours of its operation.

4.3.2.3.3 **Recommendation.**— *All helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1990, and that are required to be equipped with a CVR, should have a CVR capable of retaining the information recorded during at least the last two hours of its operation.*

4.3.3 Data link recorders

4.3.3.1 Applicability

4.3.3.1.1 All helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 2016, which utilize any of the data link communications applications listed in 5.1.2 of Appendix 4 and are required to carry a CVR, shall record on a flight recorder the data link communications messages.

4.3.3.1.2 All helicopters which are modified on or after 1 January 2016 to install and utilize any of the data link communications applications listed in 5.1.2 of Appendix 4 and are required to carry a CVR shall record on a flight recorder the data link communications messages.

Note 1.— Data link communications are currently conducted by either ATN-based or FANS 1/A-equipped helicopter.

Note 2.— A Class B AIR could be a means for recording data link communications applications messages to and from the helicopters where it is not practical or is prohibitively expensive to record those data link communications applications messages on FDR or CVR.

4.3.3.2 Duration

The minimum recording duration shall be equal to the duration of the CVR.

4.3.3.3 Correlation

Data link recording shall be able to be correlated to the recorded cockpit audio.

4.3.4 Flight recorders — general

4.3.4.1 Construction and installation

Flight recorders shall be constructed, located and installed so as to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed. Flight recorders shall meet the prescribed crashworthiness and fire protection specifications.

4.3.4.2 Operation

4.3.4.2.1 Flight recorders shall not be switched off during flight time.

4.3.4.2.2 To preserve flight recorder records, flight recorders shall be deactivated upon completion of flight time following an accident or incident. The flight recorders shall not be reactivated before their disposition as determined in accordance with Annex 13.

Note 1.— The need for removal of the flight recorder records from the aircraft will be determined by the investigation authority in the State conducting the investigation with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.

Note 2.— The operator's responsibilities regarding the retention of flight recorder records are contained in Section II, 9.6.

4.3.4.3 Continued serviceability

Operational checks and evaluations of recordings from the flight recorder systems shall be conducted to ensure the continued serviceability of the recorders.

Note.— Procedures for the inspections of the flight recorder systems are given in Appendix 4.

4.3.4.4 *Flight recorders electronic documentation*

Recommendation.— *The documentation requirement concerning FDR parameters provided by operators to accident investigation authorities should be in electronic format and take account of industry specifications.*

Note.— *Industry specification for documentation concerning flight recorder parameters may be found in the ARINC 647A, Flight Recorder Electronic Documentation, or equivalent document.*

4.4 Instruments and equipment for flights operated under VFR and IFR — by day and night

Note.— *The flight instruments requirements in 4.4.1, 4.4.2 and 4.4.3 may be met by combinations of instruments or by electronic displays.*

4.4.1 All helicopters when operating in accordance with VFR by day shall be equipped with:

- a) a magnetic compass;
- b) an accurate timepiece indicating the time in hours, minutes and seconds;
- c) a sensitive pressure altimeter;
- d) an airspeed indicator; and
- e) such additional instruments or equipment as may be prescribed by the appropriate authority.

4.4.2 All helicopters when operating in accordance with VFR at night shall be equipped with:

- a) the equipment specified in 4.4.1;
- b) an attitude indicator (artificial horizon) for each required pilot and one additional attitude indicator;
- c) a slip indicator;
- d) a heading indicator (directional gyroscope);
- e) a rate of climb and descent indicator;
- f) such additional instruments or equipment as may be prescribed by the appropriate authority;

and the following lights:

- g) the lights required by Annex 2 for aircraft in flight or operating on the movement area of a heliport;

Note.— *The general characteristics of lights are specified in Annex 8.*

- h) two landing lights;

- i) illumination for all instruments and equipment that are essential for the safe operation of the helicopter that are used by the flight crew;
- j) lights in all passenger compartments; and
- k) a flashlight for each crew member station.

4.4.2.1 **Recommendation.**— *One of the landing lights should be trainable, at least in the vertical plane.*

4.4.3 All helicopters when operating in accordance with IFR, or when the helicopter cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be equipped with:

- a) a magnetic compass;
- b) an accurate timepiece indicating the time in hours, minutes and seconds;
- c) two sensitive pressure altimeters;
- d) an airspeed indicating system with means of preventing malfunctioning due to either condensation or icing;
- e) a slip indicator;
- f) an attitude indicator (artificial horizon) for each required pilot and one additional attitude indicator;
- g) a heading indicator (directional gyroscope);
- h) a means of indicating whether the power supply to the gyroscope instrument is adequate;
- i) a means of indicating in the flight crew compartment the outside air temperature;
- j) a rate of climb and descent indicator;
- k) a stabilization system, unless it has been demonstrated to the satisfaction of the certifying authority that the helicopter possesses, by nature of its design, adequate stability without such a system;
- l) such additional instruments or equipment as may be prescribed by the appropriate authority; and
- m) if operated at night, the lights specified in 4.4.2 g) to k) and 4.4.2.1.

4.4.3.1 All helicopters when operating in accordance with IFR shall be fitted with an emergency power supply, independent of the main electrical generating system, for the purpose of operating and illuminating, for a minimum period of 30 minutes, an attitude indicating instrument (artificial horizon), clearly visible to the pilot-in-command. The emergency power supply shall be automatically operative after the total failure of the main electrical generating system and clear indication shall be given on the instrument panel that the attitude indicator(s) is being operated by emergency power.

4.4.4 **Recommendation.**— *A helicopter when operating in accordance with IFR and which has a maximum certificated take-off mass in excess of 3 175 kg or a maximum passenger seating configuration of more than 9 should be equipped with a ground proximity warning system which has a forward-looking terrain avoidance function.*

4.5 All helicopters on flights over water

4.5.1 Means of flotation

All helicopters intended to be flown over water shall be fitted with a permanent or rapidly deployable means of flotation so as to ensure a safe ditching of the helicopter when:

- a) engaged in offshore operations, or other overwater operations as prescribed by the State of the Operator; or
- b) flying over water in a hostile environment at a distance from land corresponding to more than 10 minutes at normal cruise speed when operating in performance Class 1 or 2; or

Note.— When operating in a hostile environment, a safe ditching requires a helicopter to be designed for landing on water or certificated in accordance with ditching provisions.

- c) flying over water in a non-hostile environment at a distance from land specified by the appropriate authority of the responsible State when operating in performance Class 1; or

Note.— When considering the distance beyond which flotation equipment is required, the State should take into consideration the certification standard of the helicopter.

- d) flying over water beyond autorotational or safe forced landing distance from land when operating in performance Class 3.

4.5.2 Emergency equipment

4.5.2.1 Helicopters operating in performance Class 1 or 2 and operating in accordance with the provisions of 4.5.1 shall be equipped with:

- a) one life jacket, or equivalent individual flotation device, for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided. For offshore operations the life jacket shall be worn constantly unless the occupant is wearing an integrated survival suit that includes the functionality of the life jacket;
- b) life-saving rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in emergency, provided with such life-saving equipment including means of sustaining life as is appropriate to the flight to be undertaken; and

Recommendation.— *When two life rafts are fitted, each should be able to carry all occupants in the overload state.*

Note.— The overload state is a design safety margin of 1.5 times the maximum capacity.

- c) equipment for making the pyrotechnical distress signals described in Annex 2.

4.5.2.2 Helicopters operating in performance Class 3 when operating beyond autorotational distance from land but within a distance from land specified by the appropriate authority of the responsible State shall be equipped with one life jacket, or equivalent individual flotation device, for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided.

Note.— When determining the distance from land referred to in 4.5.2.2, consideration should be given to environmental conditions and the availability of search and rescue facilities.

4.5.2.2.1 For offshore operations, when operating beyond autorotational distance from land, the life jacket shall be worn unless the occupant is wearing an integrated survival suit that includes the functionality of the life jacket.

4.5.2.3 Helicopters operating in performance Class 3 when operating beyond the distance specified in 4.5.2.2 shall be equipped as in 4.5.2.1.

4.5.2.4 In the case of helicopters operating in performance Class 2 or 3, when taking off or landing at a heliport where, in the opinion of the State of the Operator, the take-off or approach path is so disposed over water that in the event of a mishap there would be likelihood of a ditching, at least the equipment required in 4.5.2.1 a) shall be carried.

4.5.2.5 Each life jacket and equivalent individual flotation device, when carried in accordance with 4.5, shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons.

4.5.2.6 **Recommendation.**— *On any helicopter for which the individual certificate of airworthiness is first issued on or after 1 January 1991, at least 50 per cent of the life rafts carried in accordance with the provisions of 4.5.2 should be deployable by remote control.*

4.5.2.7 **Recommendation.**— *Rafts which are not deployable by remote control and which have a mass of more than 40 kg should be equipped with some means of mechanically assisted deployment.*

4.5.2.8 **Recommendation.**— *On any helicopter for which the individual certificate of airworthiness was first issued before 1 January 1991, the provisions of 4.5.2.6 and 4.5.2.7 should be complied with no later than 31 December 1992.*

4.5.3 All helicopters on flights over designated sea areas

4.5.3.1 Helicopters, when operating over sea areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult, shall be equipped with life-saving equipment (including means of sustaining life) as may be appropriate to the area overflown.

4.5.3.2 **Recommendation.**— *For offshore operations, a survival suit should be worn by all occupants when the sea temperature is less than 10°C or when the estimated rescue time exceeds the calculated survival time. When the elevation and strength of the sun results in a high temperature hazard on the flight deck, consideration should be given to alleviating the flight crew from this recommendation.*

Note.— *When establishing rescue time, the sea state and the ambient light conditions should be taken into consideration.*

4.6 All helicopters on flights over designated land areas

Helicopters, when operated across land areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult, shall be equipped with such signalling devices and life-saving equipment (including means of sustaining life) as may be appropriate to the area overflown.

4.7 Emergency locator transmitter (ELT)

4.7.1 From 1 July 2008, all helicopters operating in performance Class 1 and 2 shall be equipped with at least one automatic ELT and, when operating on flights over water as described in 4.5.1 a), with at least one automatic ELT and one ELT(S) in a raft or life jacket.

4.7.2 From 1 July 2008, all helicopters operating in performance Class 3 shall be equipped with at least one automatic ELT and, when operating on flights over water as described in 4.5.1 b), with at least one automatic ELT and one ELT(S) in a raft or life jacket.

4.7.3 ELT equipment carried to satisfy the requirements of 4.7.1 and 4.7.2 shall operate in accordance with the relevant provisions of Annex 10, Volume III.

Note.— The judicious choice of numbers of ELTs, their type and placement on aircraft and associated floatable life support systems will ensure the greatest chance of ELT activation in the event of an accident for aircraft operating over water or land, including areas especially difficult for search and rescue. Placement of transmitter units is a vital factor in ensuring optimal crash and fire protection. The placement of the control and switching devices (activation monitors) of automatic fixed ELTs and their associated operational procedures will also take into consideration the need for rapid detection of inadvertent activation and convenient manual switching by crew members.

4.8 All helicopters on high altitude flights

Note.— Approximate altitude in the Standard Atmosphere corresponding to the value of absolute pressure used in this text is as follows:

Absolute pressure	Metres	Feet
700 hPa	3 000	10 000
620 hPa	4 000	13 000
376 hPa	7 600	25 000

4.8.1 A helicopter intended to be operated at flight altitudes at which the atmospheric pressure is less than 700 hPa in personnel compartments shall be equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in 2.3.8.1.

4.8.2 A helicopter intended to be operated at flight altitudes at which the atmospheric pressure is less than 700 hPa but which is provided with means of maintaining pressures greater than 700 hPa in personnel compartments shall be provided with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in 2.3.8.2.

4.8.3 A helicopter intended to be operated at flight altitudes at which the atmospheric pressure is more than 376 hPa which cannot descend safely within four minutes to a flight altitude at which the atmospheric pressure is equal to 620 hPa, and for which the individual certificate of airworthiness was issued on or after 9 November 1998, shall be provided with automatically deployable oxygen equipment to satisfy the requirements of 2.3.8.2. The total number of oxygen dispensing units shall exceed the number of passenger and cabin crew seats by at least 10 per cent.

4.8.4 **Recommendation.**— *A helicopter intended to be operated at flight altitudes at which the atmospheric pressure is more than 376 hPa which cannot descend safely within four minutes to a flight altitude at which the atmospheric pressure is equal to 620 hPa, and for which the individual certificate of airworthiness was issued before 9 November 1998, should be provided with automatically deployable oxygen equipment to satisfy the requirements of 2.3.8.2. The total number of oxygen dispensing units should exceed the number of passenger and cabin crew seats by at least 10 per cent.*

4.9 All helicopters in icing conditions

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

4.10 Helicopters when carrying passengers — significant-weather detection

Recommendation.— *Helicopters when carrying passengers should be equipped with operative weather radar or other significant-weather detection equipment whenever such helicopters are being operated in areas where thunderstorms or other potentially hazardous weather conditions, regarded as detectable, may be expected to exist along the route either at night or under instrument meteorological conditions.*

4.11 All helicopters required to comply with the noise certification Standards in Annex 16, Volume I

All helicopters required to comply with the noise certification Standards of Annex 16, Volume I, shall carry a document attesting noise certification. When the document, or a suitable statement attesting noise certification as contained in another document approved by the State of Registry, is issued in a language other than English, it shall include an English translation.

Note 1.— *The attestation may be contained in any document, carried on board, approved by the State of Registry in accordance with the relevant provisions of Annex 16, Volume I.*

Note 2.— *The various noise certification Standards of Annex 16, Volume I, which are applicable to helicopters are determined according to the date of application for a type certificate, or the date of acceptance of an application under an equivalent prescribed procedure by the certificating authority. Some helicopters are not required to comply with any noise certification Standard. For details see Annex 16, Volume I, Part II, Chapters 8 and 11.*

4.12 Helicopters carrying passengers — cabin crew seats

4.12.1 All helicopters shall be equipped with a forward or rearward facing (within 15 degrees of the longitudinal axis of the helicopter) seat, fitted with a safety harness for the use of each cabin crew member required to satisfy the intent of 10.1 in respect of emergency evacuation.

Note 1.— *In accordance with the provisions of 4.2.2 c) 1), a seat and seat belt shall be provided for the use of each additional cabin crew member.*

Note 2.— *Safety harness includes shoulder straps and a seat belt which may be used independently.*

4.12.2 Cabin crew seats shall be located near floor level and other emergency exits as required by the State of Registry for emergency evacuation.

4.13 Helicopters required to be equipped with a pressure-altitude reporting transponder

Except as may be otherwise authorized by the appropriate authority, all helicopters shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the provisions of Annex 10, Volume IV.

Note.— *This provision is intended to support the effectiveness of ACAS as well as to improve the effectiveness of air traffic services. The intent is also for aircraft not equipped with pressure-altitude reporting transponders to be operated so as not to share airspace used by aircraft equipped with airborne collision avoidance systems.*

4.14 Microphones

All flight crew members required to be on flight deck duty shall communicate through boom or throat microphones.

4.15 Vibration health monitoring system

Recommendation.— *A helicopter which has a maximum certificated take-off mass in excess of 3 175 kg or a maximum passenger seating configuration of more than 9 should be equipped with a vibration health monitoring system.*

4.16 Helicopters equipped with automatic landing systems, a head-up display (HUD) or equivalent displays, enhanced vision systems (EVS), synthetic vision systems (SVS) and/or combined vision systems (CVS)

4.16.1 Where helicopters are equipped with automatic landing systems, HUD or equivalent displays, EVS, SVS or CVS, or any combination of those systems into a hybrid system, the use of such systems for the safe operation of a helicopter shall be approved by the State of the Operator.

Note 1.— *Information regarding a HUD or equivalent displays, including references to RTCA and EUROCAE documents, is contained in the Manual of All-Weather Operations (Doc 9365).*

Note 2.— *Automatic landing system — helicopter is an automatic approach using airborne systems which provide automatic control of the flight path, to a point aligned with the landing surface, from which the pilot can transition to a safe landing by means of natural vision without the use of automatic control.*

4.16.2 In approving the operational use of automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, the State of the Operator shall ensure that:

- a) the equipment meets the appropriate airworthiness certification requirements;
- b) the operator has carried out a safety risk assessment of the operations supported by the automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS; and
- c) the operator has established and documented the procedures for the use of, and training requirements for, automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS.

Note 1.— *Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) (Doc 9859).*

Note 2.— *Guidance on operational approvals is contained in Attachment I.*

4.17 Electronic flight bags (EFBs)

Note.— *Guidance on EFB equipment, functions and operational approval is contained in the Manual on Electronic Flight Bags (Doc 10020).*

4.17.1 EFB equipment

Where portable EFBs are used on board a helicopter, the operator shall ensure that they do not affect the performance of the helicopter systems, equipment or the ability to operate the helicopter.

4.17.2 EFB functions

4.17.2.1 Where EFBs are used on board a helicopter the operator shall:

- a) assess the safety risk(s) associated with each EFB function;
- b) establish and document the procedures for the use of, and training requirements for, the device and each EFB function; and
- c) ensure that, in the event of an EFB failure, sufficient information is readily available to the flight crew for the flight to be conducted safely.

Note.— *Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) (Doc 9859).*

4.17.2.2 The State of the Operator shall approve the operational use of EFB functions to be used for the safe operation of helicopters.

4.17.3 EFB operational approval

In approving the operational use of EFBs, the State of the Operator shall ensure that:

- a) the EFB equipment and its associated installation hardware, including interaction with helicopter systems if applicable, meet the appropriate airworthiness certification requirements;
- b) the operator has assessed the safety risks associated with the operations supported by the EFB function(s);
- c) the operator has established requirements for redundancy of the information (if appropriate) contained and displayed by the EFB function(s);
- d) the operator has established and documented procedures for the management of the EFB function(s) including any databases it may use; and
- e) the operator has established and documented the procedures for the use of, and training requirements for the EFB function(s).

Note.— *Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) (Doc 9859).*

CHAPTER 5. HELICOPTER COMMUNICATION AND NAVIGATION EQUIPMENT

5.1 Communication equipment

5.1.1 A helicopter shall be provided with radio communication equipment capable of:

- a) conducting two-way communication for heliport control purposes;
- b) receiving meteorological information at any time during flight; and
- c) conducting two-way communication at any time during flight with at least one aeronautical station and with such other aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.

Note.— The requirements of 5.1.1 are considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.

5.1.2 The radio communication equipment required in accordance with 5.1.1 shall provide for communications on the aeronautical emergency frequency 121.5 MHz.

5.1.3 For flights in defined portions of airspace or on routes where an RCP type has been prescribed, a helicopter shall, in addition to the requirements specified in 5.1.1:

- a) be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP type(s); and
- b) be authorized by the State of the Operator for operations in such airspace.

Note.— Information on RCP and associated procedures, and guidance concerning the approval process, are contained in the Manual on Required Communication Performance (RCP) (Doc 9869). This document also contains references to other documents produced by States and international bodies concerning communication systems and RCP.

5.2 Navigation equipment

5.2.1 A helicopter shall be provided with navigation equipment which will enable it to proceed:

- a) in accordance with its operational flight plan; and
- b) in accordance with the requirements of air traffic services;

except when, if not so precluded by the appropriate authority, navigation for flights under VFR is accomplished by visual reference to landmarks.

5.2.2 For operations where a navigation specification for performance-based navigation has been prescribed, a helicopter shall, in addition to the requirements specified in 5.2.1:

- a) be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specification(s); and
- b) be authorized by the State of the Operator for such operations.

Note.— Information on performance-based navigation, and guidance concerning the implementation and operational approval process, are contained in the Performance-based Navigation (PBN) Manual (Doc 9613). This document also contains a comprehensive list of references to other documents produced by States and international bodies concerning navigation systems.

5.2.3 The helicopter shall be sufficiently provided with 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 will enable the helicopter to navigate in accordance with 5.2.1 and, where applicable, 5.2.2.

5.2.4 On flights in which it is intended to land in instrument meteorological conditions, a helicopter shall be provided with appropriate navigation equipment providing guidance to a point from which a visual landing can be effected. This equipment shall be capable of providing such guidance at each heliport at which it is intended to land in instrument meteorological conditions and at any designated alternate heliports.

5.3 Installation

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

CHAPTER 6. HELICOPTER MAINTENANCE

Note 1.— For the purpose of this chapter “helicopter” includes: engines, power transmissions, rotors, components, accessories, instruments, equipment and apparatus including emergency equipment.

Note 2.— Reference is made throughout this chapter to the requirements of the State of Registry. When the State of the Operator is not the same as the State of Registry, it may be necessary to consider any additional requirements of the State of the Operator.

Note 3.— Guidance on continuing airworthiness requirements is contained in the Airworthiness Manual (Doc 9760).

6.1 Operator’s maintenance responsibilities

6.1.1 Operators shall ensure that, in accordance with procedures acceptable to the State of Registry:

- a) each helicopter they operate is maintained in an airworthy condition;
- b) the operational and emergency equipment necessary for the intended flight is serviceable; and
- c) the certificate of airworthiness of the helicopter they operate remains valid.

6.1.2 An operator shall not operate a helicopter unless it is maintained and released to service by an organization approved in accordance with Annex 6, Part I, 8.7, or under an equivalent system, either of which shall be acceptable to the State of Registry.

6.1.3 When the State of Registry accepts an equivalent system, the person signing the maintenance release shall be licensed in accordance with Annex 1.

6.1.4 An operator shall employ a person or group of persons to ensure that all maintenance is carried out in accordance with the maintenance control manual.

6.1.5 The operator shall ensure that the maintenance of its helicopters is performed in accordance with the maintenance programme approved by the State of Registry.

6.2 Operator’s maintenance control manual

6.2.1 The operator shall provide, for the use and guidance of maintenance and operational personnel concerned, a maintenance control manual, acceptable to the State of Registry, in accordance with the requirements of 9.2. The design of the manual shall observe Human Factors principles.

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

6.2.2 The operator shall ensure that the maintenance control manual is amended as necessary to keep the information contained therein up to date.

6.2.3 Copies of all amendments to the operator's maintenance control manual shall be furnished promptly to all organizations or persons to whom the manual has been issued.

6.2.4 The operator shall provide the State of the Operator and the State of Registry with a copy of the operator's maintenance control manual, together with all amendments and/or revisions to it and shall incorporate in it such mandatory material as the State of the Operator or the State of Registry may require.

6.3 Maintenance programme

6.3.1 The operator shall provide, for the use and guidance of maintenance and operational personnel concerned, a maintenance programme, approved by the State of Registry, containing the information required by 9.3. The design and application of the operator's maintenance programme shall observe Human Factors principles.

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

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

6.4 Maintenance records

6.4.1 An operator shall ensure that the following records are kept for the periods mentioned in 6.4.2:

- a) the total time in service (hours, calendar time and cycles, as appropriate) of the helicopter and all life-limited components;
- b) the current status of compliance with all mandatory continuing airworthiness information;
- c) appropriate details of modifications and repairs to the helicopter and its major components;
- d) the time in service (hours, calendar time and cycles, as appropriate) since last overhaul of the helicopter or its components subject to a mandatory overhaul life;
- e) the current status of the helicopter's compliance with the maintenance programme; and
- f) the detailed maintenance records to show that all requirements for a maintenance release have been met.

6.4.2 The records in 6.4.1 a) to e) shall be kept for a minimum period of 90 days after the unit to which they refer has been permanently withdrawn from service, and the records in 6.4.1 f) for a minimum period of one year after the signing of the maintenance release.

6.4.3 In the event of a temporary change of operator, the records shall be made available to the new operator. In the event of any permanent change of operator, the records shall be transferred to the new operator.

6.5 Continuing airworthiness information

6.5.1 The operator of a helicopter over 3 175 kg maximum mass shall monitor and assess maintenance and operational experience with respect to continuing airworthiness and provide the information as prescribed by the State of Registry and report through the system specified in Annex 8, Part II, 4.2.3 f) and 4.2.4.

6.5.2 The operator of a helicopter over 3 175 kg maximum mass shall obtain and assess continuing airworthiness information and recommendations available from the organization responsible for the type design and shall implement resulting actions considered necessary in accordance with a procedure acceptable to the State of Registry.

Note.— Guidance on interpretation of “the organization responsible for the type design” is contained in the Airworthiness Manual (Doc 9760).

6.6 Modifications and repairs

All modifications and repairs shall comply with airworthiness requirements acceptable to the State of Registry. Procedures shall be established to ensure that the substantiating data supporting compliance with the airworthiness requirements are retained.

6.7 Maintenance release

6.7.1 A maintenance release shall be completed and signed to certify that the maintenance work performed has been completed satisfactorily and in accordance with approved data and the procedures described in the maintenance organization’s procedures manual.

6.7.2 A maintenance release shall contain a certification including:

- a) basic details of the maintenance carried out including detailed reference of the approved data used;
- b) the date such maintenance was completed;
- c) when applicable, the identity of the approved maintenance organization; and
- d) the identity of the person or persons signing the release.

6.8 Records

6.8.1 An operator shall ensure that the following records are kept:

- a) in respect of the entire helicopter: the total time in service;
- b) in respect of the major components of the helicopter:
 - 1) the total time in service;
 - 2) the date of the last overhaul;
 - 3) the date of the last inspection;
- c) in respect of those instruments and equipment, the serviceability and operating life of which are determined by their time in service:
 - 1) such records of the time in service as are necessary to determine their serviceability or to compute their operating life;

2) the date of the last inspection.

6.8.2 These records shall be kept for a period of 90 days after the end of the operating life of the unit to which they refer.

CHAPTER 7. HELICOPTER FLIGHT CREW

7.1 Composition of the flight crew

7.1.1 The number and composition of the flight crew shall not be less than that specified in the operations manual. The flight crews shall include flight crew members in addition to the minimum numbers specified in the flight manual or other documents associated with the certificate of airworthiness, when necessitated by considerations related to the type of helicopter used, the type of operation involved and the duration of flight between points where flight crews are changed.

7.1.2 The flight crew shall include at least one member authorized by the State of Registry to operate the type of radio transmitting equipment to be used.

Note.— Some States have dispensed with the system of issuing radio licences.

7.2 Flight crew member emergency duties

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

7.3 Flight crew member training programmes

7.3.1 An operator shall establish and maintain a ground and flight training programme, approved by the State of the Operator, which ensures that all flight crew members are adequately trained to perform their assigned duties. The training programme shall:

- a) include ground and flight training facilities and properly qualified instructors as determined by the State of the Operator;
- b) consist of ground and flight training for the type(s) of helicopter on which the flight crew member serves;
- c) include proper flight crew coordination and training for all types of emergency and abnormal situations or procedures caused by engine, transmission, rotor, airframe or systems malfunctions, fire or other abnormalities;
- d) include training in knowledge and skills related to the visual and instrument flight procedures for the intended area of operation, human performance and threat and error management, the transport of dangerous goods and, where applicable, procedures specific to the environment in which the helicopter is to be operated;
- e) ensure that all flight crew members know the functions for which they are responsible and the relation of these functions to the functions of other crew members, particularly in regard to abnormal or emergency procedures;
- f) shall include knowledge and skills related to the operational use of head-up display and/or enhanced vision systems for those helicopters so equipped; and

- g) be given on a recurrent basis, as determined by the State of the Operator and shall include an examination to determine competence.

Note 1.— Paragraph 2.2.5 prohibits the in-flight simulation of emergency or abnormal situations when passengers or cargo are being carried.

Note 2.— Flight training may, to the extent deemed appropriate by the State of the Operator, be given in flight simulation training devices approved by the State for that purpose.

Note 3.— The scope of the recurrent training required by 7.2 and 7.3 may be varied and need not be as extensive as the initial training given in a particular type of helicopter.

Note 4.— The use of correspondence courses and written examinations as well as other means may, to the extent deemed feasible by the State of the Operator, be utilized in meeting the requirements for periodic ground training.

Note 5.— Provisions for training in the transport of dangerous goods are contained in Annex 18.

Note 6.— Guidance material to design training programmes to develop knowledge and skills in human performance can be found in the Human Factors Training Manual (Doc 9683).

Note 7.— Information for pilots and flight operations personnel on flight procedure parameters and operational procedures is contained in PANS-OPS (Doc 8168), Volume I. Criteria for the construction of visual and instrument flight procedures are contained in PANS-OPS (Doc 8168), Volume II. Obstacle clearance criteria and procedures used in certain States may differ from PANS-OPS, and knowledge of these differences is important for safety reasons.

Note 8.— Guidance material to design flight crew training programmes can be found in the Manual of Evidence-based Training (Doc 9995).

Note 9.— Guidance material on the different means used to assess competence can be found in the Attachment to Chapter 2 of the Procedures for Air Navigation Services — Training (PANS-TRG, Doc 9868).

7.3.2 The requirement for recurrent flight training in a particular type of helicopter shall be considered fulfilled by:

- a) the use, to the extent deemed feasible by the State of the Operator, of flight simulation training devices approved by that State for that purpose; or
- b) the completion within the appropriate period of the proficiency check required by 7.4.4 in that type of helicopter.

7.4 Qualifications

Note.— See the Manual of Procedures for Establishment and Management of a State's Personnel Licensing System (Doc 9379) for guidance of a general nature on cross-crew qualification, mixed-fleet flying and cross-credit.

7.4.1 Recent experience — pilot-in-command and co-pilot

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

7.4.1.2 When a pilot-in-command or a co-pilot is flying several variants of the same type of helicopter or different types of helicopter with similar characteristics in terms of operating procedures, systems and handling, the State shall decide under which conditions the requirements of 7.4.1.1 for each variant or each type of helicopter can be combined.

7.4.2 Pilot-in-command operational qualification

7.4.2.1 An operator shall not utilize a pilot as pilot-in-command of a helicopter on an operation for which that pilot is not currently qualified until such pilot has complied with 7.4.2.2 and 7.4.2.3.

7.4.2.2 Each such pilot shall demonstrate to the operator an adequate knowledge of:

- a) the operation to be flown. This shall include knowledge of:
 - 1) the terrain and minimum safe altitudes;
 - 2) the seasonal meteorological conditions;
 - 3) the meteorological, communication and air traffic facilities, services and procedures;
 - 4) the search and rescue procedures; and
 - 5) the navigation facilities and procedures associated with the route or area in which the flight is to take place; and
- b) procedures applicable to flight paths over heavily populated areas and areas of high air traffic density, obstructions, physical layout, lighting, approach aids and arrival, departure, holding and instrument approach procedures, and applicable operating minima.

Note.— That portion of the demonstration relating to arrival, departure, holding and instrument approach procedures may be accomplished in an appropriate training device which is adequate for this purpose.

7.4.2.3 A pilot-in-command shall have made a flight, representative of the operation with which the pilot is to be engaged which must include a landing at a representative heliport, as a member of the flight crew and accompanied by a pilot who is qualified for the operation.

7.4.2.4 The operator shall maintain a record, sufficient to satisfy the State of the Operator of the qualification of the pilot and of the manner in which such qualification has been achieved.

7.4.2.5 An operator shall not continue to utilize a pilot as a pilot-in-command on an operation unless, within the preceding 12 months, the pilot has made at least one representative flight as a pilot member of the flight crew, or as a check pilot, or as an observer on the flight deck. In the event that more than 12 months elapse in which a pilot has not made such a representative flight, prior to again serving as a pilot-in-command on that operation, that pilot must requalify in accordance with 7.4.2.2 and 7.4.2.3.

7.4.3 Pilot proficiency checks

7.4.3.1 An operator shall ensure that piloting technique and the ability to execute emergency procedures is checked in such a way as to demonstrate the pilot's competence on each type or variant of a type of helicopter. Where the operation may be conducted under IFR, an operator shall ensure that the pilot's competence to comply with such rules is demonstrated to either a check pilot of the operator or to a representative of the State of the Operator. Such checks shall be performed twice within any period of one year. Any two such checks which are similar and which occur within a period of four consecutive months shall not alone satisfy this requirement.

Note.— Flight simulation training devices approved by the State of the Operator may be used for those parts of the checks for which they are specifically approved.

7.4.3.2 When an operator schedules flight crew on several variants of the same type of helicopter or different types of helicopters with similar characteristics in terms of operating procedures, systems and handling, the State shall decide under which conditions the requirements of 7.4.3.1 for each variant or each type of helicopter can be combined.

7.5 Flight crew equipment

A flight crew member assessed as fit to exercise the privileges of a licence, subject to the use of suitable correcting lenses, shall have a spare set of the correcting lenses readily available when exercising those privileges.

7.6 Flight time, flight duty periods and rest periods

The State of the Operator shall establish regulations specifying the limitations applicable to the flight time and flight duty periods for flight crew members. These regulations shall also make provision for adequate rest periods and shall be such as to ensure that fatigue occurring either in a flight or successive flights or accumulated over a period of time due to these and other tasks does not endanger the safety of a flight.

Note.— Guidance on the establishment of limitations is given in Attachment A.

CHAPTER 8. FLIGHT OPERATIONS OFFICER/FLIGHT DISPATCHER

8.1 When the State of the Operator requires that a flight operations officer/flight dispatcher, employed in conjunction with an approved method of control and supervision of flight operations be licensed, that flight operations officer/flight dispatcher shall be licensed in accordance with the provisions of Annex 1.

8.2 In accepting proof of qualifications other than the option of holding of a flight operations officer/flight dispatcher licence, the State of the Operator, in accordance with the approved method of control and supervision of flight operations, shall require that, as a minimum, such persons meet the requirements specified in Annex 1 for the flight operations officer/flight dispatcher licence.

8.3 A flight operations officer/flight dispatcher shall not be assigned to duty unless that person has:

- a) satisfactorily completed an operator-specific training course that addresses all the specific components of its approved method of control and supervision of flight operations specified in 2.2.1.3;

Note.— Guidance on the composition of such training syllabi is provided in the Training Manual (Doc 7192), Part D-3 — Flight Operations Officers/Flight Dispatchers.

- b) made, within the preceding 12 months, at least a one-way qualification flight in a helicopter over any area for which that person is authorized to exercise flight supervision. The flight shall include landings at as many heliports as practicable;

Note.— For the purpose of the qualification flight, the flight operations officer/flight dispatcher must be able to monitor the flight crew intercommunication system and radio communications, and be able to observe the actions of the flight crew.

- c) demonstrated to the operator a knowledge of:

- 1) the contents of the operations manual described in Attachment G;
- 2) the radio equipment in the helicopters used; and
- 3) the navigation equipment in the helicopters used;

- d) demonstrated to the operator a knowledge of the following details concerning operations for which the officer is responsible and areas in which that individual is authorized to exercise flight supervision:

- 1) the seasonal meteorological conditions and the sources of meteorological information;
- 2) the effects of meteorological conditions on radio reception in the helicopters used;
- 3) the peculiarities and limitations of each navigation system which is used by the operation; and
- 4) the helicopter loading instructions;

- e) satisfied the operator as to knowledge and skills related to human performance as they apply to dispatch duties; and
- f) demonstrated to the operator the ability to perform the duties specified in 2.6.

8.4 **Recommendation.**— *A flight operations officer/flight dispatcher assigned to duty should maintain complete familiarization with all features of the operations which are pertinent to such duties, including knowledge and skills related to human performance.*

Note.— *Guidance material to design training programmes to develop knowledge and skills in human performance can be found in the Human Factors Training Manual (Doc 9683).*

8.5 **Recommendation.**— *A flight operations officer/flight dispatcher should not be assigned to duty after 12 consecutive months of absence from such duty, unless the provisions of 8.3 are met.*

CHAPTER 9. MANUALS, LOGS AND RECORDS

Note.— The following additional manuals, logs and records are associated with this Annex but are not included in this chapter:

Fuel and oil records — see 2.2.9

Maintenance records — see 6.8

Flight time, flight duty periods and rest periods records — see 2.2.10.3

Flight preparation forms — see 2.3

Operational flight plan — see 2.3.3

Pilot-in-command operational qualification records — see 7.4.3.4.

9.1 Flight manual

Note.— The flight manual contains the information specified in Annex 8.

The flight manual shall be updated by implementing changes made mandatory by the State of Registry.

9.2 Operator's maintenance control manual

The operator's maintenance control manual provided in accordance with 6.2, which may be issued in separate parts, shall contain the following information:

- a) a description of the procedures required by 6.1.1 including, when applicable:
 - 1) a description of the administrative arrangements between the operator and the approved maintenance organization;
 - 2) a description of the maintenance procedures and the procedures for completing and signing a maintenance release when maintenance is based on a system other than that of an approved maintenance organization;
- b) names and duties of the person or persons required by 6.1.4;
- c) a reference to the maintenance programme required by 6.3.1;
- d) a description of the methods used for the completion and retention of the operator's maintenance records required by 6.4;
- e) a description of the procedures for monitoring, assessing and reporting maintenance and operational experience required by 6.5.1;

- f) a description of the procedures for complying with the service information reporting requirements of Annex 8, Part II, 4.2.3 f) and 4.2.4;
- g) a description of procedures for assessing continuing airworthiness information and implementing any resulting actions, as required by 6.5.2;
- h) a description of the procedures for implementing action resulting from mandatory continuing airworthiness information;
- i) a description of establishing and maintaining a system of analysis and continued monitoring of the performance and efficiency of the maintenance programme, in order to correct any deficiency in that programme;
- j) a description of helicopter types and models to which the manual applies;
- k) a description of procedures for ensuring that unserviceabilities affecting airworthiness are recorded and rectified;
- l) a description of the procedures for advising the State of Registry of significant in-service occurrences;
- m) a description of procedures to control the leasing of aircraft and related aeronautical products; and
- n) a description of the maintenance control manual amendment procedures.

9.3 Maintenance programme

9.3.1 A maintenance programme for each helicopter as required by 6.3 shall contain the following information:

- a) maintenance tasks and the intervals at which these are to be performed, taking into account the anticipated utilization of the helicopter;
- b) when applicable, a continuing structural integrity programme;
- c) procedures for changing or deviating from a) and b) above; and
- d) when applicable, condition monitoring and reliability programme descriptions for helicopter systems, components, power transmissions, rotors and engines.

9.3.2 Maintenance tasks and intervals that have been specified as mandatory in approval of the type design shall be identified as such.

9.3.3 **Recommendation.**— *The maintenance programme should be based on maintenance programme information made available by the State of Design or by the organization responsible for the type design, and any additional applicable experience.*

9.4 Journey log book

9.4.1 **Recommendation.**— *The helicopter journey log book should contain the following items and the corresponding Roman numerals:*

- I — *Helicopter nationality and registration.*
- II — *Date.*

- III — *Names of crew members.*
- IV — *Duty assignments of crew members.*
- V — *Place of departure.*
- VI — *Place of arrival.*
- VII — *Time of departure.*
- VIII — *Time of arrival.*
- IX — *Hours of flight.*
- X — *Nature of flight (private, scheduled or non-scheduled).*
- XI — *Incidents, observations, if any.*
- XII — *Signature of person in charge.*

9.4.2 **Recommendation.**— *Entries in the journey log book should be made currently and in ink or indelible pencil.*

9.4.3 **Recommendation.**— *Completed journey log books should be retained to provide a continuous record of the last six months' operations.*

9.5 Records of emergency and survival equipment carried

Operators shall at all times have available for immediate communication to rescue coordination centres, lists containing information on the emergency and survival equipment carried on board any of their helicopters engaged in international air navigation. The information shall include, as applicable, the number, colour and type of life rafts and pyrotechnics, details of emergency medical supplies, water supplies and the type and frequencies of the emergency portable radio equipment.

9.6 Flight recorder records

An operator shall ensure, to the extent possible, in the event the helicopter becomes involved in an accident or incident, the preservation of all related flight recorder records, and if necessary the associated flight recorders, and their retention in safe custody pending their disposition as determined in accordance with Annex 13.

CHAPTER 10. CABIN CREW

10.1 Assignment of emergency duties

An operator shall establish, to the satisfaction of the State of the Operator, the minimum number of cabin crew required for each type of helicopter, based on seating capacity or the number of passengers carried, in order to effect a safe and expeditious evacuation of the helicopter, and the necessary functions to be performed in an emergency or a situation requiring emergency evacuation. The operator shall assign these functions for each type of helicopter.

10.2 Protection of cabin crew during flight

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

Note.— The foregoing does not preclude the pilot-in-command from directing the fastening of the seat belt only, at times other than during take-off and landing.

10.3 Training

An operator shall establish and maintain a training programme, approved by the State of the Operator, to be completed by all persons before being assigned as a cabin crew member. Cabin crew members shall complete a recurrent training programme annually. These training programmes shall ensure that each person is:

- a) competent to execute those safety duties and functions that the cabin attendant is assigned to perform in the event of an emergency or in a situation requiring emergency evacuation;
- b) drilled and capable in the use of emergency and life-saving equipment required to be carried, such as life jackets, life rafts, evacuation slides, emergency exits, portable fire extinguishers, oxygen equipment, first-aid and universal precaution kits, and automated external defibrillators;
- c) when serving on helicopters operated above 3 000 m (10 000 ft), knowledgeable as regards the effect of lack of oxygen and, in the case of pressurized helicopters, as regards physiological phenomena accompanying a loss of pressurization;
- d) aware of other crew members' assignments and functions in the event of an emergency so far as is necessary for the fulfilment of the cabin crew member's own duties;
- e) aware of the types of dangerous goods which may, and may not, be carried in a passenger cabin; and
- f) knowledgeable about human performance as related to passenger cabin safety duties including flight crew-cabin crew coordination.

Note 1.— Requirements for the training of cabin crew members in the transport of dangerous goods are included in the Dangerous Goods Training Programme contained in Annex 18 — The Safe Transport of Dangerous Goods by Air and the Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284).

Note 2.— Guidance material to design training programmes to develop knowledge and skills in human performance can be found in the Human Factors Training Manual (Doc 9683).

10.4 Flight time, flight duty periods and rest periods

The State of the Operator shall establish regulations specifying the limits applicable to flight time, flight duty periods and rest periods for cabin crew.

Note.— Guidance on the establishment of limitations is given in Attachment A.

CHAPTER 11. SECURITY*

11.1 Helicopter search procedure checklist

An operator shall ensure that there is on board a checklist of the procedures to be followed in searching for a bomb in case of suspected sabotage. The checklist shall be supported by guidance on the course of action to be taken should a bomb or suspicious object be found.

11.2 Training programmes

11.2.1 An operator shall establish and maintain a training programme which enables crew members to act in the most appropriate manner to minimize the consequences of acts of unlawful interference.

11.2.2 An operator shall also establish and maintain a training programme to acquaint appropriate employees with preventive measures and techniques in relation to passengers, baggage, cargo, mail, equipment, stores and supplies intended for carriage on a helicopter so that they contribute to the prevention of acts of sabotage or other forms of unlawful interference.

11.3 Reporting acts of unlawful interference

Following an act of unlawful interference the pilot-in-command shall submit, without delay, a report of such an act to the designated local authority.

* In the context of this Chapter, the word “security” is used in the sense of prevention of illicit acts against civil aviation.

ANNEX 6 — PART III

SECTION III

INTERNATIONAL GENERAL AVIATION

CHAPTER 1. GENERAL

Note 1.— Although the Convention on International Civil Aviation allocates to the State of Registry certain functions which that State is entitled to discharge, or obligated to discharge, as the case may be, the Assembly recognized, in Resolution A23-13 that the State of Registry may be unable to fulfil its responsibilities adequately in instances where aircraft are leased, chartered or interchanged — in particular without crew — by an operator of another State and that the Convention may not adequately specify the rights and obligations of the State of an operator in such instances until such time as Article 83 bis of the Convention enters into force. Accordingly, the Council urged that if, in the above-mentioned instances, the State of Registry finds itself unable to discharge adequately the functions allocated to it by the Convention, it delegate to the State of the Operator, subject to acceptance by the latter State, those functions of the State of Registry that can more adequately be discharged by the State of the Operator. It was understood that pending entry into force of Article 83 bis of the Convention the foregoing action would only be a matter of practical convenience and would not affect either the provisions of the Chicago Convention prescribing the duties of the State of Registry or any third State. However, as Article 83 bis of the Convention entered into force on 20 June 1997, such transfer agreements will have effect in respect of Contracting States which have ratified the related Protocol (Doc 9318) upon fulfilment of the conditions established in Article 83 bis.

Note 2.— In the case of international operations effected jointly with helicopters not all of which are registered in the same Contracting State, nothing in this Part of the Annex prevents the States concerned entering into an agreement for the joint exercise of the functions placed upon the State of Registry by the provisions of the relevant Annexes.

1.1 Compliance with laws, regulations and procedures

1.1.1 The pilot-in-command shall comply with the relevant laws, regulations and procedures of the States in which the helicopter is operated.

Note 1.— Compliance with more restrictive measures, not in contravention of the provisions of 1.1.1, may be required by the State of Registry.

Note 2.— Rules covering flight over the high seas are contained in Annex 2.

Note 3.— Information for pilots on flight procedure parameters and operational procedures is contained in PANS-OPS (Doc 8168), Volume I. Criteria for the construction of visual and instrument flight procedures are contained in PANS-OPS (Doc 8168), Volume II. Obstacle Clearance criteria and procedures used in certain States may differ from PANS-OPS, and knowledge of these differences is important for safety reasons

1.1.2 The pilot-in-command shall be responsible for the operation and safety of the helicopter and for the safety of all crew members, passengers and cargo on board, from the moment the engine(s) are started until the helicopter finally comes to rest at the end of the flight, with the engine(s) shut down and the rotor blades stopped.

1.1.3 If an emergency situation which endangers the safety of the helicopter or persons necessitates the taking of action which involves a violation of local regulations or procedures, the pilot-in-command shall notify the appropriate local authority without delay. If required by the State in which the incident occurs, the pilot-in-command shall submit a report on any such violation to the appropriate authority of such State; in that event, the pilot-in-command shall also submit a copy of it to the State of Registry. Such reports shall be submitted as soon as possible and normally within ten days.

1.1.4 The pilot-in-command shall be responsible for notifying the nearest appropriate authority by the quickest available means of any accident involving the helicopter, resulting in serious injury or death of any person or substantial damage to the helicopter or property.

Note.— A definition of the term “serious injury” is contained in Annex 13.

1.1.5 **Recommendation.**— *The pilot-in-command should have available on board the helicopter essential information concerning the search and rescue services in the areas over which it is intended the helicopter will be flown.*

1.2 Dangerous goods

Note 1.— Provisions for carriage of dangerous goods are contained in Annex 18.

Note 2.— Article 35 of the Convention refers to certain classes of cargo restrictions.

1.3 Use of psychoactive substances

Note.— Provisions concerning the use of psychoactive substances are contained in Annex 1, 1.2.7 and Annex 2, 2.5.

CHAPTER 2. FLIGHT OPERATIONS

2.1 Adequacy of operating facilities

The pilot-in-command shall not commence a flight unless it has been ascertained by every reasonable means available that the ground and/or water facilities available and directly required for such flight and for the safe operation of the helicopter are adequate including communication facilities and navigation aids.

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

2.2 Heliport or landing location operating minima

2.2.1 The pilot-in-command shall establish operating minima in accordance with criteria specified by the State of Registry for each heliport or landing location to be used in operations. Such minima shall not be lower than any that may be established by the State of the Aerodrome, except when specifically approved by that State.

Note.— This Standard does not require the State of the Aerodrome to establish operating minima.

2.2.1.1 The State of Registry may approve operational credit(s) for operations with helicopters equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS. Such approvals shall not affect the classification of the instrument approach procedure.

Note 1.— Operational credit includes:

- a) for the purposes of an approach ban (2.6.3.2), a minima below the heliport or landing location operating minima;*
- b) reducing or satisfying the visibility requirements; or*
- c) requiring fewer ground facilities as compensated for by airborne capabilities.*

Note 2.— Guidance on operational credit for aircraft equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS and CVS is contained in Attachment I and in the Manual of All-Weather Operations (Doc 9365).

Note 3.— Information regarding a HUD or equivalent displays, including references to RTCA and EUROCAE documents, is contained in the Manual of All-Weather Operations (Doc 9365).

Note 4.— Automatic landing system — helicopter is an automatic approach using airborne systems which provide automatic control of the flight path, to a point aligned with the landing surface, from which the pilot can transition to a safe landing by means of natural vision without the use of automatic control.

2.3 Briefing

2.3.1 The pilot-in-command shall ensure that crew members and passengers are made familiar, by means of an oral briefing or by other means, with the location and the use of:

- a) seat belts or harnesses; and, as appropriate,
- b) emergency exits;
- c) life jackets;
- d) oxygen dispensing equipment; and
- e) other emergency equipment provided for individual use, including passenger emergency briefing cards.

2.3.2 The pilot-in-command shall ensure that all persons on board are aware of the location and general manner of use of the principal emergency equipment carried for collective use.

2.4 Helicopter airworthiness and safety precautions

A flight shall not be commenced until the pilot-in-command is satisfied that:

- a) the helicopter is airworthy, duly registered and that appropriate certificates with respect thereto are aboard the helicopter;
- b) the instruments and equipment installed in the helicopter are appropriate, taking into account the expected flight conditions;
- c) any necessary maintenance has been performed in accordance with Chapter 6;
- d) the mass of the helicopter and centre of gravity location are such that the flight can be conducted safely, taking into account the flight conditions expected;
- e) any load carried is properly distributed and safely secured; and
- f) the helicopter operating limitations contained in the flight manual, or its equivalent, will not be exceeded.

2.5 Weather reports and forecasts

Before commencing a flight the pilot-in-command shall be familiar with all available meteorological information appropriate to the intended flight. Preparation for a flight away from the vicinity of the place of departure, and for every flight under IFR, shall include: 1) a study of available current weather reports and forecasts; and 2) the planning of an alternative course of action to provide for the eventuality that the flight cannot be completed as planned, because of weather conditions.

Note.— The requirements for flight plans are contained in Annex 2 and the PANS-ATM (Doc 4444).

2.6 Limitations imposed by weather conditions

2.6.1 Flight in accordance with VFR

A flight, except one of purely local character in visual meteorological conditions, to be conducted in accordance with VFR shall not be commenced unless available current meteorological reports, or a combination of current reports and forecasts, indicate that the meteorological conditions along the route, or that part of the route to be flown under VFR, will, at the appropriate time, be such as to render compliance with these rules possible.

2.6.2 Flight in accordance with IFR

2.6.2.1 *When an alternate is required.* A flight to be conducted in accordance with IFR shall not be commenced unless the available information indicates that conditions, at the heliport of intended landing and at least one alternate heliport will, at the estimated time of arrival, be at or above the heliport operating minima.

Note.— It is the practice in some States to declare, for flight planning purposes, higher minima for a heliport when nominated as an alternate than for the same heliport when planned as that of intended landing.

2.6.2.2 *When no alternate is required.* A flight to be conducted in accordance with IFR to a heliport when no alternate heliport is required shall not be commenced unless available current meteorological information indicates that the following meteorological conditions will exist from two hours before to two hours after the estimated time of arrival, or from the actual time of departure to two hours after the estimated time of arrival, whichever is the shorter period:

- a) a cloud base of at least 120 m (400 ft) above the minimum associated with the instrument approach procedure; and
- b) visibility of at least 1.5 km more than the minimum associated with the procedure.

Note.— These should be considered as minimum values where a reliable and continuous meteorological watch is maintained. When only an “area” type forecast is available these values should be increased accordingly.

2.6.3 Heliport operating minima

2.6.3.1 A flight shall not be continued towards the heliport of intended landing unless the latest available meteorological information indicates that conditions at that heliport, or at least one alternate heliport, will, at the estimated time of arrival, be at or above the specified heliport operating minima.

2.6.3.2 An instrument approach shall not be continued below 300 m (1 000 ft) above the heliport elevation or into the final approach segment unless the reported visibility or controlling RVR is at or above the heliport operating minima.

Note.— Criteria for the final approach segment is contained in PANS-OPS (Doc 8168), Volume II.

2.6.3.3 If, after entering the final approach segment or after descending below 300 m (1 000 ft) above the heliport elevation, the reported visibility or controlling RVR falls below the specified minimum, the approach may be continued to DA/H or MDA/H. In any case, a helicopter shall not continue its approach-to-land beyond a point at which the limits of the heliport operating minima would be infringed.

2.6.4 Flight in icing conditions

A flight to be operated in known or expected icing conditions shall not be commenced unless the helicopter is certificated and equipped to cope with such conditions.

2.7 Alternate heliports

2.7.1 For a flight to be conducted in accordance with IFR, at least one suitable alternate shall be specified in the operational flight plan and the flight plan, unless:

- a) the weather conditions in 2.6.2.2 prevail; or

- b) 1) the heliport of intended landing is isolated and no suitable alternate is available; and
- 2) an instrument approach procedure is prescribed for the isolated heliport of intended landing; and
- 3) a point of no return (PNR) is determined in case of an offshore destination.

2.7.2 Suitable offshore alternates may be specified subject to the following:

- a) the offshore alternates shall be used only after passing a PNR. Prior to a PNR, onshore alternates shall be used;
- b) mechanical reliability of critical control systems and critical components shall be considered and taken into account when determining the suitability of the alternate;
- c) one engine inoperative performance capability shall be attainable prior to arrival at the alternate;
- d) to the extent possible, deck availability shall be guaranteed; and
- e) weather information must be reliable and accurate.

Note.— The landing technique specified in the flight manual following control system failure may preclude the nomination of certain helidecks as alternate heliports.

2.7.3 **Recommendation.**—*Offshore alternates should not be used when it is possible to carry enough fuel to have an onshore alternate. Offshore alternates should not be used in a hostile environment.*

2.8 Fuel and oil requirements

2.8.1 *All helicopters.* A flight shall not be commenced unless, taking into account both the meteorological conditions and any delays that are expected in flight, the helicopter carries sufficient fuel and oil to ensure that it can safely complete the flight. In addition, a reserve shall be carried to provide for contingencies.

2.8.2 *VFR operations.* The fuel and oil carried in order to comply with 2.8.1 shall, in the case of VFR operations, be at least the amount to allow the helicopter to:

- a) fly to the landing site to which the flight is planned;
- b) have a final reserve fuel to fly thereafter for a period of 20 minutes at best-range speed; and
- c) have an additional amount of fuel to provide for the increased consumption on the occurrence of potential contingencies, as determined by the State and specified in the State regulations governing general aviation.

2.8.3 *IFR operations.* The fuel and oil carried in order to comply with 2.8.1 shall, in the case of IFR operations, be at least the amount to allow the helicopter:

2.8.3.1 When no alternate is required, in terms of 2.6.2.2, to fly to and execute an approach at the heliport or landing location to which the flight is planned, and thereafter to have:

- a) a final reserve fuel to fly 30 minutes at holding speed at 450 m (1 500 ft) above the destination heliport or landing location under standard temperature conditions and approach and land; and
- b) an additional amount of fuel to provide for the increased consumption on the occurrence of potential contingencies.

2.8.3.2 When an alternate is required, in terms of 2.6.2.1, to fly to and execute an approach, and a missed approach, at the heliport or landing location to which the flight is planned, and thereafter:

- a) fly to and execute an approach at the alternate specified in the flight plan; and then
- b) have a final reserve fuel to fly for 30 minutes at holding speed at 450 m (1 500 ft) above the alternate under standard temperature conditions, and approach and land; and
- c) have an additional amount of fuel to provide for the increased consumption on the occurrence of potential contingencies.

2.8.3.3 When no suitable alternate is available (i.e. the heliport of intended landing is isolated and no suitable alternate is available), to fly to the heliport to which the flight is planned and thereafter for a period as specified by the State of the Operator.

2.8.4 In computing the fuel and oil required in 2.8.1, at least the following shall be considered:

- a) meteorological conditions forecast;
- b) expected air traffic control routings and traffic delays;
- c) for IFR flight, one instrument approach at the destination heliport, including a missed approach;
- d) the procedures for loss of pressurization, where applicable, or failure of one engine while en route; and
- e) any other conditions that may delay the landing of the helicopter or increase fuel and/or oil consumption.

Note.— Nothing in 2.8 precludes amendment of a flight plan in flight in order to replan the flight to another heliport, provided that the requirements of 2.8 can be complied with from the point where the flight has been replanned.

2.8.5 The use of fuel after flight commencement for purposes other than originally intended during pre-flight planning shall require a re-analysis and, if applicable, adjustment of the planned operation.

2.9 In-flight fuel management

2.9.1 The pilot-in-command shall monitor the amount of usable fuel remaining on board to ensure it is not less than the fuel required to proceed to a landing site where a safe landing can be made with the planned final reserve fuel remaining.

Note.— The protection of final reserve fuel is intended to ensure safe landing at any heliport or landing location when unforeseen occurrences may not permit a safe completion of an operation as originally planned.

2.9.2 The pilot-in-command shall advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific landing site, the pilot calculates that any change to the existing clearance to that landing site, or other air traffic delays, may result in landing with less than the planned final reserve fuel.

Note 1.— The declaration of MINIMUM FUEL informs ATC that all planned landing site options have been reduced to a specific landing site of intended landing, that no precautionary landing site is available, and any change to the existing clearance, or air traffic delays, may result in landing with less than the planned final reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.

Note 2.— A precautionary landing site refers to a landing site, other than the site of intended landing, where it is expected that a safe landing can be made prior to the consumption of the planned final reserve fuel.

2.9.3 The pilot-in-command shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAY MAYDAY FUEL, when the usable fuel estimated to be available upon landing at the nearest landing site where a safe landing can be made is less than the required final reserve fuel in compliance with 2.8.

Note 1.— The planned final reserve fuel refers to the value calculated in 2.8 and is the minimum amount of fuel required upon landing at any landing site. The declaration of MAYDAY MAYDAY MAYDAY FUEL informs ATC that all available landing options have been reduced to a specific site and a portion of the final reserve fuel may be consumed prior to landing.

Note 2.— The pilot estimates with reasonable certainty that the fuel remaining upon landing at the nearest safe landing site will be less than the final reserve fuel taking into consideration the latest information available to the pilot, the area to be overflown (i.e. with respect to the availability of precautionary landing areas), meteorological conditions and other reasonable contingencies.

Note 3.— The words “MAYDAY FUEL” describe the nature of the distress conditions as required in Annex 10, Volume II, 5.3.2.1.1, b) 3.

2.10 Oxygen supply

Note.— Approximate altitudes in the Standard Atmosphere corresponding to the values of absolute pressure used in the text are as follows:

Absolute pressure	Metres	Feet
700 hPa	3 000	10 000
620 hPa	4 000	13 000

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

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

2.10.2 A flight to be operated with a pressurized helicopter shall not be commenced unless a sufficient quantity of stored breathing oxygen is carried to supply all the crew members and a proportion of the passengers, as is appropriate to the circumstances of the flight being undertaken, in the event of loss of pressurization, for any period that the atmospheric pressure in any compartment occupied by them would be less than 700 hPa.

2.11 Use of oxygen

All flight crew members, when engaged in performing duties essential to the safe operation of a helicopter in flight, shall use breathing oxygen continuously whenever the circumstances prevail for which its supply has been required in 2.9.1 or 2.9.2.

2.12 In-flight emergency instruction

In an emergency during flight, the pilot-in-command shall ensure that all persons on board are instructed in such emergency action as may be appropriate to the circumstances.

2.13 Weather reporting by pilots

Recommendation.— *When weather conditions likely to affect the safety of other aircraft are encountered, they should be reported as soon as possible.*

2.14 Hazardous flight conditions

Recommendation.— *Hazardous flight conditions, other than those associated with meteorological conditions, encountered en route should be reported as soon as possible. The reports so rendered should give such details as may be pertinent to the safety of other aircraft.*

2.15 Fitness of flight crew members

The pilot-in-command shall be responsible for ensuring that a flight:

- a) will not be commenced if any flight crew member is incapacitated from performing duties by any cause such as injury, sickness, fatigue, the effects of alcohol or drugs; and
- b) will not be continued beyond the nearest suitable heliport when flight crew members' capacity to perform functions is significantly reduced by impairment of faculties from causes such as fatigue, sickness, lack of oxygen.

2.16 Flight crew members at duty stations

2.16.1 Take-off and landing

All flight crew members required to be on flight deck duty shall be at their stations.

2.16.2 En route

All flight crew members required to be on flight deck duty shall remain at their stations except when their absence is necessary for the performance of duties in connection with the operation of the helicopter, or for physiological needs.

2.16.3 Seat belts

All flight crew members shall keep their seat belt fastened when at their stations.

2.16.4 Safety harness

Recommendation.— *When safety harnesses are provided, any flight crew member occupying a pilot's seat should keep the safety harness fastened during the take-off and landing phases; all other flight crew members should keep their safety harness fastened during the take-off and landing phases unless the shoulder straps interfere with the performance of their duties, in which case the shoulder straps may be unfastened but the seat belt must remain fastened.*

Note.— *Safety harness includes shoulder strap(s) and a seat belt which may be used independently.*

2.17 Instrument flight procedures

2.17.1 One or more instrument approach procedures designed to support instrument approach operations shall be approved and promulgated by the State in which the heliport is located, or by the State which is responsible for the heliport when located outside the territory of any State, to serve each final approach and take-off area or heliport utilized for instrument flight operations.

2.17.2 All helicopters operated in accordance with IFR shall comply with the instrument approach procedures approved by the State in which the heliport is located, or by the State which is responsible for the heliport when located outside the territory of any State.

Note 1.— See Section II, Chapter 2, 2.2.8.3, for instrument approach operation classifications.

Note 2.— Information for pilots on flight procedure parameters and operational procedures is contained in PANS-OPS (Doc 8168), Volume I. Criteria for the construction of instrument flight procedures for the guidance of procedure specialists are provided in PANS-OPS (Doc 8168), Volume II. Obstacle clearance criteria and procedures used in certain States may differ from PANS-OPS, and knowledge of these differences is important for safety reasons (see Section II, Chapter 1, 1.1.1).

2.18 Instruction — general

A helicopter rotor shall not be turned under power for the purpose of flight without a qualified pilot at the controls.

2.19 Refuelling with passengers on board or rotors turning

2.19.1 **Recommendation.**— *A helicopter should not be refuelled when passengers are embarking, on board or disembarking or when the rotor is turning unless it is attended by the pilot-in-command or other qualified personnel ready to initiate and direct an evacuation of the helicopter by the most practical and expeditious means available.*

2.19.2 **Recommendation.**— *When refuelling with passengers embarking, on board or disembarking, two-way communications should be maintained by helicopter inter-communications system or other suitable means between the ground crew supervising the refuelling and the pilot-in-command or other qualified personnel required by 2.19.1.*

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

Note 2.— Additional precautions are required when refuelling with fuels other than aviation kerosene or when refuelling results in a mixture of aviation kerosene with other aviation turbine fuels, or when an open line is used.

2.20 Over-water flights

All helicopters on flights over water in a hostile environment in accordance with 4.3.1 shall be certificated for ditching. Sea state shall be an integral part of ditching information.

CHAPTER 3. HELICOPTER PERFORMANCE OPERATING LIMITATIONS

3.1 A helicopter shall be operated:

- a) in compliance with the terms of its airworthiness certificate or equivalent approved document;
- b) within the operating limitations prescribed by the certificating authority of the State of Registry; and
- c) within the mass limitations imposed by compliance with the applicable noise certification Standards in Annex 16, Volume I, unless otherwise authorized, in exceptional circumstances for a certain heliport where there is no noise disturbance problem, by the competent authority of the State in which the heliport is situated.

3.2 Placards, listings, instrument markings, or combinations thereof, containing those operating limitations prescribed by the certificating authority of the State of Registry for visual presentation, shall be displayed in the helicopter.

Note.— The Standards of Annex 8, Part IV, apply to all helicopters intended for the carriage of passengers or cargo or mail in international air navigation.

3.3 Where helicopters are operating to or from heliports in a congested hostile environment, the competent authority of the State in which the heliport is situated shall take such precautions as are necessary to control the risk associated with an engine failure.

Note.— Guidance is provided in Attachment A, 2.4.

CHAPTER 4. HELICOPTER INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS

Note.— Specifications for the provision of helicopter communication and navigation equipment are contained in Chapter 5.

4.1 All helicopters on all flights

4.1.1 General

In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness, the instruments, equipment and flight documents prescribed in the following paragraphs shall be installed or carried, as appropriate, in helicopters according to the helicopter used and to the circumstances under which the flight is to be conducted. The prescribed instruments and equipment, including their installation, shall be approved or accepted by the State of Registry.

4.1.2 Instruments

A helicopter shall be equipped with instruments which will enable the flight crew to control the flight path of the helicopter, carry out any required procedural manoeuvre, and observe the operating limitations of the helicopter in the expected operating conditions.

4.1.3 Equipment

4.1.3.1 A helicopter shall be equipped with:

- a) an accessible first-aid kit;
- b) portable fire extinguishers of a type which, when discharged, will not cause dangerous contamination of the air within the helicopter. At least one shall be located in:
 - 1) the pilot's compartment; and
 - 2) each passenger compartment that is separate from the pilot's compartment and that is not readily accessible to the flight crew;

Note.— Refer to 4.1.3.2 for fire extinguishing agents.

- c)
 - 1) a seat or berth for each person over an age to be determined by the State of Registry; and
 - 2) a seat belt for each seat and restraining belts for each berth;
- d) the following manuals, charts and information:
 - 1) the flight manual or other documents or information concerning any operating limitations prescribed for the helicopter by the certificating authority of the State of Registry, required for the application of Chapter 3;
 - 2) current and suitable charts for the route of the proposed flight and all routes along which it is reasonable to expect that the flight may be diverted;
 - 3) procedures, as prescribed in Annex 2, for pilots-in-command of intercepted aircraft; and

- 4) a list of visual signals for use by intercepting and intercepted aircraft, as contained in Annex 2; and
- e) if fuses are used, spare electrical fuses of appropriate ratings for replacement of those accessible in flight.

4.1.3.2 Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in a helicopter for which the individual certificate of airworthiness is first issued on or after 31 December 2011 and any extinguishing agent used in a portable fire extinguisher in a helicopter for which the individual certificate of airworthiness is first issued on or after 31 December 2016 shall:

- a) meet the applicable minimum performance requirements of the State of Registry; and
- b) not be of a type listed in the 1987 *Montreal Protocol on Substances that Deplete the Ozone Layer* as it appears in the Eighth Edition of the *Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer*, Annex A, Group II.

Note.— Information concerning extinguishing agents is contained in the UNEP Halons Technical Options Committee Technical Note No. 1 – New Technology Halon Alternatives and FAA Report No. DOT/FAA/AR-99-63, Options to the Use of Halons for Aircraft Fire Suppression Systems.

4.1.3.3 **Recommendation.**— All helicopters on all flights should be equipped with the ground-air signal codes for search and rescue purposes.

4.1.3.4 **Recommendation.**— All helicopters on all flights should be equipped with a safety harness for each flight crew member seat.

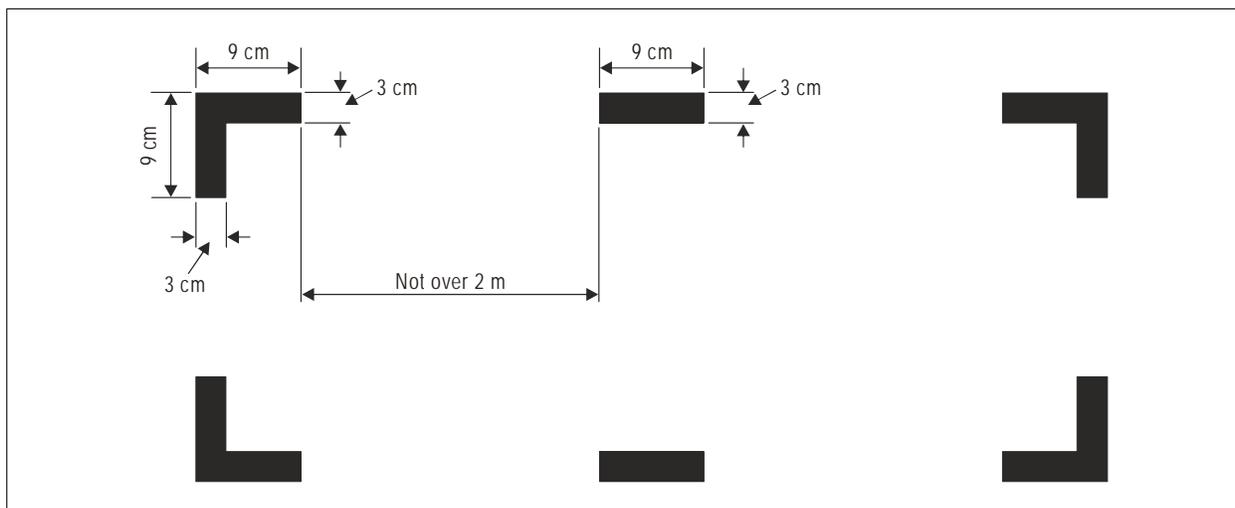
Note.— Safety harness includes shoulder strap(s) and a seat belt which may be used independently.

4.1.4 Marking of break-in points

4.1.4.1 If areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on a helicopter, such areas shall be marked as shown below (see figure following). The colour of the markings shall be red or yellow, and if necessary they shall be outlined in white to contrast with the background.

4.1.4.2 If the corner markings are more than 2 m apart, intermediate lines 9 cm × 3 cm shall be inserted so that there is no more than 2 m between adjacent markings.

Note.— This Standard does not require any helicopter to have break-in areas.



MARKING OF BREAK-IN POINTS (see 4.1.4)

4.2 Instruments and equipment for flights operated under VFR and IFR — by day and night

Note.— The flight instrument requirements in 4.2.1, 4.2.2 and 4.2.3 may be met by combinations of instruments or by electronic displays.

4.2.1 All helicopters when operating in accordance with VFR by day shall be:

- a) equipped with:
 - 1) a magnetic compass;
 - 2) a sensitive pressure altimeter;
 - 3) an airspeed indicator;
 - 4) such additional instruments or equipment as may be prescribed by the appropriate authority; and
- b) equipped with, or shall carry, a means of measuring and displaying the time in hours, minutes and seconds.

4.2.2 All helicopters when operating in accordance with VFR at night shall be equipped with:

- a) the equipment specified in 4.2.1;
- b) an attitude indicator (artificial horizon) for each required pilot;
- c) a slip indicator;
- d) a heading indicator (directional gyroscope);
- e) a rate of climb and descent indicator;
- f) such additional instruments or equipment as may be prescribed by the appropriate authority;

and the following lights:

- g) the lights required by Annex 2 for aircraft in flight or operating on the movement area of a heliport;

Note.— The general characteristics of the lights are specified in Annex 8.

- h) a landing light;
- i) illumination for all flight instruments and equipment that are essential for the safe operation of the helicopter;
- j) lights in all passenger compartments; and
- k) a flashlight for each crew member station.

4.2.2.1 **Recommendation.**— *The landing light should be trainable, at least in the vertical plane.*

4.2.3 All helicopters, when operating in accordance with IFR, or when the helicopter cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be:

- a) equipped with:

- 1) a magnetic compass;
- 2) a sensitive pressure altimeter;

Note.— Due to the long history of misreadings, the use of drum-pointer altimeters is not recommended.

- 3) an airspeed indicating system with a means of preventing malfunctioning due to either condensation or icing;
 - 4) a slip indicator;
 - 5) an attitude indicator (artificial horizon) for each required pilot and one additional attitude indicator;
 - 6) a heading indicator (directional gyroscope);
 - 7) a means of indicating whether the supply of power to the gyroscopic instruments is adequate;
 - 8) a means of indicating in the flight crew compartment the outside air temperature;
 - 9) a rate of climb and descent indicator;
 - 10) such additional instruments or equipment as may be prescribed by the appropriate authority;
 - 11) if operated by night, the lights specified in 4.2.2 g) to k) and 4.2.2.1; and
- b) equipped with, or shall carry, a means of measuring and displaying the time in hours, minutes and seconds.

4.3 All helicopters on flights over water

4.3.1 Means of flotation

All helicopters intended to be flown over water shall be fitted with a permanent or rapidly deployable means of flotation so as to ensure a safe ditching of the helicopter when:

- a) engaged in offshore operations or other over-water operations as prescribed by the State of Registry; or
- b) flying at a distance from land specified by the appropriate State authority.

Note.— When determining the distance from land referred to in 4.3.1, consideration should be given to environmental conditions and the availability of search and rescue facilities.

4.3.2 Emergency equipment

4.3.2.1 Helicopters operating in accordance with the provisions of 4.3.1 shall be equipped with:

- a) one life jacket, or equivalent individual flotation device, for each person on board, stowed in a position easily accessible from the seat of the person for whose use it is provided;
- b) when not precluded by consideration related to the type of helicopter used, life-saving rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in emergency, provided with such life-saving equipment including means of sustaining life as is appropriate to the flight to be undertaken; and

c) equipment for making the pyrotechnical distress signals described in Annex 2.

4.3.2.2 When taking off or landing at a heliport where, in the opinion of the State of the Operator, the take-off or approach path is so disposed over water that in the event of a mishap there would be likelihood of a ditching, at least the equipment required in 4.3.2.1 a) shall be carried.

4.3.2.3 Each life jacket and equivalent individual flotation device, when carried in accordance with this 4.3, shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons.

4.3.2.4 **Recommendation.**— *On any helicopter for which the individual certificate of airworthiness is first issued on or after 1 January 1991, at least 50 per cent of the life rafts carried in accordance with the provisions of 4.3.2 should be deployable by remote control.*

4.3.2.5 **Recommendation.**— *Rafts which are not deployable by remote control and which have a mass of more than 40 kg should be equipped with some means of mechanically assisted deployment.*

4.3.2.6 **Recommendation.**— *On any helicopter for which the individual certificate of airworthiness was first issued before 1 January 1991, the provisions of 4.3.2.4 and 4.3.2.5 should be complied with no later than 31 December 1992.*

4.4 All helicopters on flights over designated land areas

Helicopters, when operated across land areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult, shall be equipped with such signalling devices and life-saving equipment (including means of sustaining life) as may be appropriate to the area overflown.

4.5 All helicopters on high altitude flights

4.5.1 Unpressurized helicopters

Unpressurized helicopters intended to be operated at high altitudes shall carry equipment for storing and dispensing the oxygen supplies required in 2.9.1.

4.5.2 Pressurized helicopters

Recommendation.— *Pressurized helicopters intended to be operated at high altitudes should carry emergency oxygen storage and dispensing equipment capable of storing and dispensing the oxygen supplies required in 2.9.2.*

4.6 All helicopters required to comply with the noise certification Standards in Annex 16, Volume I

All helicopters required to comply with the noise certification Standards of Annex 16, Volume I, shall carry a document attesting noise certification. When the document, or a suitable statement attesting noise certification as contained in another document approved by the State of Registry, is issued in a language other than English, it shall include an English translation.

Note 1.— The attestation may be contained in any document, carried on board, approved by the State of Registry in accordance with the relevant provisions of Annex 16, Volume I.

Note 2.— The various noise certification Standards of Annex 16, Volume I, which are applicable to helicopters are determined according to the date of application for a type certificate, or the date of acceptance of an application under an equivalent prescribed procedure by the certifying authority. Some helicopters are not required to comply with any noise certification Standard. For details see Annex 16, Volume I, Part II, Chapters 8 and 11.

4.7 Flight recorders

Note 1.— Crash protected flight recorders comprise one or more of the following systems: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) and/or a data link recorder (DLR). Image and data link information may be recorded on either the CVR or the FDR.

Note 2.— Combination recorders (FDR/CVR) may be used to meet the flight recorder equipage requirements in this Annex.

Note 3.— Detailed guidance on flight recorders is contained in Appendix 4.

Note 4.— For helicopters for which the application for type certification is submitted to a Contracting State before 1 January 2016, specifications applicable to flight recorders may be found in EUROCAE ED-112, ED-56A, ED-55, Minimum Operational Performance Specifications (MOPS), or earlier equivalent documents.

Note 5.— For helicopters for which the application for type certification is submitted to a Contracting State on or after 1 January 2016, specifications applicable to flight recorders may be found in EUROCAE ED-112A, Minimum Operational Performance Specification (MOPS), or equivalent documents.

4.7.1 Flight data recorders

Note.— Parameters to be recorded are listed in Table A4-1 of Appendix 4.

4.7.1.1 Types

4.7.1.1.1 A Type IV FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude, engine power and operation.

4.7.1.1.2 A Type IVA FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude, engine power, operation and configuration.

4.7.1.1.3 A Type V FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude and engine power.

4.7.1.2 Operation

4.7.1.2.1 All helicopters of a maximum certificated take-off mass of over 3 180 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2016 shall be equipped with a Type IVA FDR.

4.7.1.2.2 All helicopters of a maximum certificated take-off mass of over 7 000 kg, or having a passenger seating configuration of more than nineteen, for which the individual certificate of airworthiness is first issued on or after 1 January 1989 shall be equipped with a Type IV FDR.

4.7.1.2.3 **Recommendation.**— *All helicopters of a maximum certificated take-off mass of over 3 180 kg, up to and including 7 000 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1989 should be equipped with a Type V FDR.*

4.7.1.3 Discontinuation

4.7.1.3.1 The use of engraving metal foil FDRs shall be discontinued.

4.7.1.3.2 **Recommendation.**— *The use of analogue FDRs using frequency modulation (FM) should be discontinued.*

4.7.1.3.3 The use of photographic film FDRs shall be discontinued.

4.7.1.3.4 The use of analogue FDRs using frequency modulation (FM) shall be discontinued by 1 January 2012.

4.7.1.3.5 **Recommendation.**— *The use of magnetic tape FDRs should be discontinued by 1 January 2011.*

4.7.1.3.6 The use of magnetic tape FDRs shall be discontinued by 1 January 2016.

4.7.1.4 Duration

Types IV, IVA and V FDRs shall be capable of retaining the information recorded during at least the last ten hours of their operation.

4.7.2 Cockpit voice recorders

4.7.2.1 Operation

4.7.2.1.1 All helicopters of a maximum certificated take-off mass of over 7 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 shall be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on the CVR.

4.7.2.1.2 **Recommendation.**— *All helicopters of a maximum certificated take-off mass of over 3 180 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 should be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed should be recorded on the CVR.*

4.7.2.1.3 All helicopters of a maximum certificated take-off mass of over 7 000 kg for which the individual certificate of airworthiness was first issued before 1 January 1987 shall be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on the CVR.

4.7.2.2 Discontinuation

4.7.2.2.1 The use of magnetic tape and wire CVRs shall be discontinued by 1 January 2016.

4.7.2.2.2 **Recommendation.**— *The use of magnetic tape and wire CVRs should be discontinued by 1 January 2011.*

4.7.2.3 Duration

4.7.2.3.1 A CVR shall be capable of retaining the information recorded during at least the last 30 minutes of its operation.

4.7.2.3.2 From 1 January 2016, all helicopters required to be equipped with a CVR shall be equipped with a CVR capable of retaining the information recorded during the last two hours of its operation.

4.7.2.3.3 **Recommendation.**— *All helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1990, and that are required to be equipped with a CVR, should have a CVR capable of retaining the information recorded during at least the last two hours of its operation.*

4.7.3 Data link recorders

4.7.3.1 Applicability

4.7.3.1.1 All helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 2016, which utilize any of the data link communications applications listed in 5.1.2 of Appendix 4, and are required to carry a CVR, shall record on a flight recorder, the data link communications messages.

4.7.3.1.1.1 All helicopters which are modified on or after 1 January 2016, to install and utilize any of the data link communications applications listed in 5.1.2 of Appendix 4 and are required to carry a CVR, shall record on a flight recorder the data link communications messages.

Note 1.— Data link communications are currently conducted by either ATN-based or FANS 1/A-equipped aircraft.

Note 2.— A Class B AIR could be a means for recording data link communications applications messages to and from the helicopters where it is not practical or prohibitively expensive to record those data link communications applications messages on FDR or CVR.

4.7.3.2 Duration

The minimum recording duration shall be equal to the duration of the CVR.

4.7.3.3 Correlation

Data link recording shall be able to be correlated to the recorded cockpit audio.

4.7.4 Flight recorders — general

4.7.4.1 Construction and installation

Flight recorders shall be constructed, located and installed so as to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed. Flight recorders shall meet the prescribed crashworthiness and fire protection specifications.

4.7.4.2 Operation

4.7.4.2.1 Flight recorders shall not be switched off during flight time.

4.7.4.2.2 To preserve flight recorder records, flight recorders shall be deactivated upon completion of flight time following an accident or incident. The flight recorders shall not be reactivated before their disposition as determined in accordance with Annex 13.

Note 1.— The need for removal of the flight recorder records from the aircraft will be determined by the investigation authority in the State conducting the investigation with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.

Note 2.— The operator/owner's responsibilities regarding the retention of flight recorder records are contained in Section II, 9.6.

4.7.4.3 Continued serviceability

Operational checks and evaluations of recordings from the flight recorder systems shall be conducted to ensure the continued serviceability of the recorders.

Note.— Procedures for the inspections of the flight recorder systems are given in Appendix 4.

4.7.4.4 Flight recorders electronic documentation

Recommendation.— *The documentation requirement concerning FDR parameters provided by operator/owners to accident investigation authorities should be in electronic format and take account of industry specifications.*

Note.— Industry specification for documentation concerning flight recorder parameters may be found in the ARINC 647A, Flight Recorder Electronic Documentation, or equivalent document.

4.8 Emergency locator transmitter (ELT)

4.8.1 From 1 July 2008, all helicopters operating in performance Class 1 and 2 shall be equipped with at least one automatic ELT and, when operating on flights over water as described in 4.3.1 a), with at least one automatic ELT and one ELT(S) in a raft or life jacket.

4.8.2 From 1 July 2008, all helicopters operating in performance Class 3 shall be equipped with at least one automatic ELT and, when operating on flights over water as described in 4.3.1 b), with at least one automatic ELT and one ELT(S) in a raft or life jacket.

4.8.3 ELT equipment carried to satisfy the requirements of 4.8.1 and 4.8.2 shall operate in accordance with the relevant provisions of Annex 10, Volume III.

Note.— The judicious choice of numbers of ELTs, their type and placement on aircraft and associated floatable life support systems will ensure the greatest chance of ELT activation in the event of an accident for aircraft operating over water or land, including areas especially difficult for search and rescue. Placement of transmitter units is a vital factor in ensuring optimal crash and fire protection. The placement of the control and switching devices (activation monitors) of automatic fixed ELTs and their associated operational procedures will also take into consideration the need for rapid detection of inadvertent activation and convenient manual switching by crew members.

4.9 Helicopters required to be equipped with a pressure-altitude reporting transponder

4.9.1 From 1 January 2003, unless exempted by the appropriate authorities, all helicopters shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of Annex 10, Volume IV.

4.9.2 **Recommendation.**— *All helicopters should be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of Annex 10, Volume IV.*

Note.— *The provisions in 4.9.1 and 4.9.2 are intended to support the effectiveness of ACAS as well as to improve the effectiveness of air traffic services. Effective dates for carriage requirements of ACAS are contained in Annex 6, Part I, 6.18.1 and 6.18.2. The intent is also for aircraft not equipped with pressure-altitude reporting transponders to be operated so as not to share airspace used by aircraft equipped with airborne collision avoidance systems. To this end, exemptions from the carriage requirement for pressure-altitude reporting transponders could be given by designating airspace where such carriage is not required.*

4.10 Microphones

Recommendation.— *All flight crew members required to be on flight deck duty should communicate through boom or throat microphones.*

4.11 Helicopters equipped with automatic landing systems, a head-up display (HUD) or equivalent displays, enhanced vision systems (EVS), synthetic vision systems (SVS) and/or combined vision systems (CVS)

4.11.1 Where helicopters are equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, or any combination of those systems into a hybrid system, criteria for the use of such systems for the safe operation of a helicopter shall be established by the State of Registry.

Note.— *Information regarding a HUD or equivalent displays, including references to RTCA and EUROCAE documents, is contained in the Manual of All-Weather Operations (Doc 9365).*

4.11.2 In approving the operational use of automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, the State of Registry shall ensure that:

- a) the equipment meets the appropriate airworthiness certification requirements;
- b) the operator has carried out a safety risk assessment of the operations supported by the automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS;
- c) the operator has established and documented the requirements for the use of, and training for, automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS.

Note 1.— *Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) (Doc 9859).*

Note 2.— *Guidance on operational approvals is contained in Attachment I.*

4.12 Electronic flight bags (EFBs)

Note.— *Guidance on EFB equipment, functions and establishing criteria for their operational use is contained in the Manual on Electronic Flight Bags (Doc 10020).*

4.12.1 EFB equipment

Where portable EFBs are used on board a helicopter, the pilot-in-command and the owner shall ensure that they do not affect the performance of the helicopter systems, equipment or the ability to operate the helicopter.

4.12.2 EFB functions

4.12.2.1 Where EFBs are used on board a helicopter the pilot-in-command and/or the owner shall:

- a) assess the safety risk(s) associated with each EFB function;
- b) establish the procedures for the use of, and training requirements for, the device and each EFB function; and
- c) ensure that, in the event of an EFB failure, sufficient information is readily available to the flight crew for the flight to be conducted safely.

Note.— *Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) (Doc 9859).*

4.12.2.2 The State of the Registry shall establish criteria for the operational use of EFB functions to be used for the safe operation of helicopters.

4.12.3 EFB operational criteria

In establishing criteria for the operational use of EFBs, the State of Registry shall ensure that:

- a) the EFB equipment and its associated installation hardware, including interaction with helicopter systems if applicable, meet the appropriate airworthiness certification requirements;
- b) the owner has assessed the risks associated with the operations supported by the EFB function(s);
- c) the owner has established requirements for redundancy of the information (if appropriate) contained and displayed by the EFB function(s);
- d) the owner has established and documented procedures for the management of the EFB function(s) including any databases it may use; and
- e) the owner has established and documented the procedures for the use of, and training requirements for, the EFB function(s).

Note.— *Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) (Doc 9859).*

CHAPTER 5. HELICOPTER COMMUNICATION AND NAVIGATION EQUIPMENT

5.1 Communication equipment

5.1.1 A helicopter to be operated in accordance with IFR or at night shall be provided with radio communication equipment. Such equipment shall be capable of conducting two-way communication with those aeronautical stations and on those frequencies prescribed by the appropriate authority.

Note.— The requirements of 5.1.1 are considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.

5.1.2 When compliance with 5.1.1 requires that more than one communication equipment unit be provided, each shall be independent of the other or others to the extent that a failure in any one will not result in failure of any other.

5.1.3 A helicopter to be operated in accordance with VFR, but as a controlled flight, shall, unless exempted by the appropriate authority, be provided with radio communication equipment capable of conducting two-way communication at any time during flight with such aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.

5.1.4 A helicopter to be operated on a flight to which the provisions of 4.3 or 4.4 apply shall, unless exempted by the appropriate authority, be provided with radio communication equipment capable of conducting two-way communication at any time during flight with such aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.

5.1.5 **Recommendation.**— *The radio communication equipment required in accordance with 5.1.1 to 5.1.4 should provide for communication on the aeronautical emergency frequency.*

5.1.6 For flights in defined portions of airspace or on routes where an RCP type has been prescribed, a helicopter shall, in addition to the requirements specified in 5.1.1 to 5.1.5:

- a) be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP type(s); and
- b) be authorized by the State of Registry for operations in such airspace.

Note.— Information on RCP and associated procedures, and guidance concerning the approval process, are contained in the Manual on Required Communications Performance (RCP) (Doc 9869). This document also contains references to other documents produced by States and international bodies concerning communication systems and RCP.

5.2 Navigation equipment

5.2.1 A helicopter shall be provided with navigation equipment which will enable it to proceed:

- a) in accordance with its flight plan; and
- b) in accordance with the requirements of air traffic services;

except when, if not so precluded by the appropriate authority, navigation for flights under VFR is accomplished by visual reference to landmarks. For international general aviation, landmarks shall be located at least every 110 km (60 NM).

5.2.2 For operations where a navigation specification for performance-based navigation has been prescribed, a helicopter shall, in addition to the requirements specified in 5.2.1:

- a) be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specification(s); and
- b) be authorized by the State of the Operator for such operations.

Note.— Information on performance-based navigation and associated procedures, and guidance concerning the implementation and operational approval process, are contained in the Performance-based Navigation (PBN) Manual (Doc 9613). This document also contains a comprehensive list of references to other documents produced by States and international bodies concerning navigation systems.

5.2.3 The helicopter shall be sufficiently provided with 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 will enable the helicopter to navigate in accordance with 5.2.1 and, where applicable, 5.2.2.

Note.— For international general aviation, this requirement may be met by means other than the duplication of equipment.

5.2.4 On flights in which it is intended to land in instrument meteorological conditions, a helicopter shall be provided with appropriate navigation equipment providing guidance to a point from which a visual landing can be effected. This equipment shall be capable of providing such guidance at each heliport at which it is intended to land in instrument meteorological conditions and at any designated alternate heliports.

CHAPTER 6. HELICOPTER MAINTENANCE

Note 1.— For the purpose of this chapter “helicopter” includes: engines, power transmissions, rotors, components, accessories, instruments, equipment and apparatus including emergency equipment.

Note 2.— Guidance on continuing airworthiness requirements is contained in the Airworthiness Manual (Doc 9760).

6.1 Maintenance responsibilities

6.1.1 The owner of a helicopter, or in the case where it is leased, the lessee, shall ensure that:

- a) the helicopter is maintained in an airworthy condition;
- b) the operational and emergency equipment necessary for the intended flight is serviceable;
- c) the certificate of airworthiness of the helicopter remains valid; and
- d) the maintenance of the helicopter is performed in accordance with a maintenance programme acceptable to the State of Registry.

6.1.2 The helicopter shall not be operated unless it is maintained and released to service under a system acceptable to the State of Registry.

6.1.3 When the maintenance release is not issued by an organization approved in accordance with Annex 6, Part I, 8.7, the person signing the maintenance release shall be licensed in accordance with Annex 1.

6.2 Maintenance records

6.2.1 The owner shall ensure that the following records are kept for the periods mentioned in 6.2.2:

- a) the total time in service hours, calendar time and cycles, as appropriate of the helicopter and all life-limited components;
- b) the current status of compliance with all mandatory continuing airworthiness information;
- c) appropriate details of modifications and repairs to the helicopter;
- d) the time in service (hours, calendar time and cycles, as appropriate) since last overhaul of the helicopter or its components subject to a mandatory overhaul life;
- e) the current status of the helicopter’s compliance with the maintenance programme; and
- f) the detailed maintenance records to show that all requirements for signing of a maintenance release have been met.

6.2.2 The records in 6.2.1 a) to e) shall be kept for a minimum period of 90 days after the unit to which they refer has been permanently withdrawn from service, and the records in 6.2.1 f) for a minimum period of one year after the signing of the maintenance release.

6.2.3 The lessee of a helicopter shall comply with the requirements of 6.2.1 and 6.2.2, as applicable, while the helicopter is leased.

6.3 Continuing airworthiness information

The owner of a helicopter over 3 175 kg maximum certificated take-off mass, or in the case where it is leased, the lessee, shall, as required by the State of Registry, ensure that the information resulting from maintenance and operational experience with respect to continuing airworthiness is transmitted as required by Annex 8, Part II, 4.2.3 f) and 4.2.4.

6.4 Modifications and repairs

All modifications and repairs shall comply with airworthiness requirements acceptable to the State of Registry. Procedures shall be established to ensure that the substantiating data supporting compliance with the airworthiness requirements are retained.

6.5 Maintenance release

6.5.1 A maintenance release shall be completed and signed, as prescribed by the State of Registry, to certify that the maintenance work performed has been completed satisfactorily.

6.5.2 A maintenance release shall contain a certification including:

- a) basic details of the maintenance carried out;
- b) the date such maintenance was completed;
- c) when applicable, the identity of the approved maintenance organization; and
- d) the identity of the person or persons signing the release.

CHAPTER 7. HELICOPTER FLIGHT CREW

7.1 Qualifications

The pilot-in-command shall ensure that the licences of each flight crew member have been issued or rendered valid by the State of Registry, and are properly rated and of current validity, and shall be satisfied that flight crew members have maintained competence.

Note.— Information for pilots on flight procedure parameters and operational procedures is contained in PANS-OPS (Doc 8168), Volume I. Criteria for the construction of visual and instrument flight procedures are contained in PANS-OPS (Doc 8168), Volume II. Obstacle Clearance criteria and procedures used in certain States may differ from PANS-OPS, and knowledge of these differences is important for safety reasons.

7.2 Composition of the flight crew

The number and composition of the flight crew shall not be less than that specified in the flight manual or other documents associated with the certificate of airworthiness.

ANNEX 6 — PART III

APPENDICES

APPENDIX 1. SAFETY OVERSIGHT OF AIR OPERATORS

(See Section II, Chapter 2, 2.2.1.8)

Note 1.— Appendix 1 to Annex 19 contains the general provisions for a State safety oversight system.

Note 2.— This Appendix provides additional provisions for the safety oversight of international commercial air transport operators.

1. Primary aviation legislation

The State of the Operator shall enact and implement laws that enable the State to regulate the certification and continued supervision of air operators and the resolution of safety issues identified by the authority and to ensure that compliance will result in an acceptable level of safety performance for the operations undertaken.

Note 1.— The term authority as used in this Appendix refers to the Civil Aviation Authority as well as equivalent organizations, including inspectors and staff.

Note 2.— Guidance on the inspection, certification and continued surveillance of operations is contained in the Manual of Procedures for Operations Inspection, Certification and Continued Surveillance (Doc 8335) and the Airworthiness Manual (Doc 9760).

2. Specific operating regulations

The State of the Operator shall adopt regulations that provide for the certification and continued surveillance of aircraft operations and the maintenance of aircraft in conformity with the Annexes to the Convention on International Civil Aviation.

3. State safety oversight system and functions

3.1 The State of the Operator shall ensure that the authority is responsible for the safety oversight of air operators.

3.2 The State of the Operator shall use a methodology to determine its inspector staffing requirements according to the size and complexity of civil air operations in that State.

3.3 **Recommendation.**— *The methodology in 3.2 should be documented.*

3.4 The State of the Operator shall ensure that authority inspectors have adequate support, credentials and transportation to accomplish, independently, their certification and continued surveillance tasks.

4. Qualified technical personnel

The State of the Operator shall require that the initial and recurrent training of the authority inspectors include aircraft-specific subjects.

Note.— Guidance on experience and training for inspectors is contained in the Manual of Procedures for Operations Inspection, Certification and Continued Surveillance (Doc 8335).

5. Technical guidance, tools and provision of safety-critical information

5.1 The State of the Operator shall ensure that authority inspectors are provided with technical guidance manuals containing the policies, procedures and standards to be used in the certification and continued surveillance of air operators.

5.2 The State of the Operator shall ensure that authority inspectors are provided with technical guidance manuals containing the policies, procedures and standards to be used in the resolution of safety issues, including enforcement.

5.3 The State of the Operator shall ensure that authority inspectors are provided with technical guidance manuals that addresses ethics, personal conduct and the avoidance of actual or perceived conflicts of interest in the performance of official duties.

6. Certification obligations

The State of the Operator shall require, prior to commencement of new commercial air transport operations, air operators to demonstrate that they can safely conduct the proposed operations.

7. Continued surveillance obligations

The State of the Operator shall use an ongoing surveillance plan to confirm that operators continue to meet the relevant requirements for initial certification and that each air operator is functioning satisfactorily.

8. Resolution of safety issues

Note.— Provisions for the resolution of safety issues are contained in Appendix 1 to Annex 19.

APPENDIX 2. ADDITIONAL REQUIREMENTS FOR OPERATIONS OF HELICOPTERS IN PERFORMANCE CLASS 3 IN INSTRUMENT METEOROLOGICAL CONDITIONS (IMC)

(See Section II, Chapter 3, 3.4.1)

Airworthiness and operations requirements provided in accordance with Section II, Chapter 3, 3.4.1, shall satisfy the following:

1. Engine reliability

1.1 Attaining and maintaining approval for engines used by helicopters operating in performance Class 3 in IMC:

1.1.1 In order to attain initial approval for existing in-service engine types, reliability shall be shown to have a nominal power loss rate of less than 1 per 100 000 engine hours based on a risk management process.

Note.— Power loss in this context is defined as any significant loss of power, the cause of which may be traced to engine or engine component, design, maintenance or installation, including design or installation of the fuel ancillary or engine control systems. (See Attachment H.)

1.1.2 In order to attain initial approval for new engine types, the State of Design shall assess engine models for acceptance for operations in performance Class 3 in IMC on a case-by-case basis.

1.1.3 In order to maintain approval, the State of Design shall, through the continuing airworthiness process, ensure that engine reliability remains consistent with the intent of the Standard contained in 1.1.1.

1.2 The operator shall be responsible for a programme for ongoing engine trend monitoring.

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

- a) for turbine engines: a re-ignition system that activates automatically or a manually selectable continuous ignition system unless the engine certification has determined that such a system is not required, taking into consideration the likely environmental conditions in which the engine is to be operated;
- b) a magnetic particle detection or equivalent system that monitors the engine, accessories gearbox, and reduction gearbox, and which includes a flight deck caution indication; and
- c) a means that would permit continuing operation of the engine through a sufficient power range to safely complete the flight in the event of any reasonably probable failure of the fuel control unit.

2. Systems and equipment

Helicopters operating in performance Class 3 in IMC shall be equipped with the following systems and equipment intended to ensure continued safe flight or to assist in achieving a safe forced landing after an engine failure, under all allowable operating conditions:

- a) either two separate electrical generating systems, each one capable of supplying all probable combinations of continuous in-flight electrical loads for instruments, equipment and systems required in IMC; or a primary electrical

source and a standby battery or other alternate source of electric power that is capable of supplying 150 per cent of electrical loads of all required instruments and equipment necessary for safe emergency operations of the helicopter for at least one hour; and

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

Note.— If a battery is used to satisfy the requirement for a second power source (see 2 a) above), an additional electrical power supply may not be required.

- 1) maintain the operation of all essential flight instruments, communication and navigation systems during a descent from the maximum certificated altitude in an autorotational configuration to the completion of a landing;
 - 2) maintain the operation of the stabilization system, if applicable;
 - 3) lower the landing gear, if applicable;
 - 4) where required, provide power to one pitot heater, which must serve an airspeed indicator clearly visible to the pilot;
 - 5) provide for the operation of the landing light;
 - 6) provide for one engine restart, if applicable; and
 - 7) provide for the operation of the radio altimeter;
- c) a radio altimeter;
- d) an autopilot if intended as a substitute for a second pilot. In these cases, the State of Operator shall ensure the operator's approval clearly states any conditions or limitations on its use;
- e) a means to provide for at least one attempt at engine re-start;
- f) an area navigation system approved for use in IFR, capable of being used to locate suitable landing areas in the event of an emergency;
- g) a landing light that is independent of retractable landing gear and is capable of adequately illuminating the touchdown area in a night forced landing; and
- h) an engine fire warning system.

3. Minimum serviceability requirements — operating equipment

The State of the Operator shall specify the minimum serviceability requirements for operating equipment in helicopters operating in performance Class 3 in IMC.

4. Operations manual information

The operations manual shall include limitations, procedures, approval status and other information relevant to operations in performance Class 3 in IMC.

5. Event reporting

5.1 An operator approved to conduct operations by helicopters in performance Class 3 in IMC shall report all significant failures, malfunctions or defects to the State of the Operator who in turn shall notify the State of Design.

5.2 The State of the Operator shall monitor operations in performance Class 3 in IMC so as to be able to take any actions necessary to ensure that the intended safety level is maintained. The State of the Operator shall notify major events or trends of particular concern to the appropriate type certificate holder and the State of Design.

6. Operator planning

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

- a) the nature of the terrain to be overflown, including the potential for carrying out a safe forced landing in the event of an engine failure or major malfunction;
- b) weather information, including seasonal and other adverse meteorological influences that may affect the flight; and
- c) other criteria and limitations as specified by the State of the Operator.

7. Flight crew experience, training and checking

7.1 The State of the Operator shall prescribe the minimum flight crew experience for helicopters operating in performance Class 3 in IMC.

7.2 An operator's flight crew training and checking programme shall be appropriate to operations in performance Class 3 in IMC, covering normal, abnormal and emergency procedures and, in particular, detection of engine failure including descent to a forced landing in IMC and, for single engine helicopters, entry into a stabilized autorotation.

8. Operator certification or validation

The operator shall demonstrate the ability to conduct operations in performance Class 3 in IMC through a certification and approval process specified by the State of the Operator.

Note.— Guidance on the airworthiness and operational requirements is contained in Attachment H.

APPENDIX 3. AIR OPERATOR CERTIFICATE (AOC)

(Note. — See Section II, Chapter 2, 2.2.1.5 and 2.2.1.6)

1. Purpose and scope

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

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

Note.— Attachment E, paragraph 3.2.2, contains additional information that may be listed in the operations specifications associated with the air operator certificate.

2. AOC template

Note.— Section II, Chapter 4, 4.1.2, requires a certified true copy of the AOC to be carried aboard.

AIR OPERATOR CERTIFICATE		
1	STATE OF THE OPERATOR²	1
	ISSUING AUTHORITY³	
AOC # ⁴ : Expiry date ⁵ :	OPERATOR NAME⁶ Dba trading name ⁷ : Operator address ⁸ : Telephone ⁹ : Fax: E-mail:	OPERATIONAL POINTS OF CONTACT¹⁰ Contact details, at which operational management can be contacted without undue delay, are listed in _____ ¹¹ .
This certificate certifies that _____ ¹² is authorized to perform commercial air operations, as defined in the attached operations specifications, in accordance with the operations manual and the _____ ¹³ .		
Date of issue ¹⁴ :	Name and signature ¹⁵ : Title:	

Notes.—

1. *For use of the State of the Operator.*
2. *Replace by the name of the State of the Operator.*
3. *Replace by the identification of the issuing authority of the State of the Operator.*
4. *Unique AOC number, as issued by the State of the Operator.*

5. Date after which the AOC ceases to be valid (dd-mm-yyyy).
6. Replace by the operator's registered name.
7. Operator's trading name, if different. Insert "dba" before the trading name (for "doing business as").
8. Operator's principal place of business address.
9. Operator's principal place of business telephone and fax details, including the country code. E-mail to be provided if available.
10. The contact details include the telephone and fax numbers, including the country code, and the e-mail address (if available) at which operational management can be contacted without undue delay for issues related to flight operations, airworthiness, flight and cabin crew competency, dangerous goods and other matters as appropriate.
11. Insert the controlled document, carried on board, in which the contact details are listed, with the appropriate paragraph or page reference. e.g.: "Contact details are listed in the operations manual, Gen/Basic, Chapter 1, 1.1" or "... are listed in the operations specifications, page 1" or "... are listed in an attachment to this document".
12. Operator's registered name.
13. Insert reference to the appropriate civil aviation regulations.
14. Issuance date of the AOC (dd-mm-yyyy).
15. Title, name and signature of the authority representative. In addition, an official stamp may be applied on the AOC.

3. Operations specifications for each aircraft model

Note.— Section II, Chapter 4, 4.1.2, requires a copy of the operations specifications of this section to be carried aboard.

3.1 For each helicopter model in the operator's fleet, identified by helicopter make, model and series, the following list of authorizations, conditions and limitations shall be included: issuing authority contact details, operator name and AOC number, date of issue and signature of the authority representative, aircraft model, types and area of operations, special limitations and authorizations.

Note.— If authorizations and limitations are identical for two or more models, these models may be grouped in a single list.

3.2 The operations specifications layout referred to in Chapter 2, 2.2.1.6, shall be as follows:

Note.— The MEL constitutes an integral part of the operations manual.

OPERATIONS SPECIFICATIONS (subject to the approved conditions in the operations manual)				
ISSUING AUTHORITY CONTACT DETAILS¹				
Telephone: _____		Fax: _____		E-mail: _____
AOC# ² : _____ Operator name ³ : _____ Date ⁴ : _____ Signature: _____				
Dba trading name: _____				
Aircraft model ⁵ : _____				
Types of operation: Commercial air transportation <input type="checkbox"/> Passengers <input type="checkbox"/> Cargo <input type="checkbox"/> Other ⁶ : _____				
Area(s) of operation ⁷ : _____				
Special limitations ⁸ : _____				
SPECIAL AUTHORIZATIONS	YES	NO	SPECIFIC APPROVALS ⁹	REMARKS
Dangerous goods	<input type="checkbox"/>	<input type="checkbox"/>		
Low visibility operations				
Approach and landing	<input type="checkbox"/>	<input type="checkbox"/>	CAT ¹⁰ : _____ RVR: _____ m DH: _____ ft	
Take-off	<input type="checkbox"/>	<input type="checkbox"/>	RVR ¹¹ : _____ m	
Operational credit(s)	<input type="checkbox"/>	<input type="checkbox"/>	¹²	
Navigation specifications for PBN operations ¹³	<input type="checkbox"/>	<input type="checkbox"/>		¹⁴
Continuing airworthiness			¹⁵	
EFB			¹⁶	
Other ¹⁷	<input type="checkbox"/>	<input type="checkbox"/>		

Notes.—

1. Telephone and fax contact details of the authority, including the country code. E-mail to be provided if available.

2. *Insert the associated AOC number.*
3. *Insert the operator's registered name and the operator's trading name, if different. Insert "dba" before the trading name (for "doing business as").*
4. *Issuance date of the operations specifications (dd-mm-yyyy) and signature of the authority representative.*

5. *Insert the Commercial Aviation Safety Team (CAST)/ICAO designation of the helicopter make, model and series, or master series, if a series has been designated (e.g. Bell-47G-3 or SIKORSKY-S55). The CAST/ICAO taxonomy is available at: <http://www.intlaviationstandards.org>.*
 6. *Other type of transportation to be specified (e.g. emergency medical service).*
 7. *List the geographical area(s) of authorized operation (by geographical coordinates or specific routes, flight information region or national or regional boundaries).*
 8. *List the applicable special limitations (e.g. VFR only, day only).*
 9. *List in this column the most permissive criteria for each approval or the approval type (with appropriate criteria).*
 10. *Insert the applicable instrument approach operation classified as Type B (CAT II, etc.). Insert the minimum RVR in metres and decision height in feet. One line is used per listed approach category.*
 11. *Insert the approved minimum take-off RVR in metres. One line per approval may be used if different approvals are granted.*
 12. *List the airborne capabilities (i.e. automatic landing, HUD, EVS, SVS, CVS) and associated operational credit(s) granted.*
 13. *Performance-based navigation (PBN): one line is used for each PBN specification authorization (e.g. RNAV 10, RNAV 1, RNP 4), with appropriate limitations or conditions listed in the "Specific Approvals" and/or "Remarks" columns.*
 14. *Limitations, conditions and regulatory basis for operational approval associated with the performance-based navigation specifications (e.g. GNSS, DME/DME/IRU). Information on performance-based navigation, and guidance concerning the implementation and operational approval process, are contained in the Performance-based Navigation (PBN) Manual (Doc 9613).*
 15. *Insert the name of the person/organization responsible for ensuring that the continuing airworthiness of the helicopter is maintained and the regulation that requires the work, i.e. within the AOC regulation or a specific approval (e.g. EC2042/2003, Part M, Subpart G).*
 16. *List the EFB functions with any applicable limitations.*
 17. *Other authorizations or data can be entered here, using one line (or one multi-line block) per authorization (e.g. special approach authorization, special operations, specification of which performance class(es) the aircraft can be operated in).*
-

APPENDIX 4. FLIGHT RECORDERS

(Note — See Section II, Chapter 4, 4.3 and Section III, Chapter 4, 4.7)

The material in this Appendix concerns flight recorders intended for installation in helicopters engaged in international air navigation. Crash protected flight recorders comprise one or more of the following-systems: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) and/or a data link recorder (DLR).

1. General requirements

1.1 Non-deployable flight recorder containers shall:

- a) be painted a distinctive orange or yellow colour;
- b) carry reflective material to facilitate their location; and
- c) have securely attached an automatically activated underwater locating device operating at a frequency of 37.5 kHz. At the earliest practical date, but not later than 1 January 2018, this device shall operate for a minimum of ninety days.

Note.— Current industry practice is to phase out yellow flight recorder containers at the end of the service life of the flight recorder.

1.2 The flight recorder systems shall be installed so that:

- a) the probability of damage to the recordings is minimized;
- b) they receive electrical power from a bus that provides the maximum reliability for operation of the flight recorder systems without jeopardizing service to essential or emergency loads;
- c) there is an aural or visual means for pre-flight checking that the flight recorder systems are operating properly; and
- d) if the flight recorder systems have a bulk erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact.

1.3 The flight recorder systems, when tested by methods approved by the appropriate certificating authority, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate.

1.4 Means shall be provided for an accurate time correlation between the flight recorder systems functions.

1.5 The manufacturer usually provides the appropriate certificating authority with the following information in respect of the flight recorder systems:

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

2. Flight data recorder (FDR)

2.1 The flight data recorder shall start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power.

2.2 Parameters to be recorded

2.2.1 Flight data recorders for helicopters shall be classified as Type IV, IVA and V depending upon the number of parameters to be recorded.

2.2.2 The parameters that satisfy the requirements for Types IV, IVA and V FDRs, are listed in the paragraphs below. The number of parameters to be recorded shall depend on helicopter complexity. The parameters without an asterisk (*) are mandatory parameters which shall be recorded regardless of helicopter complexity. In addition, the parameters designated by an asterisk (*) shall be recorded if an information data source for the parameter is used by helicopter systems or the flight crew to operate the helicopter. However, other parameters may be substituted with due regard to the helicopter type and the characteristics of the recording equipment.

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

- Pressure altitude
- Indicated airspeed
- Outside air temperature
- Heading
- Normal acceleration
- Lateral acceleration
- Longitudinal acceleration (body axis)
- Time or relative time count
- Navigation data*: drift angle, wind speed, wind direction, latitude/longitude
- Radio altitude*.

2.2.4 The following parameters shall satisfy the requirements for attitude:

- Pitch attitude
- Roll attitude
- Yaw rate.

2.2.5 The following parameters shall satisfy the requirements for engine power:

- Power on each engine: free power turbine speed (Nf), engine torque, engine gas generator speed (Ng), cockpit power control position
- Rotor: main rotor speed, rotor brake
- Main gearbox oil pressure*
- Gearbox oil temperature*: main gearbox oil temperature, intermediate gearbox oil temperature, tail rotor gearbox oil temperature
- Engine exhaust gas temperature (T₄)*
- Turbine inlet temperature (TIT)*.

2.2.6 The following parameters shall satisfy the requirements for operation:

- Hydraulics low pressure
- Warnings

- Primary flight controls — pilot input and/or control output position: collective pitch, longitudinal cyclic pitch, lateral cyclic pitch, tail rotor pedal, controllable stabilator, hydraulic selection
- Marker beacon passage
- Each navigation receiver frequency selection
- AFCS mode and engagement status*
- Stability augmentation system engagement*
- Indicated sling load force*
- Vertical deviation*: ILS glide path, MLS elevation, GNSS approach path
- Horizontal deviation*: ILS localizer, MLS azimuth, GNSS approach path
- DME 1 and 2 distances*
- Altitude rate*
- Ice detector liquid water content*
- Helicopter health and usage monitor system (HUMS)*: engine data, chip detectors, channel timing, exceedance discretes, broadband average engine vibration.

2.2.7 The following parameters shall satisfy the requirements for configuration:

- Landing gear or gear selector position*
- Fuel contents*
- Ice detector liquid water content*.

2.2.8 *Type IVA FDR*. This FDR will be capable of recording, as appropriate to the helicopter, at least the 48 parameters in Table A4-1.

2.2.9 *Type IV FDR*. This FDR shall be capable of recording, as appropriate to the helicopter, at least the first 30 parameters in Table A4-1.

2.2.10 *Type V FDR*. This FDR shall be capable of recording, as appropriate to the helicopter, at least the first 15 parameters in Table A4-1.

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

- a) additional operational information from electronic displays, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS); and
- b) additional engine parameters (EPR, N_1 , fuel flow, etc.).

2.3 Additional information

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

2.3.2 Documentation concerning parameter allocation, conversion equations, periodic calibration and other serviceability/maintenance information shall be maintained by the operator/owner. The documentation shall be sufficient to ensure that accident investigation authorities have the necessary information to read out the data in engineering units.

3. Cockpit voice recorder (CVR)

3.1 Signals to be recorded

3.1.1 The CVR shall start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power. In addition, 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.

3.1.2 The CVR shall record on four separate channels, or more, at least the following:

- a) voice communication transmitted from or received in the aircraft by radio;
- b) aural environment on the flight deck;
- c) voice communication of flight crew members on the flight deck using the interphone system, if installed;
- d) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker; and
- e) voice communication of flight crew members using the passenger address system, if installed.

3.1.3 The CVR shall be capable of recording on at least four channels simultaneously. On tape-based CVR, to ensure accurate time correlation between channels, the CVR shall record in an in-line format. If a bi-directional configuration is used, the in-line format and channel allocation shall be retained in both directions.

3.1.4 The preferred channel allocation shall be as follows:

Channel 1 — co-pilot headphones and live boom microphone

Channel 2 — pilot headphones and live boom microphone

Channel 3 — area microphone

Channel 4 — time reference, main rotor speed or the flight deck vibration environment, the third and fourth crew member's headphone and live microphone, if applicable.

Note 1.— Channel 1 is located closest to the base of the recording head.

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

4. Airborne image recorder (AIR)

4.1 Classes

4.1.1 A Class A AIR captures the general cockpit area in order to provide data supplemental to conventional flight recorders.

Note 1.— To respect crew privacy, the cockpit area view may be designed as far as practical to exclude the head and shoulders of crew members whilst seated in their normal operating position.

Note 2.— There are no provisions for Class A AIRs in this document.

4.1.2 A Class B AIR captures data link message displays.

4.1.3 A Class C AIR captures instruments and control panels.

Note.— It may be considered as a means for recording flight data where it is not practical or prohibitively expensive to record on an FDR, or where an FDR is not required.

4.2 Operation

The AIR will start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the AIR will 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.

5. Data link recorder (DLR)

5.1 Applications to be recorded

5.1.1 Where the helicopter flight path is authorized or controlled through the use of data link messages, all data link messages, both uplinks (to the helicopter) and downlinks (from the helicopter), shall be recorded on the helicopter. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall be recorded.

Note.— Sufficient information to derive the content of the data link communications message and the time the messages were displayed to the flight crew is needed to determine an accurate sequence of events on board the aircraft.

5.1.2 Messages applying to the applications listed below shall be recorded. Applications without the asterisk (*) are mandatory applications which shall be recorded regardless of the system complexity. Applications with an (*) are to be recorded only as far as is practicable given the architecture of the system.

- Data link initiation capability
- Controller–pilot data link communications
- Data link flight information services
- Automatic dependent surveillance — contract
- Automatic dependent surveillance — broadcast*
- Aeronautical operational control*.

Note.— Descriptions of the applications are contained in Table A4-2.

6. Inspections of flight recorder systems

6.1 Prior to the first flight of the day, the built-in test features for the flight recorders and flight data acquisition unit (FDAU), when installed, shall be monitored by manual and/or automatic checks.

6.2 FDR systems or ADRS, CVR systems or CARS, and AIR systems or AIRS shall have recording system inspection intervals of one year; subject to the approval from the appropriate regulatory authority, this period may be extended to two years provided these systems have demonstrated a high integrity of serviceability and self-monitoring. DLR systems or DLRS shall have recording system inspection intervals of two years; subject to the approval from the appropriate regulatory authority, this period may be extended to four years provided these systems have demonstrated high integrity of serviceability and self-monitoring.

6.3 Recording system inspections shall be carried out as follows:

- a) an analysis of the recorded data from the flight recorders shall ensure that the recorder operates correctly for the nominal duration of the recording;
- b) the analysis of the FDR or ADRS shall evaluate the quality of the recorded data to determine if the bit error rate (including those errors introduced by recorder, the acquisition unit, the source of the data on the helicopter and by the tools used to extract the data from the recorder) is within acceptable limits and to determine the nature and distribution of the errors;
- c) a complete flight recording from the FDR or ADRS shall be examined in engineering units to evaluate the validity of all recorded parameters. Particular attention shall be given to parameters from sensors dedicated to the FDR or ADRS. Parameters taken from the aircraft's electrical bus system need not be checked if their serviceability can be detected by other aircraft systems;
- d) the readout facility shall have the necessary software to accurately convert the recorded values to engineering units and to determine the status of discrete signals;
- e) an examination of the recorded signal on the CVR or CARS shall be carried out by replay of the CVR or CARS recording. While installed in the aircraft, the CVR or CARS shall record test signals from each aircraft source and from relevant external sources to ensure that all required signals meet intelligibility standards;
- f) where practicable, during the examination, a sample of in-flight recordings of the CVR or CARS shall be examined for evidence that the intelligibility of the signal is acceptable; and
- g) an examination of the recorded images on the AIR or AIRS shall be carried out by replay of the AIR or AIRS recording. While installed in the aircraft, the AIR or AIRS shall record test images from each aircraft source and from relevant external sources to ensure that all required images meet recording quality standards.

6.4 A flight recorder system shall be considered unserviceable if there is a significant period of poor quality data, unintelligible signals, or if one or more of the mandatory parameters is not recorded correctly.

6.5 A report of the recording system inspection shall be made available on request to regulatory authorities for monitoring purposes.

6.6 Calibration of the FDR system:

- a) for those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out at least every five years or in accordance with the recommendations of the sensor manufacturer to determine any discrepancies in the engineering conversion routines for the mandatory parameters and to ensure that parameters are being recorded within the calibration tolerances; and
- b) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed as recommended by the sensor manufacturer, or at least every two years.

Table A4-1. Parameter Guidance for Flight Data Recorders

Serial number	Parameter	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
1	Time (UTC when available, otherwise relative time count or GPS time sync)	24 hours	4	±0.125% per hour	1 s
2	Pressure altitude	–300 m (–1 000 ft) to maximum certificated altitude of aircraft +1 500 m (+5 000 ft)	1	±30 m to ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)
3	Indicated airspeed	As the installed pilot display measuring system	1	±3%	1 kt
4	Heading	360°	1	±2°	0.5°
5	Normal acceleration	–3 g to +6 g	0.125	±0.09 g excluding a datum error of ±0.045 g	0.004 g
6	Pitch attitude	±75° or 100% of useable range whichever is greater	0.5	±2°	0.5°
7	Roll attitude	±180°	0.5	±2°	0.5°
8	Radio transmission keying	On-off (one discrete)	1	—	—
9	Power on each engine	Full range	1 (per engine)	±2%	0.1% of full range
10	Main rotor:				
	Main rotor speed	50–130%	0.51	±2%	0.3% of full range
	Rotor brake	Discrete		—	—
11	Pilot input and/or control surface position — primary controls (collective pitch, longitudinal cyclic pitch, lateral cyclic pitch, tail rotor pedal)	Full range	0.5 (0.25 recommended)	±2% unless higher accuracy uniquely required	0.5% of operating range
12	Hydraulics, each system (low pressure and selection)	Discrete	1	—	—
13	Outside air temperature	Sensor range	2	±2°C	0.3°C
14*	Autopilot/ autothrottle/AFCS mode and engagement status	A suitable combination of discrettes	1	—	—
15*	Stability augmentation system engagement	Discrete	1	—	—
<i>Note.— The preceding 15 parameters satisfy the requirements for a Type V FDR.</i>					
16*	Main gearbox oil pressure	As installed	1	As installed	6.895 kN/m ² (1 psi)
17*	Main gearbox oil temperature	As installed	2	As installed	1°C

Serial number	Parameter	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
18	Yaw rate	±400°/second	0.25	±1.5% maximum range excluding datum error of ±5%	±2°/s
19*	Sling load force	0 to 200% of certified load	0.5	±3% of maximum range	0.5% for maximum certified load
20	Longitudinal acceleration	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
21	Lateral acceleration	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
22*	Radio altitude	−6 m to 750 m (−20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft), 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)
23*	Vertical beam deviation	Signal range	1	±3%	0.3% of full range
24*	Horizontal beam deviation	Signal range	1	±3%	0.3% of full range
25	Marker beacon passage	Discrete	1	—	—
26	Warnings	Discrete(s)	1	—	—
27	Each navigation receiver frequency selection	Sufficient to determine selected frequency	4	As installed	—
28*	DME 1 and 2 distances	0–370 km (0–200 NM)	4	As installed	1 852 m (1 NM)
29*	Navigation data (latitude/longitude, ground speed, drift angle, wind speed, wind direction)	As installed	2	As installed	As installed
30*	Landing gear and gear selector position	Discrete	4	—	—
<i>Note.— The preceding 30 parameters satisfy the requirements for a Type IV FDR.</i>					
31*	Engine exhaust gas temperature (T ₄)	As installed	1	As installed	
32*	Turbine inlet temperature (TIT/ITT)	As installed	1	As installed	
33*	Fuel contents	As installed	4	As installed	
34*	Altitude rate	As installed	1	As installed	
35*	Ice detection	As installed	4	As installed	
36*	Helicopter health and usage monitor system	As installed	—	As installed	—
37	Engine control modes	Discrete	1	—	—
38*	Selected barometric setting (pilot and co-pilot)	As installed	64 (4 recommended)	As installed	0.1 mb (0.01 in Hg)

Serial number	Parameter	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
39*	Selected altitude (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
44*	Selected flight path (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
45*	Selected decision height	As installed	4	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot and co-pilot)	Discrete(s)	4	—	—
47*	Multi-function/engine/alerts display format	Discrete(s)	4	—	—
48*	Event marker	Discrete	1	—	—

Note.— The preceding 48 parameters satisfy the requirements for a Type IVA FDR.

Table A4-2. Description of Applications for Data Link Recorders

Item No.	Application type	Application description	Recording content
1	Data link initiation	This includes any applications used to log on to or initiate data link service. In FANS-1/A and ATN, these are ATS facilities notification (AFN) and context management (CM) respectively.	C
2	Controller/pilot communication	This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and controllers on the ground. In FANS-1/A and ATN, this includes the CPDLC application. It also includes applications used for the exchange of oceanic (OCL) and departure clearances (DCL) as well as data link delivery of taxi clearances.	C
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. Where parametric data are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	C
4	Flight information	This includes any service used for delivery of flight information to specific aircraft. This includes, for example, data link aviation weather report service (D-METAR), data link-automatic terminal service (D-ATIS), digital Notice to Airmen (D-NOTAM) and other textual data link services.	C
5	Aircraft broadcast surveillance	This includes elementary and enhanced surveillance systems, as well as automatic dependent surveillance — broadcast (ADS-B) output data. Where parametric data sent by the helicopter are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	M*
6	Aeronautical operational control data	This includes any application transmitting or receiving data used for aeronautical operational control purposes (per the ICAO definition of operational control).	M*

Key:

C: Complete contents recorded.

M: Information that enables correlation to any associated records stored separately from the helicopter.

*: Applications that are to be recorded only as far as is practicable given the architecture of the system.

Table A4-3. Parameter Guidance for Aircraft Data Recording Systems

N°	Parameter name	Parameter category	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading (Magnetic or True)	R*	±180°	1	±2°	0.5°	*If not available, record rotational rates
2	Pitch attitude	E*	±90°	0.25	±2°	0.5°	*If not available, record rotational rates
3	Roll attitude	E*	±180°	0.25	±2°	0.5°	*If not available, record rotational rates
4	Yaw rate	E*	±300°/s	0.25	±1% + drift of 360°/h	2°/s	*Essential if no heading available
5	Pitch rate	E*	±300°/s	0.25	±1% + drift of 360°/h	2°/s	*Essential if no pitch attitude available
6	Roll rate	E*	±300°/s	0.25	±1% + drift of 360°/h	2°/s	*Essential if no roll attitude available
7	Positioning system: latitude/longitude	E	Latitude: ±90° Longitude: ±180°	2 (1 if available)	As installed (0.00015° recommended)	0.00005°	
8	Positioning system estimated error	E*	Available range	2 (1 if available)	As installed	As installed	*If available
9	Positioning system: altitude	E	-300 m (-1 000 ft) to maximum certificated altitude of helicopter + 1 500 m (5 000 ft)	2 (1 if available)	As installed (±15 m (±50 ft) recommended)	1.5 m (5 ft)	
10	Positioning system: time*	E	24 hours	1	±0.5 s	0.1 s	*UTC time preferred where available.
11	Positioning system: ground speed	E	0-1 000 kt	2 (1 if available)	As installed (±5 kt recommended)	1 kt	
12	Positioning system: track	E	0-360°	2 (1 if available)	As installed (±2° recommended)	0.5°	
13	Normal acceleration	E	-3 g to + 6 g	0.25 (0.125 if available)	As installed (±0.09 g excluding a datum error of ±0.05 g recommended)	0.004 g	

N°	Parameter name	Parameter category	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
14	Longitudinal acceleration	E	±1 g	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
15	Lateral acceleration	E	±1 g	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
16	External static pressure (or pressure altitude)	R	34.4 hPa (1.02 in-Hg) to 310.2 hPa (9.16 in-Hg) or available sensor range	1	As installed (±1 hPa (0.3 in-Hg) or ±30 m (±100 ft) to ±210 m (±700 ft) recommended)	0.1 hPa (0.03 in-Hg) or 1.5 m (5 ft)	
17	Outside air temperature (or total air temperature)	R	-50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	
18	Indicated air speed	R	As the installed pilot display measuring system or available sensor range	1	As installed (±3% recommended)	1 kt (0.5 kt recommended)	
19	Main rotor speed (Nr)	R	50% to 130% or available sensor range	0.5	As installed	0.3% of full range	
20	Engine RPM (*)	R	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	*For piston-engined helicopters
21	Engine oil pressure	R	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
22	Engine oil temperature	R	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
23	Fuel flow or pressure	R	Full range	Each engine each second	As installed	2% of full range	
24	Manifold pressure (*)	R	Full range	Each engine each second	As installed	0.2% of full range	*For piston-engined helicopters

N°	Parameter name	Parameter category	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
25	Engine thrust/power/torque parameters required to determine propulsive thrust/power*	R	Full range	Each engine each second	As installed	0.1% of full range	*Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power. A margin for possible overspeed should be provided. Only for turbine-engined helicopters.
26	Engine gas generator speed (Ng) (*)	R	0–150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
27	Free power turbine speed (Nf) (*)	R	0–150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
28	Collective pitch	R	Full range	0.5	As installed	0.1% of full range	
29	Coolant temperature (*)	R	Full range	1	As installed (±5°C recommended)	1° C	*Only for piston-engined helicopters
30	Main voltage	R	Full range	Each engine each second	As installed	1 Volt	
31	Cylinder head temperature (*)	R	Full range	Each cylinder each second	As installed	2% of full range	*Only for piston-engined helicopters
32	Fuel quantity	R	Full range	4	As installed	1% of full range	
33	Exhaust gas temperature	R	Full range	Each engine each second	As installed	2% of full range	
34	Emergency voltage	R	Full range	Each engine each second	As installed	1 Volt	
35	Trim surface position	R	Full range or each discrete position	1	As installed	0.3% of full range	
36	Landing gear position	R	Each discrete position*	Each gear every two seconds	As installed		*Where available, record up-and-locked and down-and-locked position
37	Novel/unique aircraft features	R	As required	As required	As required	As required	

Key:

E: Essential parameters

R: Recommended parameters

ANNEX 6 — PART III

ATTACHMENTS

ATTACHMENT A. HELICOPTER PERFORMANCE AND OPERATING LIMITATIONS

Supplementary to Section II, Chapter 3, and Section III, Chapter 3

Purpose and scope

This attachment comprises material supplementary to Chapter 3 of Sections II and III that is provided for the purpose of guidance. A State may use this material as a basis for establishing its code of performance, but may introduce alternatives or alleviations that would meet the safety objectives of Annex 6.

Note.— Quantitative specifications can be found in the Example provided below.

1. Definitions

Category A. With respect to helicopters, means a multi-engined helicopter designed with engine and system isolation features specified in Annex 8, Part IVB, and capable of operations using take-off and landing data scheduled under a critical engine failure concept which assures adequate designated surface area and adequate performance capability for continued safe flight or safe rejected take-off.

Category B. With respect to helicopters, means a single engine or multi-engined helicopter which does not meet Category A standards. Category B helicopters have no guaranteed capability to continue safe flight in the event of an engine failure, and a forced landing is assumed.

2. General

2.1 Helicopters operating in performance Classes 1 and 2 should be certificated in Category A.

2.2 Helicopters operating in performance Class 3 should be certificated in either Category A or Category B (or equivalent).

2.3 Except as permitted by the appropriate authority:

2.3.1 Take-off or landing from/to heliports in a congested hostile environment should only be conducted in performance Class 1.

2.3.2 Operations in performance Class 2 should only be conducted with a safe forced landing capability during take-off and landing.

2.3.3 Operations in performance Class 3 should only be conducted in a non-hostile environment.

2.4 In order to permit variations from 2.3.1, 2.3.2 and 2.3.3, the Authority should undertake a risk assessment, considering factors such as:

a) the type of operation and the circumstances of the flight;

- b) the area/terrain over which the flight is being conducted;
- c) the probability of a critical engine failure and the consequence of such an event;
- d) the procedures to maintain the reliability of the engine(s);
- e) the training and operational procedures to mitigate the consequences of the critical engine failure; and
- f) installation and utilization of a usage monitoring system.

Note 1.— It is recognized that there may be instances in which a safe forced landing may not be possible due to environmental or other factors. Many States have already applied risk management and permitted variations to specific operations such as operations to helidecks where exposure to an engine failure is present without a safe forced landing. Permitting variations based on risk assessment is a normal part of the process of a State developing a code of performance. When operations without suitable areas for safe forced landings are being considered, all relevant factors should be evaluated. These may include the likelihood of the event, the possible consequences, any mitigating measures as well as the potential benefits and costs of the operation. The specific process for conducting this evaluation is to be decided by the State. In any case, appropriate consideration of a safe forced landing should be either implicit or explicit to a performance code's construction. Accident history and other relevant safety data and analysis are crucial to the development of operational regulations in this area. The resulting requirements may take many forms, such as designation of approved operational areas, routes of flight and obstacle clearance requirements.

Note 2.— If there are routes with access to suitable forced landing areas, these should be used for flights into and out of the congested area. Where no such routes exist, evaluation of the operation could include consideration of mitigating factors such as the reliability of the propulsion system in the short periods when flight over a suitable forced landing area is not possible.

Example

Purpose and Scope

The following example provides *quantitative specifications* to illustrate a level of performance intended by the provisions of Section II, Chapter 3. A State may use this example as a basis for establishing its code of performance, but may introduce variations provided such variations meet the safety objectives of Section II, Chapter 3 and Attachment A.

Abbreviations Specific to Helicopter Operations

Abbreviations

D	Maximum dimension of helicopter
DPBL	Defined point before landing
DPATO	Defined point after take-off
DR	Distance travelled (helicopter)
FATO	Final approach and take-off area
HFM	Helicopter flight manual
LDP	Landing decision point
LDAH	Landing distance available (helicopter)
LDRH	Landing distance required (helicopter)
R	Rotor radius of helicopter
RTODR	Rejected take-off distance required (helicopter)
TDP	Take-off decision point
TLOF	Touchdown and lift-off area
TODAH	Take-off distance available (helicopter)
TODRH	Take-off distance required (helicopter)
V _{TOSS}	Take-off safety speed

1. Definitions

1.1 Only applicable to operations in performance Class 1

Landing distance required (LDRH). The horizontal distance required to land and come to a full stop from a point 15 m (50 ft) above the landing surface.

Rejected take-off distance required (RTODR). The horizontal distance required from the start of the take-off to the point where the helicopter comes to a full stop following an engine failure and rejection of the take-off at the take-off decision point.

Take-off distance required (TODRH). The horizontal distance required from the start of the take-off to the point at which V_{TOSS}, a selected height and a positive climb gradient are achieved, following failure of the critical engine being recognized at TDP, the remaining engines operating within approved operating limits.

Note.— The selected height stated above is to be determined with reference to either:

- a) the take-off surface; or

b) a level defined by the highest obstacle in the take-off distance required.

1.2 Applicable to operations in all performance classes

D. The maximum dimension of the helicopter.

Distance DR. The horizontal distance that the helicopter has travelled from the end of the take-off distance available.

Landing distance available (LDAH). The length of the final approach and take-off area plus any additional area declared available and suitable for helicopters to complete the landing manoeuvre from a defined height.

R. The rotor radius of the helicopter.

Take-off distance available (TODAH). The length of the final approach and take-off area plus the length of helicopter clearway (if provided) declared available and suitable for helicopters to complete the take-off.

Take-off flight path. The vertical and horizontal path, with the critical engine inoperative, from a specified point in the take-off to 300 m (1 000 ft) above the surface.

Touchdown and lift-off area (TLOF). A load bearing area on which a helicopter may touch down or lift off.

V_{TOSS} . Take-off safety speed for helicopters certificated in Category A.

V_y . Best rate of climb speed.

2. General

2.1 Applicability

2.1.1 Helicopters with a passenger seating configuration of more than 19, or helicopters operating to or from a heliport in a congested hostile environment should be operating in performance Class 1.

2.1.2 Helicopters with a passenger seating configuration of 19 or less but more than 9 should be operating in performance Class 1 or 2, unless operating to or from a congested hostile environment in which case the helicopters should be operating in performance Class 1.

2.1.3 Helicopters with a passenger seating configuration of 9 or less should be operating in performance Class 1, 2 or 3, unless operating to or from a congested hostile environment in which case the helicopters should be operating in performance Class 1.

2.2 Significant performance factors

To determine the performance of the helicopter, account should be taken of at least the following factors:

- a) mass of the helicopter;
- b) elevation or pressure-altitude and temperature; and

- c) wind; for take-off and landing, accountability for wind should be no more than 50 per cent of any reported steady headwind component of 5 knots or more. Where take-off and landing with a tailwind component is permitted in the flight manual, not less than 150 per cent of any reported tailwind component should be allowed. Where precise wind measuring equipment enables accurate measurement of wind velocity over the point of take-off and landing, these values may be varied.

2.3 Operating conditions

2.3.1 For helicopters operating in performance Class 2 or 3 in any flight phase where an engine failure may cause the helicopter to force-land:

- a) a minimum visibility should be defined by the operator, taking into account the characteristics of the helicopter, but should not be less than 800 m for helicopters operating in performance Class 3; and
- b) the operator should verify that the surface below the intended flight path permits the pilot to execute a safe forced landing.

2.3.2 Performance Class 3 operations are not to be performed:

- a) out of the sight of the surface; or
- b) at night; or
- c) when the cloud ceiling is less than 180 m (600 ft).

Note.— The text of 2.3 contains an interpretation of the principle of “appropriate consideration” for a safe forced landing (contained in Section II, Chapter 3, 3.1.2). For States which take advantage of Section II, Chapter 3, 3.4, or which have risk assessed exposure and/or permitted night VFR operations, 2.3 should be replaced with an appropriately constructed alternative text.

2.4 Obstacle accountability area

2.4.1 For the purpose of the obstacle clearance requirements in 4 below, an obstacle should be considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than:

- a) for VFR operations:
 - 1) half of the minimum width of the FATO (or the equivalent term used in the helicopter flight manual) defined in the helicopter flight manual (or when no width is defined, 0.75 D), plus 0.25 times D (or 3 m, whichever is greater), plus:
 - 0.10 DR for VFR day operations
 - 0.15 DR for VFR night operations
- b) for IFR operations:
 - 1) 1.5 D (or 30 m, whichever is greater), plus:
 - 0.10 DR for IFR operations with accurate course guidance
 - 0.15 DR for IFR operations with standard course guidance
 - 0.30 DR for IFR operations without course guidance

- c) for operations with initial take-off conducted visually and converted to IFR/IMC at a transition point, the criteria required in 2.4.1 a) apply up to the transition point then the criteria required in 2.4.1 b) apply after the transition point.

2.4.2 For a take-off using a backup take-off procedure (or with lateral transition), for the purpose of the obstacle clearance requirements in 4 below, an obstacle located below the backup flight path (lateral flight path) should be considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than half of the minimum width of the FATO (or the equivalent term used in the helicopter flight manual) defined in the helicopter flight manual (when no width is defined, $0.75 D$ plus 0.25 times D , or 3 m, whichever is greater) plus:

- a) 0.10 distance travelled from the back edge of the FATO for VFR day operations;
- b) 0.15 distance travelled from the back edge of the FATO for VFR night operations.

2.4.3 Obstacles may be disregarded if they are situated beyond:

- a) $7 R$ for day operations if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;
- b) $10 R$ for night operations if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;
- c) 300 m if navigational accuracy can be achieved by appropriate navigation aids; and
- d) 900 m in the other cases.

Note.— Standard course guidance includes ADF and VOR guidance. Accurate course guidance includes ILS, MLS, or other course guidance providing an equivalent navigational accuracy.

2.4.4 The transition point should not be located before the end of TODRH for helicopters operating in performance Class 1 and before the DPATO for helicopters operating in performance Class 2.

2.4.5 When considering the missed approach flight path, the divergence of the obstacle accountability area should only apply after the end of the take-off distance available.

2.5 Source of performance data

An operator should ensure that the approved performance data contained in the helicopter flight manual is used to determine compliance with this Example, supplemented as necessary with other data acceptable to the State of the Operator.

3. Operating area considerations

3.1 FATO

For operations in performance Class 1, the dimensions of the FATO should be at least equal to the dimensions specified in the helicopter flight manual.

Note.— A FATO that is smaller than the dimensions specified in the helicopter flight manual may be accepted if the helicopter is capable of a hover out of ground effect with one engine inoperative (HOGE OEI), and the conditions of 4.1 below can be met.

4. Limitations resulting from performance

4.1 Operations in performance Class 1

4.1.1 Take-off

4.1.1.1 The take-off mass of the helicopter should not exceed the maximum take-off mass specified in the flight manual for the procedure to be used and to achieve a rate of climb of 100 ft/min at 60 m (200 ft) and 150 ft/min at 300 m (1 000 ft) above the level of the heliport with the critical engine inoperative and the remaining engines operating at an appropriate power rating, taking into account the parameters specified in 2.2 (Figure A-1).

4.1.1.2 Rejected take-off

The take-off mass should be such that the rejected take-off distance required does not exceed the rejected take-off distance available.

4.1.1.3 Take-off distance

The take-off mass should be such that the take-off distance required does not exceed the take-off distance available.

Note 1.— As an alternative, the requirement above may be disregarded provided that the helicopter with the critical engine failure recognized at TDP can, when continuing the take-off, clear all obstacles from the end of the take-off distance available to the end of the take-off distance required by a vertical margin of not less than 10.7 m (35 ft) (Figure A-2).

Note 2.— For elevated heliports, the airworthiness code provides appropriate clearance from the elevated heliport edge (Figure A-3).

4.1.1.4 Backup procedures (or procedures with lateral transition)

An operator should ensure that, with the critical engine inoperative, all obstacles below the backup flight path (the lateral flight path) are cleared by an adequate margin. Only the obstacles specified in 2.4.2 should be considered.

4.1.2 Take-off flight path

From the end of the take-off distance required with the critical engine inoperative:

4.1.2.1 The take-off mass should be such that the climb path provides a vertical clearance of not less than 10.7 m (35 ft) for VFR operations and 10.7 m (35 ft) plus 0.01 DR for IFR operations above all obstacles located in the climb path. Only obstacles as specified in 2.4 should be considered.

4.1.2.2 Where a change of direction of more than 15 degrees is made, obstacle clearance requirements should be increased by 5 m (15 ft) from the point at which the turn is initiated. This turn should not be initiated before reaching a height of 60 m (200 ft) above the take-off surface, unless permitted as part of an approved procedure in the flight manual.

4.1.3 En route

The take-off mass is such that it is possible, in case of the critical engine failure occurring at any point of the flight path, to continue the flight to an appropriate landing site and achieve the minimum flight altitudes for the route to be flown.

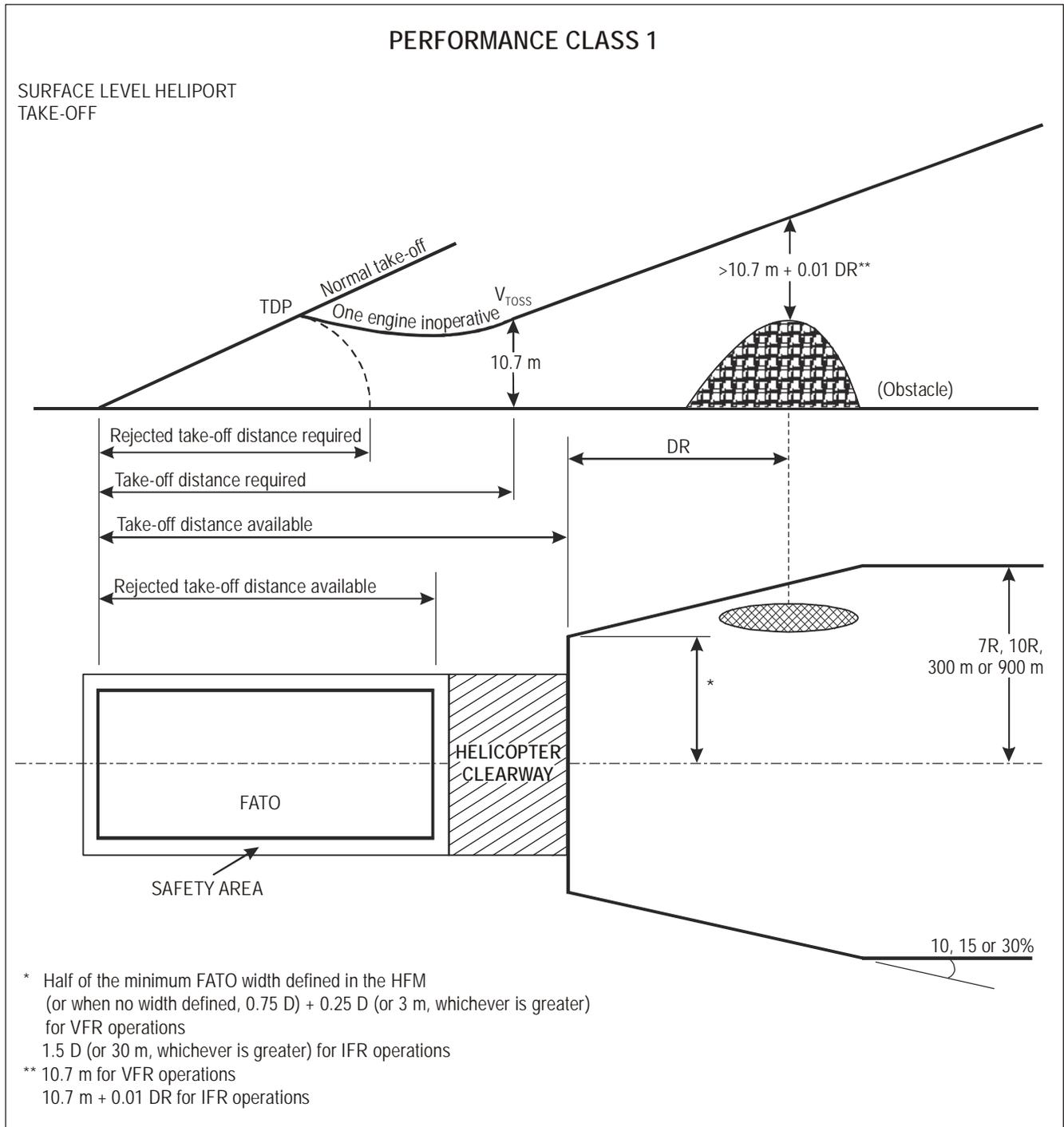


Figure A-1

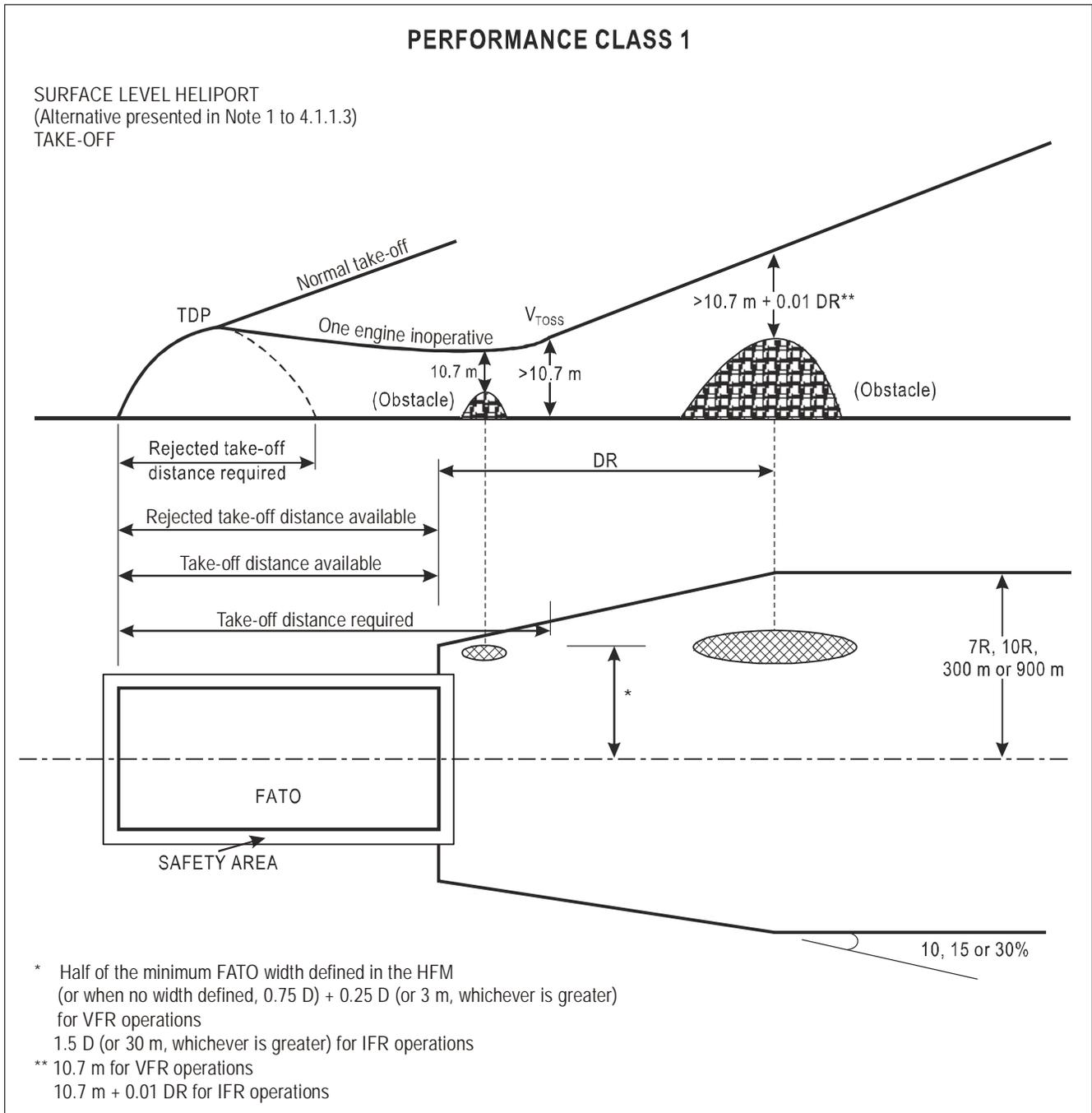


Figure A-2

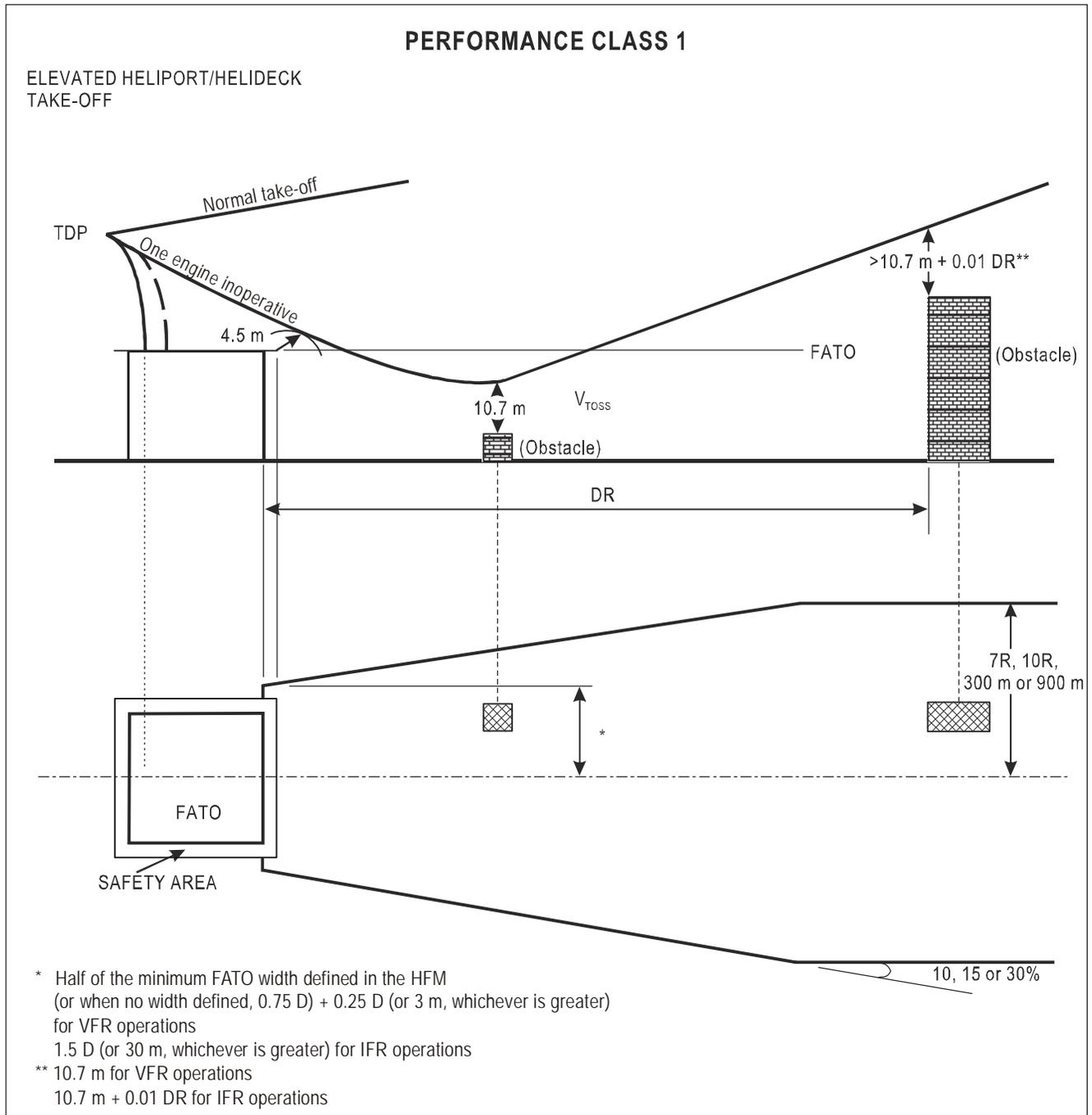


Figure A-3

4.1.4 Approach, landing and balked landing (Figures A-4 and A-5)

The estimated landing mass at the destination or alternate should be such that:

- a) it does not exceed the maximum landing mass specified in the flight manual for the procedure to be used and to achieve a rate of climb of 100 ft/min at 60 m (200 ft) and 150 ft/min at 300 m (1 000 ft) above the level of the heliport with the critical engine inoperative and the remaining engines operating at an appropriate power rating, taking into account the parameters specified in 2.2;
- b) the landing distance required does not exceed the landing distance available unless the helicopter, with the critical engine failure recognized at LDP can, when landing, clear all obstacles in the approach path;
- c) in case of the critical engine failure occurring at any point after the LDP, it is possible to land and stop within the FATO; and
- d) in the event of the critical engine failure being recognized at the LDP or at any point before the LDP, it is possible either to land and stop within the FATO or to overshoot, meeting the conditions of 4.1.2.1 and 4.1.2.2.

Note.— For elevated heliports, the airworthiness code provides appropriate clearance from the elevated heliport edge.

4.2 Operations in performance Class 2

4.2.1 Take-off (Figures A-6 and A-7)

The mass of the helicopter at take-off should not exceed the maximum take-off mass specified in the flight manual for the procedures to be used and to achieve a rate of climb of 150 ft/min at 300 m (1 000 ft) above the level of the heliport with the critical engine inoperative and the remaining engines operating at an appropriate power rating, taking into account the parameters specified in 2.2.

4.2.2 Take-off flight path

From DPATO or, as an alternative, no later than 60 m (200 ft) above the take-off surface with the critical engine inoperative, the conditions of 4.1.2.1 and 4.1.2.2 should be met.

4.2.3 En route

The requirements of 4.1.3 should be met.

4.2.4 Approach, landing and balked landing (Figures A-8 and A-9)

The estimated landing mass at the destination or alternate should be such that:

- a) it does not exceed the maximum landing mass specified in the flight manual for a rate of climb of 150 ft/min at 300 m (1 000 ft) above the level of the heliport with the critical engine inoperative and the remaining engines operating at an appropriate power rating, taking into account the parameters specified in 2.2;
- b) it is possible, in case of the critical engine failure occurring at or before the DPBL, either to perform a safe forced landing or to overshoot, meeting the requirements of 4.1.2.1 and 4.1.2.2.

Only obstacles as specified in 2.4 should be considered.

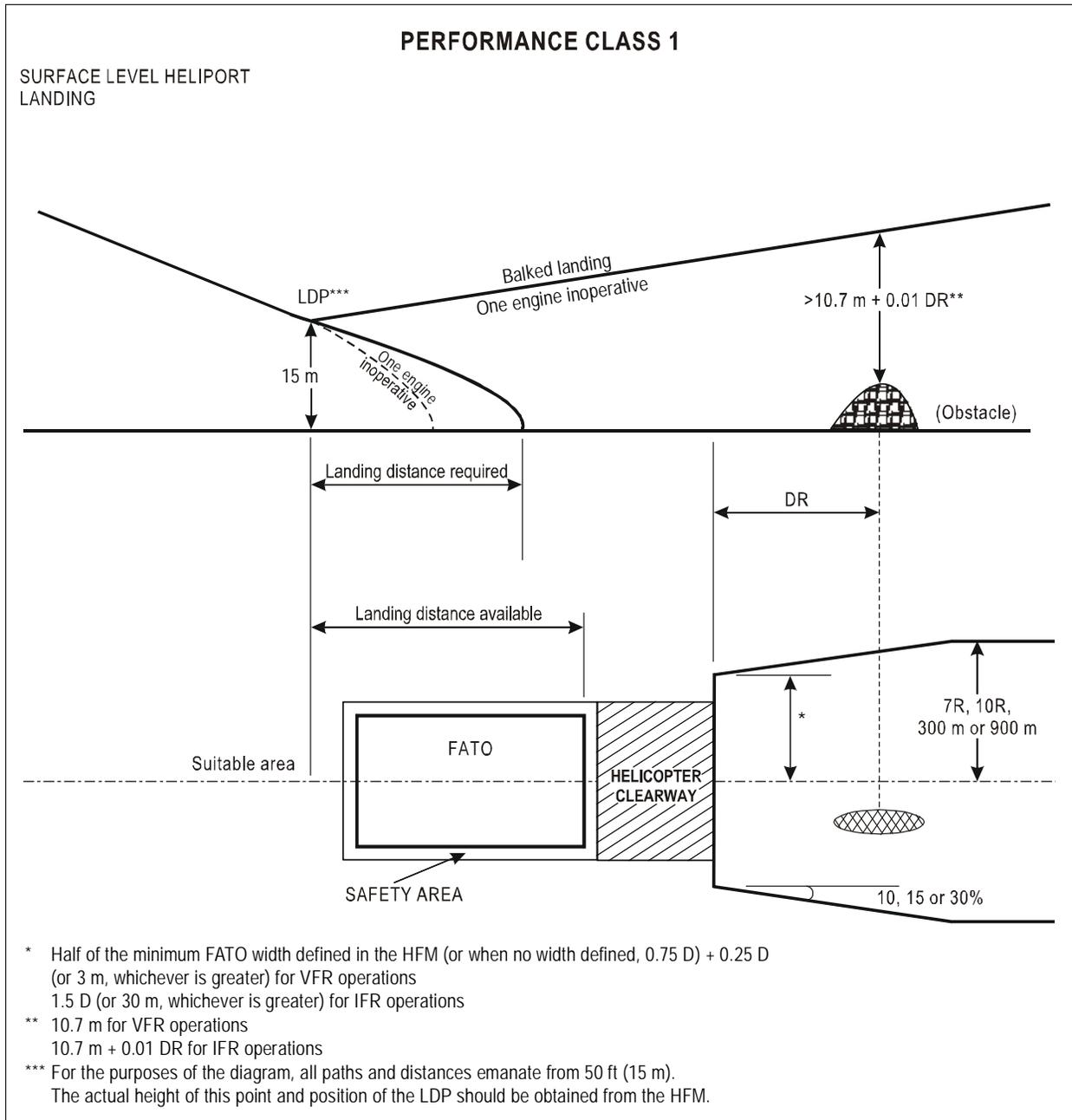


Figure A-4

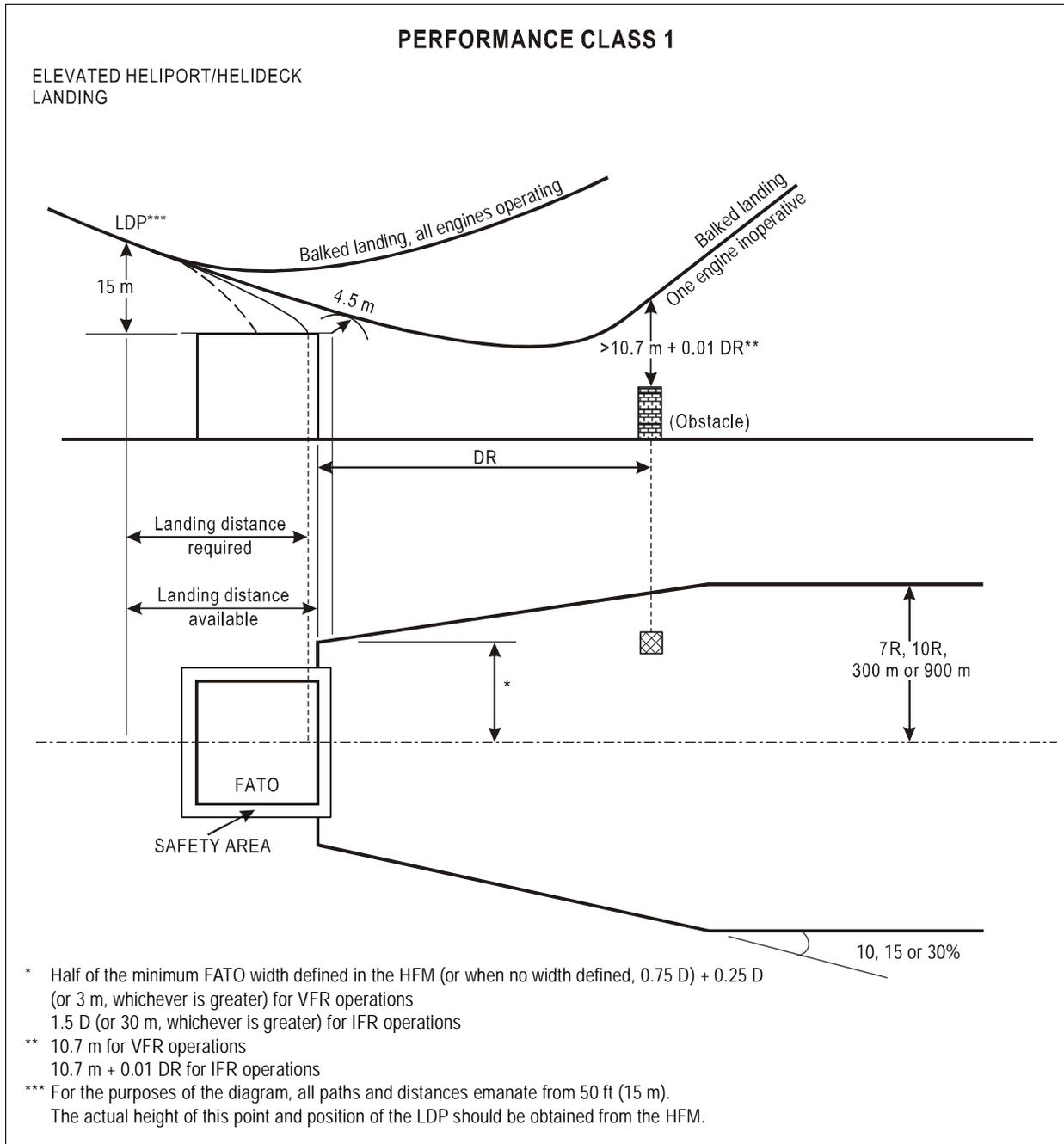


Figure A-5

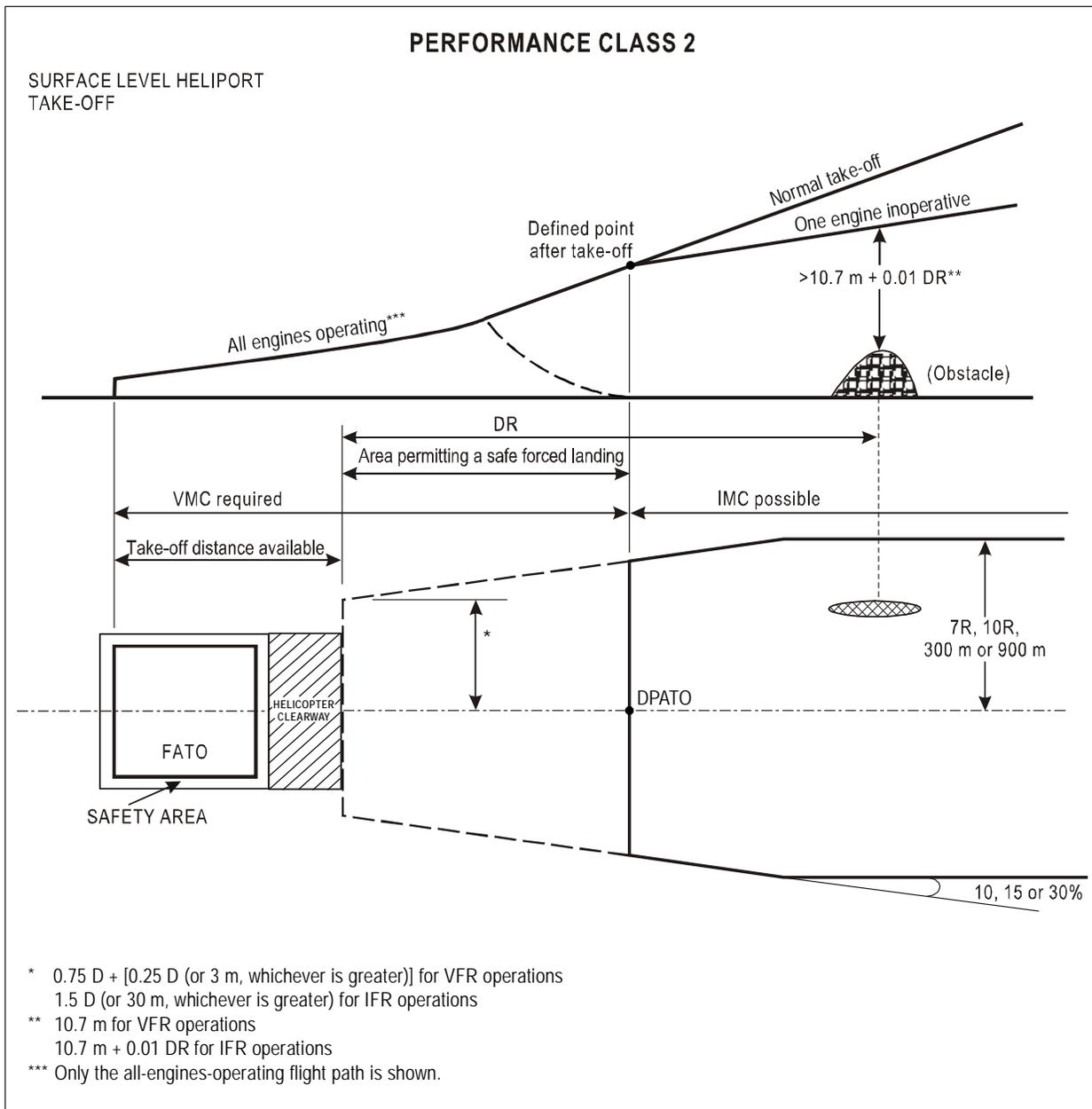


Figure A-6

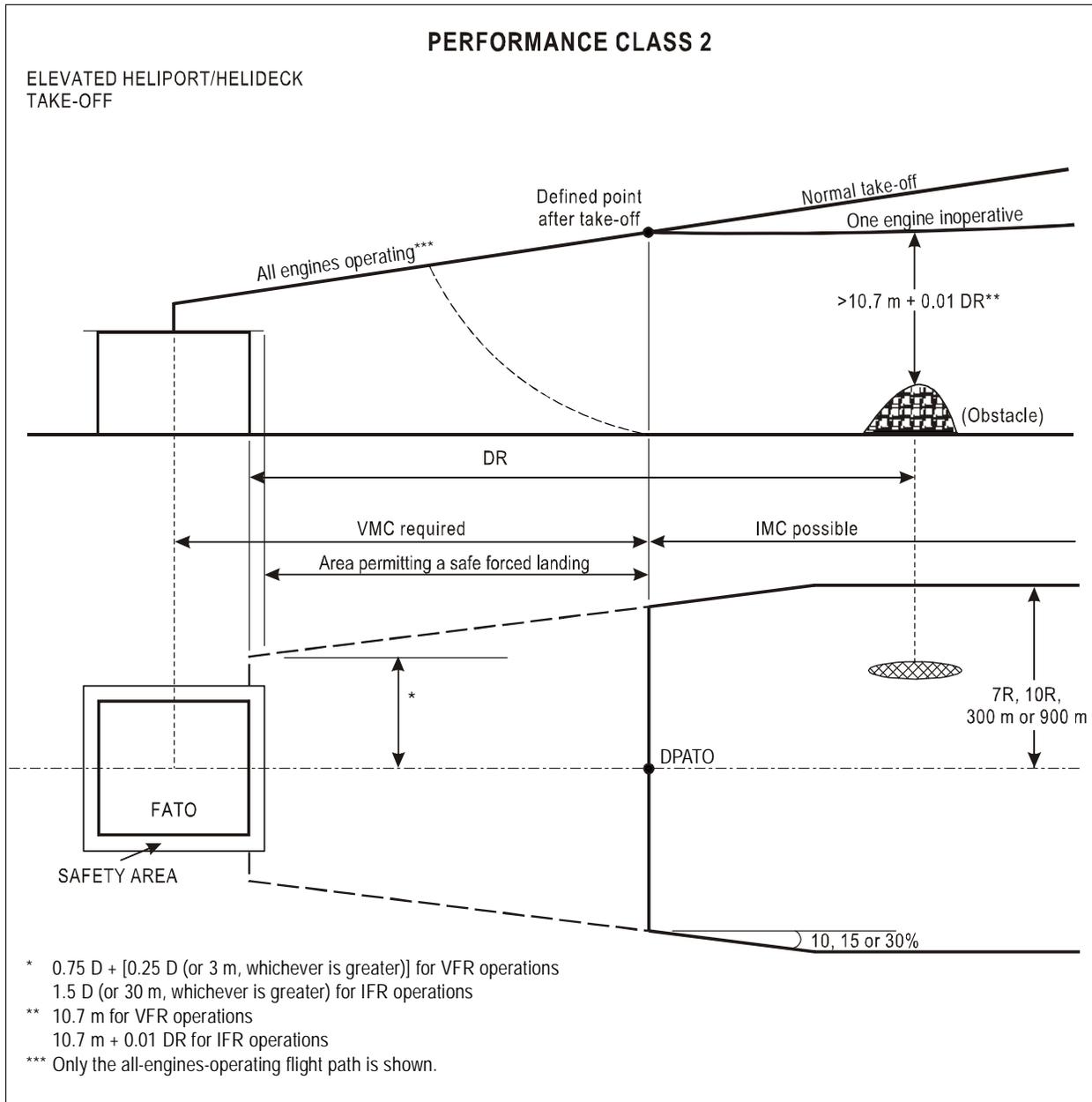


Figure A-7

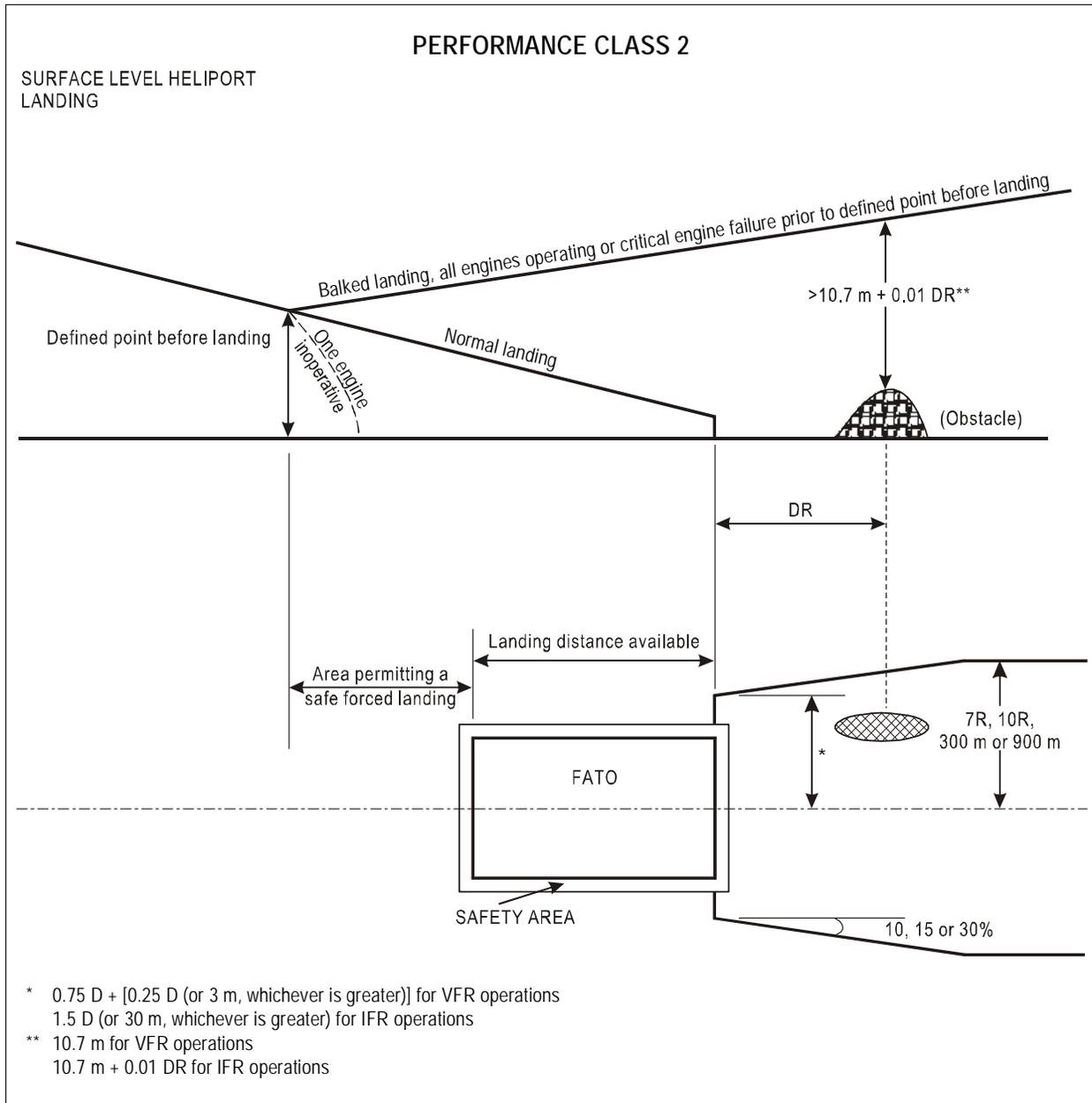


Figure A-8

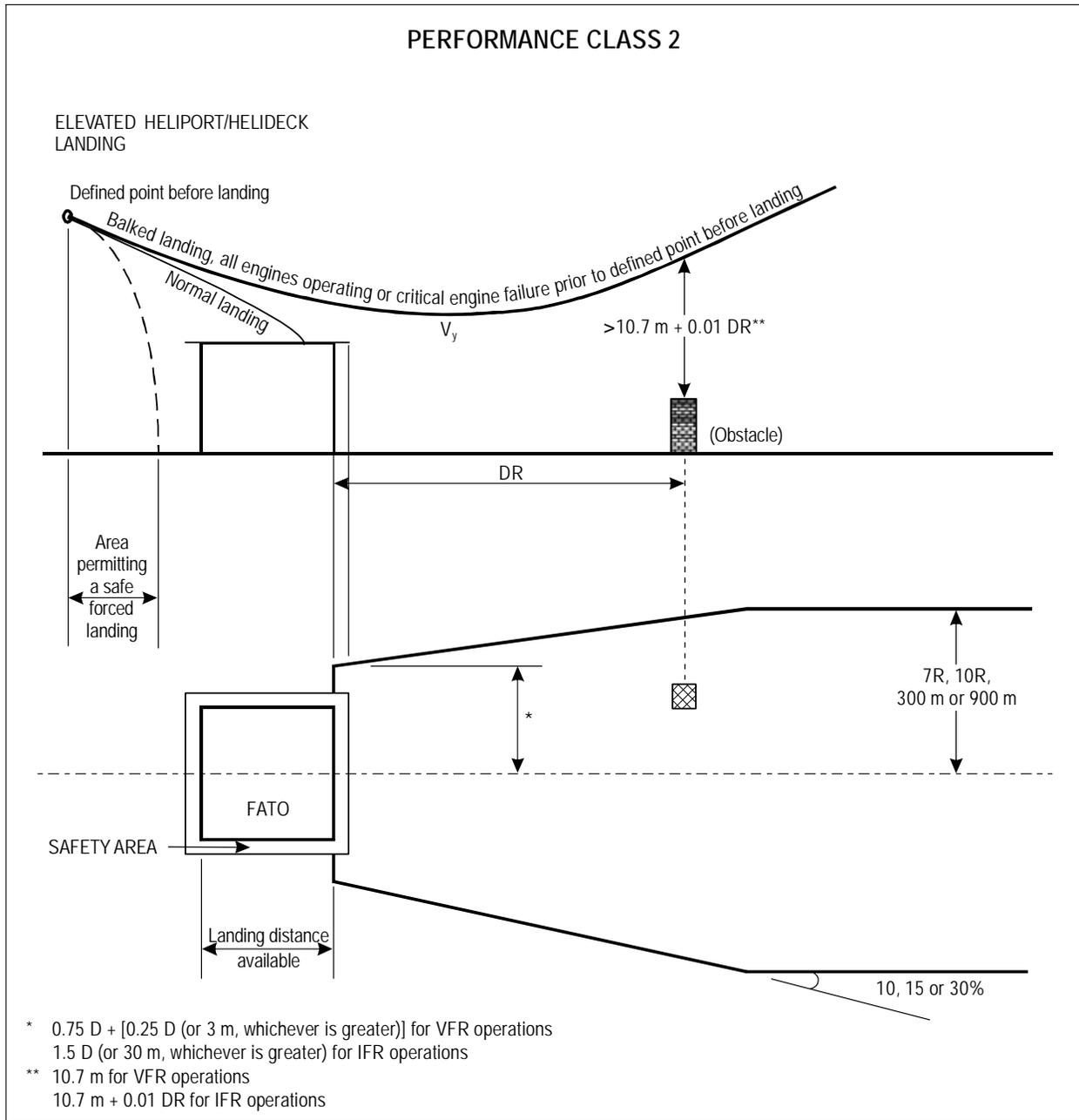


Figure A-9

4.3 Operations in performance Class 3

4.3.1 *Take-off*

The mass of the helicopter at take-off should not exceed the maximum take-off mass specified in the flight manual for a hover in ground effect with all engines operating at take-off power, taking into account the parameters specified in 2.2. If conditions are such that a hover in ground effect is not likely to be established, the take-off mass should not exceed the maximum mass specified for a hover out of ground effect with all engines operating at take-off power, taking into account the parameters specified in 2.2.

4.3.2 *Initial climb*

The take-off mass should be such that the climb path provides adequate vertical clearance above all obstacles located along the climb path, all engines operating.

4.3.3 *En route*

The take-off mass is such that it is possible to achieve the minimum flight altitudes for the route to be flown, all engines operating.

4.3.4 *Approach and landing*

The estimated landing mass at the destination or alternate should be such that:

- a) it does not exceed the maximum landing mass specified in the flight manual for a hover in ground effect with all engines operating at take-off power, taking into account the parameters specified in 2.2. If conditions are such that a hover in ground effect is not likely to be established, the take-off mass should not exceed the maximum mass specified for a hover out of ground effect with all engines operating at take-off power, taking into account the parameters specified in 2.2;
- b) it is possible to perform a balked landing, all engines operating, at any point of the flight path and clear all obstacles by an adequate vertical interval.

ATTACHMENT B. FLIGHT TIME AND FLIGHT DUTY PERIOD LIMITATIONS

Supplementary to Section II, Chapter 2, 2.2.10.2

1. Purpose and scope

1.1 Flight time and flight duty period limitations are established for the sole purpose of reducing the probability that fatigue of flight crew members may adversely affect the safety of flight.

1.2 In order to guard against this, two types of fatigue must be taken into account, namely, transient fatigue and cumulative fatigue. Transient fatigue may be described as fatigue which is normally experienced by a healthy individual following a period of work, exertion or excitement, and it is normally dispelled by a single sufficient period of sleep. On the other hand cumulative fatigue may occur after delayed or incomplete recovery from transient fatigue or as the after-effect of more than a normal amount of work, exertion or excitement without sufficient opportunity for recuperation.

1.3 Limitations based on the provisions of Part III, Section II, of the Annex will provide safeguards against both kinds of fatigue because they will recognize:

1.3.1 The necessity to limit flight time in such a way as to guard against both kinds of fatigue.

1.3.2 The necessity to limit time spent on duty on the ground immediately prior to a flight or at intermediate points during a series of flights in such a way as to guard particularly against transient fatigue.

1.3.3 The necessity to provide flight crew members with adequate opportunity to recover from fatigue.

1.3.4 The necessity of taking into account other related tasks the flight crew member may be required to perform in order to guard particularly against cumulative fatigue.

2. General

2.1 The responsibility rests with the pilot, not to exercise the privileges of the licence and related ratings at any time when aware of any decrease in medical fitness which might render the pilot unable to safely exercise these privileges, including any decrease in medical fitness through fatigue.

2.2 The limitations laid down in the following paragraphs are to be considered as minimum requirements and it is the responsibility of the operator to adjust them in certain cases, having regard to the factors mentioned below. Specific factors to be taken into consideration are:

- a) the crew composition of the aircraft;
- b) the probability of operational delays;
- c) the type of aircraft and route complexities such as traffic density, navigation aids, standard of equipment carried, communication difficulties, and high altitude flying in unpressurized aircraft, or flying with high cabin altitudes in pressurized aircraft;

- d) the proportion of night flying involved;
- e) the extent to which the accommodation at layovers is such as to permit crews to secure real rest;
- f) the number of landings and take-offs;
- g) the need for an orderly scheduling system, giving a high degree of stability (for this, provision of adequate reserves is an important factor);
- h) the sleep deprivation arising from interruption of the normal sleep/wake cycle; and
- i) the cockpit environment.

2.3 For reasons of flight safety, the operator has the responsibility to ensure that crew members engaged in duties other than flight duties performed on behalf of the employer are provided with at least the minimum required rest periods before engaging in flight duties.

3. Definitions

Deadheading crew. A crew member positioned by the operator in flight or by surface transport.

Duty period. The time during which a flight crew member carries out any duty at the behest of the flight crew member's employer.

Flight duty period. The total time from the moment a flight crew member commences duty, immediately subsequent to a rest period and prior to making a flight or a series of flights, to the moment the flight crew member is relieved of all duties having completed such flight or series of flights.

Flight sector. A flight or one of a series of flights which commences at a parking place of the aircraft and terminates at a parking place of the aircraft.

It is composed of:

- flight preparation,
- flight time,
- post-flight period after the flight sector or series of flight sectors.

Flight time — helicopters. The total time from the moment a helicopter's rotor blades start turning until the moment the helicopter finally comes to rest at the end of the flight, and the rotor blades are stopped.

Rest period. Any period of time on the ground during which a flight crew member is relieved of all duties by the operator.

Series of flights. Two or more flight sectors accomplished in between two rest periods.

Standby. A defined period during which a crew member may be called for duty with minimum notice.

Turnaround time. The time spent on the ground during a flight duty period between two flight sectors.

4. Comments about the definitions

4.1 Flight time

The definition of flight time is of necessity very general but in the context of limitations it is, of course, intended to apply to flight crew members in accordance with the relevant definition of a flight crew member. Pursuant to that latter definition, licensed crew personnel travelling as passengers cannot be considered flight crew members, although this should be taken into account in arranging rest periods.

4.2 Flight duty periods

4.2.1 The definition of flight duty period is intended to cover a continuous period of duty which always includes a flight or a series of flights. It is meant to include all duties a flight crew member may be required to carry out from the moment the flight crew member reports at the place of employment on the day of a flight until relieved of duties, having completed the flight or series of flights. It is considered necessary that this period should be subject to limitations because a flight crew member's activities within the limits of such period would eventually induce fatigue — transient or cumulative — which could endanger the safety of a flight. There is on the other hand (from the point of view of flight safety) insufficient reason to establish limitations for any other time during which a flight crew member is performing a task assigned by the operator. Such task should, therefore, only be taken into account when making provisions for rest periods as one among many factors which could lead to fatigue.

4.2.2 The definition does not imply the inclusion of such periods as time taken for a flight crew member to travel from the flight crew member's home to the place of employment.

4.2.3 An important safeguard may be established if States and operators recognize the right of a crew member to refuse further flight duty when suffering from fatigue of such a nature as to affect adversely the safety of flight.

4.3 Rest periods

The definition of rest period implies an absence of duty and is intended to be for the purpose of recovering from fatigue; the way in which this recovery is achieved is the responsibility of the individual.

5. Types of limitations

5.1 Limitations are broadly divided by time; for example, the majority of States reporting to ICAO prescribe daily, monthly and yearly flight time limitations, and a considerable number also prescribe quarterly flight time limitations. It will probably be sufficient to prescribe flight duty period limitations on a daily basis. It must be understood, however, that these limitations will vary considerably taking into account a variety of situations.

5.2 In formulating regulations or rules governing flight time limitations the size of the crew complement and the extent to which the various tasks to be performed can be divided among the crew members should be taken into account; and in the case where adequate facilities for relief are provided in the aircraft in such a way that a crew member may have horizontal rest and a degree of privacy, flight duty periods could be extended. Adequate rest facilities on the ground are required at places where relief periods are to be given. Also States or operators should give due weight to the following factors: traffic density; navigational and communication facilities; rhythm of work/sleep cycle; number of landings and take-offs; aircraft handling and performance characteristics and weather conditions.

6. Pro forma table

The following pro forma table is provided to illustrate one of many forms in which the Standard at Section II, 2.2.10.2, may be implemented.

<i>Crew</i>	<i>Maximum flight duty period in 24 hours</i>	<i>Maximum flight time (hours)</i>				<i>Rest periods</i>	
		<i>Daily 24 hours</i>	<i>Monthly</i>	<i>Quarterly</i>	<i>Annually</i>	<i>Daily</i>	<i>Per week</i>
Pilot-in-command							
1st Officer							

ATTACHMENT C. MEDICAL SUPPLIES

Supplementary to Section II, Chapter 4, 4.2.2 a)

First-aid kit

The following provides guidance on typical contents of a first-aid kit for carriage aboard a helicopter:

- List of contents
- Antiseptic swabs (10/pack)
- Bandage: adhesive strips
- Bandage: gauze 7.5 cm × 4.5 m
- Bandage: triangular; safety pins
- Dressing: burn 10 cm × 10 cm
- Dressing: compress, sterile 7.5 cm × 12 cm
- Dressing: gauze, sterile 10.4 cm × 10.4 cm
- Tape: adhesive 2.5 cm (roll)
- Steri-strips (or equivalent adhesive strip)
- Hand cleanser or cleansing towelettes
- Pad with shield, or tape, for eye
- Scissors: 10 cm (if allowed by national regulations)
- Tape: Adhesive, surgical 1.2 cm × 4.6 m
- Tweezers: splinter
- Disposable gloves (multiple pairs)
- Thermometers (non-mercury)
- Mouth-to-mouth resuscitation mask with one-way valve
- First-aid manual, current edition
- Incident record form

The following suggested medications can be included in the first-aid kits where permitted by national regulations:

- Mild to moderate analgesic
- Antiemetic
- Nasal decongestant
- Antacid
- Antihistamine

Universal precaution kit

A universal precaution kit should be carried on a helicopter that is required to operate with at least one cabin crew member. Such a kit may be used to clean up any potentially infectious body contents such as blood, urine, vomit and faeces and to protect the cabin crew who are assisting potentially infectious cases of suspected communicable disease.

Typical contents

- Dry powder that can convert small liquid spill into a sterile granulated gel
 - Germicidal disinfectant for surface cleaning
 - Skin wipes
 - Face/eye mask (separate or combined)
 - Gloves (disposable)
 - Protective apron
 - Large absorbent towel
 - Pick-up scoop with scraper
 - Bio-hazard disposal waste bag
 - Instructions
-

ATTACHMENT D. MINIMUM EQUIPMENT LIST (MEL)

Supplementary to Section II, Chapter 4, 4.1.3

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

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

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

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

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

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

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

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

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

10. The responsibilities of the pilot-in-command in accepting a helicopter for operation with deficiencies in accordance with a minimum equipment list are specified in Section II, Chapter 2, 2.3.1.

ATTACHMENT E. AIR OPERATOR CERTIFICATION AND VALIDATION

Supplementary to Section II, Chapter 2, 2.2.1

1. Purpose and scope

1.1 Introduction

The purpose of this Attachment is to provide guidance concerning the actions required by States in connection with the operator certification requirements in Chapter 2, 2.2.1, particularly the means of accomplishing and recording those actions.

1.2 Prior certification required

In accordance with Standard 2.2.1.3, the issuance of an air operator certificate (AOC) is “dependent upon the operator demonstrating” to the State that its organization, training, flight operations and maintenance arrangements are adequate considering the nature and extent of the operations to be conducted. The certification process involves the State’s evaluation of each operator and a determination that the operator is capable of conducting safe operations before initial issuance of an AOC or the addition of any subsequent authorizations to an AOC.

1.3 Standard certification practices

The State of the Operator is required by Standard 2.2.1.8 to establish a certification system to ensure compliance with the required standards for the type of operation to be conducted. Several States have developed policies and procedures to comply with this certification requirement as industry capabilities evolve. While those States did not develop their certification practices in coordination with each other, their practices are remarkably similar and consistent in their requirements. The effectiveness of their practices has been validated over many years, resulting in improved safety records of operators throughout the world. Many of these certification practices have been incorporated by reference in ICAO provisions.

2. Required technical safety evaluations

2.1 Approval and acceptance actions

2.1.1 The certification and continued surveillance of an air operator includes actions taken by a State on matters submitted for its review. The actions can be categorized as approvals or acceptances depending on the nature of the response by the State to the matter submitted for its review.

2.1.2 An approval is an active response by the State to a matter submitted for its review. An approval constitutes a finding or determination of compliance with the applicable standards. An approval will be evidenced by the signature of the approving official, the issuance of a document or certificate, or some other formal action taken by the State.

2.1.3 An acceptance does not necessarily require an active response by the State to a matter submitted for its review. A State may accept a matter submitted to it for review as being in compliance with the applicable standards if the State does not specifically reject all or a portion of the matter under review, usually after some defined period of time after submission.

2.1.4 The phrase “approved by the State” or similar phrases using the word “approval” are frequently used in Part III, Section II. Provisions indicating a review and implying approval or at least “acceptance” by the State occur even more frequently in Part III, Section II. In addition to these specific phrases, Part III, Section II, contains numerous references to requirements which would, as a minimum, create the need for at least a technical review by the State. This Attachment groups and outlines those specific Standards and Recommended Practices for ease of use by States.

2.1.5 The State should make or arrange for a technical safety evaluation before issuing the approval or acceptance. The evaluation should:

- a) be accomplished by a person with specific qualifications to make such a technical evaluation;
- b) be in accordance with written, standardized methodology; and
- c) where necessary to safety, include a practical demonstration of the air operator’s actual ability to conduct such an operation.

2.2 Demonstrations necessary prior to some approvals

2.2.1 Standard 2.2.1.3 obligates the State of the Operator, prior to certification of an operator, to require sufficient demonstrations by the operator to enable the State to evaluate the adequacy of the operator’s organization, method of control and supervision of flight operations, ground handling and maintenance arrangements. These demonstrations should be in addition to the review or inspections of manuals, records, facilities and equipment. Some of the approvals required by Part III, Section II, such as approval for Category III operations, have significant safety implications and should be validated by demonstration before the State approves such operations.

2.2.2 While the specific methodology and extent of the required demonstrations and evaluations vary between States, the certification processes of States whose operators have good safety records are generally consistent. In these States, technically qualified inspectors evaluate a representative sample of the actual training, maintenance and operations prior to the issuance of an AOC or additional authorizations to the AOC.

2.3 Recording of certification actions

2.3.1 It is important that the certification, approval and acceptance actions of the State are adequately documented. The State should issue a written instrument, such as a letter or formal document, as an official record of the action. These written instruments should be retained as long as the operator continues to exercise the authorizations for which the approval or acceptance action was issued. These instruments are unambiguous evidence of the authorities held by an operator and provide proof in the event that the State and the operator disagree on the operations that the operator is authorized to conduct.

2.3.2 Some States collect certification records such as inspections, demonstrations, approvals and acceptance instruments into a single file which is retained as long as the operator is active. Other States retain these records in files according to the certification action performed, and revise the file as the approvals or acceptance instruments are updated. Regardless of the method used, these certification records are persuasive evidence that a State is complying with its ICAO obligations regarding operator certification.

2.4 Coordination of operations and airworthiness evaluations

Some of the references to approval or acceptance in Part III, Section II, will require an operations evaluation and an airworthiness evaluation. Low minima approvals for the conduct of Category II and III ILS approaches, for example, require

coordinated prior evaluation by operations and airworthiness specialists. Flight operations specialists should evaluate the operational procedures, training and qualifications. Airworthiness specialists should evaluate the aircraft, equipment reliability and maintenance procedures. These evaluations may be accomplished separately, but should be coordinated to ensure that all aspects necessary for safety have been addressed before any approval is issued.

2.5 State of the Operator and State of Registry responsibilities

2.5.1 Annex 6, Part III, Section II, places the responsibility for initial certification, issuance of the AOC, and ongoing surveillance of an air operator on the State of the Operator. Annex 6, Part III, also requires the State of the Operator to consider or act in accordance with various approvals and acceptances by the State of Registry. Under these provisions, the State of the Operator should ensure that its actions are consistent with the approvals and acceptances of the State of Registry and that the air operator is in compliance with State of Registry requirements.

2.5.2 It is essential that the State of the Operator be satisfied with the arrangements by which its air operators use aircraft on the register of another State, particularly for maintenance and crew training. The State of the Operator should review such arrangements in coordination with the State of Registry. Where appropriate, an agreement transferring oversight responsibilities from the State of Registry to the State of the Operator pursuant to Article 83 *bis* to the Convention on International Civil Aviation should be arranged to preclude any misunderstandings regarding which State is responsible for specific oversight responsibilities.

Note.— Guidance concerning the responsibilities of the State of the Operator and the State of Registry in connection with lease, charter and interchange operations is contained in the Manual of Procedures for Operations Inspection, Certification and Continued Surveillance (Doc 8335). Guidance concerning the transfer of State of Registry responsibilities to the State of the Operator in accordance with Article 83 bis is contained in Guidance on the Implementation of Article 83 bis of the Convention on International Civil Aviation (Cir 295).

3. Approval actions

3.1 Approvals

The term “approval” implies a more formal action on the part of the State with respect to a certification matter than does the term “acceptance”. Some States require the Director of the CAA or a designated lower level CAA official to issue a formal written instrument for every “approval” action taken. Other States allow a variety of documents to be issued as evidence of an approval. The approval document issued and the matter addressed by the approval will depend on the delegated authority of the official. In such States, authority to sign routine approvals, such as operator minimum equipment lists for specific aircraft, is delegated to technical inspectors. More complex or significant approvals are normally issued by higher level officials.

3.2 Air operator certificate (AOC)

3.2.1 The AOC required by Annex 6, Part III, Section II, Chapter 2, 2.2.1, is a formal instrument. Section II, Chapter 2, 2.2.1.5, lists the information to be included in the AOC.

3.2.2 In addition to the items in Appendix 3, paragraph 3, operations specifications may include other specific authorizations, such as:

- a) take-off and landing operations with exposure time;
- b) special approach procedures (e.g. steep gradient approach, instrument landing system precision runway monitor approach, localizer-type directional aid precision runway monitor approach, RNP approach);

- c) instrument meteorological conditions operations in Performance Class III; and
- d) operations in areas with special procedures (e.g. operations in areas using different altimetry units or altimeter setting procedures).

3.3 Provisions that require an approval

The following provisions require or encourage approval by specified States. The approval of the State of the Operator is required in all of the certification actions listed below that are not preceded by one or more asterisks. Certification actions listed below that are preceded by one or more asterisks require approval by the State of Registry (single asterisk or “*”), or by the State of Design (double asterisk or “**”). However, the State of the Operator should take the necessary steps to ensure that operators for which it is responsible comply with any applicable approvals issued by the State of Registry and/or State of Design, in addition to its own requirements.

- a) **Configuration deviation list (CDL) (Definitions);
- b) **Master minimum equipment list (MMEL) (Definitions);
- c) The method for establishing minimum flight altitudes (2.2.7.3);
- d) The method of determining heliport operating minima (2.2.8.1);
- e) Flight time, flight duty periods and rest periods (2.2.10.2);
- f) Helicopter-specific minimum equipment list (MEL) (4.1.3);
- g) RNP Performance-based navigation operations (5.2.2 b));
- h) *Approved maintenance organization (6.1.2);
- i) *Helicopter-specific maintenance programme (6.3.1);
- j) Flight crew training programmes (7.3.1);
- k) Training in the transport of dangerous goods (7.3.1, Note 5);
- l) Use of flight simulation training devices (7.3.2 a), 7.4.2 and 7.4.4.1, Note);
- m) Method of control and supervision of flight operations (2.2.1.3 and 8.1);
- n) **Mandatory maintenance tasks and intervals (9.3.2); and
- o) Cabin attendant training programmes (10.3).

3.4 Provisions that require a technical evaluation

Other provisions of Part III, Section II, require the State to have made a technical evaluation. These provisions contain the phrases “acceptable to the State”, “satisfactory to the State”, “determined by the State”, “deemed acceptable by the State”, and “prescribed by the State”. While not necessarily requiring an approval by the State, these Standards do require the State to at least accept the matter at issue after it conducts a specific review or evaluation. These provisions are:

- a) details of the helicopter-specific checklists (Definition: aircraft operating manual and 4.1.4);
- b) details of the aircraft-specific systems (Definition: aircraft operating manual and 4.1.4);
- c) mandatory material for the operations manual (2.2.3.2 and Attachment G);
- d) *operator's aircraft-specific maintenance responsibilities (6.1.1);
- e) *method of maintenance and release (6.1.2);
- f) *maintenance control manual (6.2.1);
- g) *mandatory material for the maintenance control manual (6.2.4);
- h) *reporting of maintenance experience information (6.5.1);
- i) *implementing necessary maintenance corrective actions (6.5.2);
- j) *modification and repair requirements (6.6);
- k) training facilities (7.3.1);
- l) qualifications of instructors (7.3.1);
- m) need for recurrent training (7.3.1);
- n) use of correspondence courses and written examinations (7.3.1, Note 4);
- o) use of flight simulation training devices (7.3.2);
- p) flight crew qualification records (7.4.3.4);
- q) designated representative of the State of the Operator (7.4.4.1);
- r) *flight manual changes (9.1); and
- s) minimum number of flight attendants assigned to a specific aircraft (10.1).

4. Acceptance actions

4.1 Acceptance

4.1.1 The actual extent of the State's technical evaluation of an operator's readiness to conduct certain flight operations should be much broader than just those Standards which require or imply approval. During certification, the State should ensure that an operator will be in compliance with all requirements of Part III, Section II, prior to conducting international commercial air transport operations.

4.1.2 The concept of "acceptance" is used by some States as a formal method of ensuring that all critical aspects of operator certification are reviewed by the State prior to the formal issuance of the AOC. Using this concept, these States

exercise their prerogative to have technical inspectors review all operators' policies and procedures impacting operational safety. The actual execution of an instrument to reflect this acceptance (assuming such a document is issued) may be delegated to the technical inspector assigned to the certification.

4.1.3 The act of "acceptance" is in addition to the issuance of a specific approval. For example, certain portions of the operations manual may be "accepted" by formal instrument, while other portions such as the aircraft-specific minimum equipment list are "approved" by a separate formal instrument.

4.2 Conformance report

Some States use a conformance report to document the acceptances it makes with regard to a particular operator. This is a document submitted by the operator detailing how, with specific references to operations or maintenance manuals, it will comply with all applicable State regulations. This type of document is referenced in Doc 8335. Such a conformance report should be actively used during the certification process and revised as necessary to reflect modifications required by the State in the operator's policies and procedures. Then a final conformance report is included in the State's certification records, along with other records of certification. The conformance report is an excellent method of demonstrating that the operator was properly certificated with respect to all applicable regulatory requirements.

4.3 Operations and maintenance manuals

4.3.1 Operations and maintenance manuals, and any subsequent amendments should be submitted to the State (2.2.3.2, 6.1.1, 6.2.4, 6.3.2). The State also establishes minimum contents for these manuals (9.2, 9.3, 9.4 and Attachment G). The pertinent portions of an operator's manual for evaluation should be identified in the State's technical guidance, e.g. operations policy manual, aircraft operating manual, cabin crew manual, route guide, and training manual. Some States issue a formal instrument accepting each manual and any subsequent amendments.

4.3.2 The State's technical evaluation should, in addition to ensuring that all required contents are addressed, consider if the specific policies and procedures would result in the desired outcome. For example, the specifications for the operational flight plan (Attachment G, 2.1.15) should provide the step-by-step completion guidance necessary for compliance with 2.3 concerning the content and retention of these plans.

4.3.3 Proven industry practices, such as an example of an actual completed operational flight plan for reference by the flight crew and dispatchers (although not a Standard), may also be required by a State's technical evaluator during certification. This aspect of the technical evaluation should be conducted by inspectors experienced in operator certification. A major consideration with respect to evaluating for proven industry practices that are aircraft-specific, equipment-specific or have limited applications is the employment of evaluators who are currently qualified in the practice to be evaluated.

5. Other approval or acceptance considerations

Some States provide for approval or acceptance of certain critical documents, records or procedures specified in Part III, Section II, although the relevant Annex 6 Standards do not require approval or acceptance by the State of the Operator. The following are some examples:

- a) method for obtaining aeronautical data (2.1.1);
- b) adequacy of the fuel and oil records (2.2.9);
- c) adequacy of flight time, flight duty and rest period records (2.2.10.3, 7.6, 10.4);

- d) adequacy of the aircraft maintenance logbook (2.3.1 a), b), and c));
- e) adequacy of the load manifest (2.3.1 d), e) and f));
- f) adequacy of the operational plan (2.3.1 g));
- g) method for obtaining weather data (2.3.5.1 and 2.3.5.2);
- h) method of compliance with carry-on baggage stowage (2.7);
- i) helicopter performance operating limitations (3.2.4);
- j) method of obtaining and applying heliport obstacle data (3.3);
- k) adequacy of passenger information cards (4.2.2 d));
- l) procedures for long-range navigation (5.2.1 b));
- m) contents of the journey log book (9.4); and
- n) content of the security training programme (11.2).

6. Validation of standards of operations

Standard 2.2.1.4 requires that the validity of an AOC shall depend upon the operator maintaining the original certification standards (2.2.1.3) under the supervision of the State of the Operator. This supervision requires that a system of continued surveillance be established to ensure the required standards of operations are maintained (2.2.1.8). A good starting point in the development of such a system is to require annual or semi-annual inspections, observations and tests to validate the required certification approval and acceptance actions.

7. Amendment of air operator certificates

The certification of an operator is an ongoing process. Few operators will be satisfied over time with the initial authorizations issued with their AOC. Evolving market opportunities will cause an operator to change aircraft models and seek approval for new operational areas requiring other additional capabilities. Additional technical evaluations should be required by the State before issuing the formal written instruments approving any changes to the original AOC and other authorizations. Where possible, each request should be “bridged”, using the original authorization as the foundation to determine the extent of the State’s impending evaluation before issuing the formal instrument.

ATTACHMENT F. FLIGHT SAFETY DOCUMENTS SYSTEM

Supplementary to Section II, Chapter 1, 1.3.6

1. Introduction

1.1 The following material provides guidance on the organization and development of an operator's flight safety documents system. It should be understood that the development of a flight safety documents system is a complete process, and changes to each document comprising the system may affect the entire system. Guidelines applicable to the development of operational documents have been produced by government and industry sources and are available to operators. Nevertheless, it may be difficult for operators to make the best use of these guidelines, since they are distributed across a number of publications.

1.2 Furthermore, guidelines applicable to operational documents development tend to focus on a single aspect of documents design, for example, formatting and typography. Guidelines rarely cover the entire process of operational documents development. It is important for operational documents to be consistent with each other, and consistent with regulations, manufacturer requirements and Human Factors principles. It is also necessary to ensure consistency across departments as well as consistency in application. Hence the emphasis on an integrated approach, based on the notion of the operational documents as a complete system.

1.3 The guidelines in this Attachment address the major aspects of an operator's flight safety documents system development process, with the aim of ensuring compliance with Section II, Chapter 1, 1.3.6. The guidelines are based not only upon scientific research, but also upon current industry best practices, with an emphasis on a high degree of operational relevance.

2. Organization

2.1 A flight safety documents system should be organized according to criteria which ensure easy access to information required for flight and ground operations contained in the various operational documents comprising the system and which facilitate management of the distribution and revision of operational documents.

2.2 Information contained in a flight safety documents system should be grouped according to the importance and use of the information, as follows:

- a) time-critical information, e.g. information that can jeopardize the safety of the operation if not immediately available;
- b) time-sensitive information, e.g. information that can affect the level of safety or delay the operation if not available in a short time period;
- c) frequently used information;
- d) reference information, e.g. information that is required for the operation but does not fall under b) or c) above; and
- e) information that can be grouped based on the phase of operation in which it is used.

2.3 Time-critical information should be placed early and prominently in the flight safety documents system.

2.4 Time-critical information, time-sensitive information, and frequently used information should be placed in cards and quick-reference guides.

3. Validation

The flight safety documents system should be validated before deployment, under realistic conditions. Validation should involve the critical aspects of the information use, in order to verify its effectiveness. Interactions among all groups that can occur during operations should also be included in the validation process.

4. Design

4.1 A flight safety documents system should maintain consistency in terminology and in the use of standard terms for common items and actions.

4.2 Operational documents should include a glossary of terms, acronyms and their standard definition, updated on a regular basis to ensure access to the most recent terminology. All significant terms, acronyms and abbreviations included in the flight documents system should be defined.

4.3 A flight safety documents system should ensure standardization across document types, including writing style, terminology, use of graphics and symbols, and formatting across documents. This includes a consistent location of specific types of information, consistent use of units of measurement and consistent use of codes.

4.4 A flight safety documents system should include a master index to locate, in a timely manner, information included in more than one operational document.

Note.— The master index must be placed in the front of each document and consist of no more than three levels of indexing. Pages containing abnormal and emergency information must be tabbed for direct access.

4.5 A flight safety documents system should comply with the requirements of the operator's quality system, if applicable.

5. Deployment

Operators should monitor deployment of the flight safety documents system, to ensure appropriate and realistic use of the documents, based on the characteristics of the operational environment and in a way which is both operationally relevant and beneficial to operational personnel. This monitoring should include a formal feedback system for obtaining input from operational personnel.

6. Amendment

6.1 Operators should develop an information gathering, review, distribution and revision control system to process information and data obtained from all sources relevant to the type of operation conducted, including, but not limited to, the State of the Operator, State of Design, State of Registry, manufacturers and equipment vendors.

Note.— Manufacturers provide information for the operation of specific aircraft that emphasizes the aircraft systems and procedures under conditions that may not fully match the requirements of operators. Operators should ensure that such information meets their specific needs and those of the local authority.

6.2 Operators should develop an information gathering, review and distribution system to process information resulting from changes that originate within the operator, including:

- a) changes resulting from the installation of new equipment;
- b) changes in response to operating experience;
- c) changes in an operator's policies and procedures;
- d) changes in an operator certificate; and
- e) changes for purposes of maintaining cross-fleet standardization.

Note.— Operators should ensure that crew coordination philosophy, policies and procedures are specific to their operation.

6.3 A flight safety documents system should be reviewed:

- a) on a regular basis (at least once a year);
- b) after major events (mergers, acquisitions, rapid growth, downsizing, etc.);
- c) after technology changes (introduction of new equipment); and
- d) after changes in safety regulations.

6.4 Operators should develop methods of communicating new information. The specific methods should be responsive to the degree of communication urgency.

Note.— As frequent changes diminish the importance of new or modified procedures, it is desirable to minimize changes to the flight safety documents system.

6.5 New information should be reviewed and validated considering its effects on the entire flight safety documents system.

6.6 The method of communicating new information should be complemented by a tracking system to ensure currency by operational personnel. The tracking system should include a procedure to verify that operational personnel have the most recent updates.

ATTACHMENT G. CONTENTS OF AN OPERATIONS MANUAL

Supplementary to Section II, Chapter 2, 2.2.3.1

1. Organization

1.1 An operations manual, which may be issued in separate parts corresponding to specific aspects of operations, provided in accordance with Section II, Chapter 2, 2.2.3.1, should contain at least the following:

- a) General;
- b) Aircraft operating information;
- c) Routes and aerodromes; and
- d) Training.

1.2 From 1 January 2006, an operations manual, which may be issued in separate parts corresponding to specific aspects of operations, provided in accordance with Section II, Chapter 2, 2.2.3.1, should be organized with the following structure:

- a) General;
- b) Aircraft operating information;
- c) Routes and aerodromes; and
- d) Training.

2. Contents

The operations manual referred to in 1.1 and 1.2 should contain at the least the following:

2.1 General

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

2.1.2 Rules limiting the flight time and flight duty periods and providing for adequate rest periods for flight crew members and cabin crew.

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

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

2.1.5 The method for determining minimum flight altitudes.

2.1.6 The methods for determining heliport operating minima.

- 2.1.7 Safety precautions during refuelling with passengers on board.
- 2.1.8 Ground handling arrangements and procedures.
- 2.1.9 Procedures, as prescribed in Annex 12, for pilots-in-command observing an accident.
- 2.1.10 The flight crew for each type of operation including the designation of the succession of command.
- 2.1.11 Specific instructions for the computation of the quantities of fuel and oil to be carried, having regard to all circumstances of the operation including the possibility of loss of pressurization and the failure of one or more engines while en route.
- 2.1.12 The conditions under which oxygen shall be used and the amount of oxygen determined in accordance with Section II, Chapter 2, 2.3.8.2.
- 2.1.13 Instructions for mass and balance control.
- 2.1.14 Instructions for the conduct and control of ground de-icing/anti-icing operations.
- 2.1.15 The specifications for the operational flight plan.
- 2.1.16 Standard operating procedures (SOP) for each phase of flight.
- 2.1.17 Instructions on the use of normal checklists and the timing of their use.
- 2.1.18 Departure contingency procedures.
- 2.1.19 Instructions on the maintenance of altitude awareness.
- 2.1.20 Instructions on the clarification and acceptance of ATC clearances, particularly where terrain clearance is involved.
- 2.1.21 Departure and approach briefings.
- 2.1.22 Route and destination familiarization.
- 2.1.23 Conditions required to commence or to continue an instrument approach.
- 2.1.24 Instructions for the conduct of precision and non-precision instrument approach procedures.
- 2.1.25 Allocation of flight crew duties and procedures for the management of crew workload during night and IMC instrument approach operations.
- 2.1.26 Information and instructions relating to the interception of civil aircraft including:
 - a) procedures, as prescribed in Annex 2, for pilots-in-command of intercepted aircraft; and
 - b) visual signals for use by intercepting and intercepted aircraft, as contained in Annex 2.
- 2.1.27 Details of the safety management system (SMS) provided in accordance with Chapters 3 and 4 of Annex 19.
- 2.1.28 Information and instructions on the carriage of dangerous goods, including action to be taken in the event of an emergency.

Note.— Guidance material on the development of policies and procedures for dealing with dangerous goods incidents on board aircraft is contained in Emergency Response Guidance for Aircraft Incidents involving Dangerous Goods (Doc 9481).

2.1.29 Security instructions and guidance.

2.1.30 The search procedure checklist provided in accordance with Section II, Chapter 11, 11.1.

2.1.31 Instructions and training requirements for the use of head-up displays (HUD) or enhanced vision systems (EVS) equipment as applicable.

2.1.32 Instructions and training requirements for the use of the EFB, as applicable.

2.2 Aircraft operating information

2.2.1 Certification limitations and operating limitations.

2.2.2 The normal, abnormal and emergency procedures to be used by the flight crew and the checklists relating thereto as required by Section II, Chapter 4, 4.1.4.

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

2.2.4 Instructions and data for mass and balance calculations.

2.2.5 Instructions for aircraft loading and securing of load.

2.2.6 Aircraft systems, associated controls and instructions for their use, as required by Section II, Chapter 4, 4.1.4.

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

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

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

2.2.10 The normal, abnormal and emergency procedures to be used by the cabin crew, the checklists relating thereto and aircraft systems information as required, including a statement related to the necessary procedures for the coordination between flight and cabin crew.

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

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

2.3 Routes, aerodromes and heliports

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

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

2.3.3 Heliport operating minima for each of the heliports that are likely to be used as heliports of intended landing or as alternate heliports.

2.3.4 The increase of heliport operating minima in case of degradation of approach or heliport facilities.

2.3.5 Instructions for the use of aerodrome operating minima for instrument approaches applicable to the use of HUD and EVS.

2.4 Training

2.4.1 Details of the flight crew training programme and requirements, as required by Section II, Chapter 7, 7.3.

2.4.2 Details of the cabin crew duties training programme as required by Section II, Chapter 10, 10.3.

2.4.3 Details of the flight operations officer/flight dispatcher training programme when employed in conjunction with a method of flight supervision in accordance with Section II, Chapter 2, 2.2.

Note.— Details of the flight operations officer/flight dispatcher training programme are contained in Section II, Chapter 8, 8.3.

ATTACHMENT H. ADDITIONAL GUIDANCE FOR OPERATIONS OF HELICOPTERS IN PERFORMANCE CLASS 3 IN INSTRUMENT METEOROLOGICAL CONDITIONS (IMC)

Supplementary to Section II, Chapter 3, 3.4 and Appendix 2

1. Purpose and scope

The purpose of this attachment is to give additional guidance on the airworthiness and operational requirements described in Section II, Chapter 3, 3.4 and Appendix 2, which have been designed to meet the overall level of safety intended for approved operations in performance Class 3 in IMC.

2. Engine reliability

2.1 The power loss rate required in Chapter 3, 3.4.1 and Appendix 2, paragraph 1 should be established based on data from commercial air transport operations supplemented by suitable data from other operations in similar theatres of operations. Service experience is needed on which to base the judgement, and this should include a number of hours, acceptable to the State of Design, on the actual helicopter/engine combination unless additional testing has been carried out or experience on sufficiently similar variants of the engine is available.

2.2 In assessing engine reliability, evidence should be derived from a world fleet database covering as large a sample as possible of operations considered to be representative, compiled by the appropriate type certificate holders and reviewed by the States of Design. Since flight hour reporting is not mandatory for many types of operators, appropriate statistical estimates may be used to develop the engine reliability data. Data for individual operators approved for these operations including trend monitoring and event reports should also be monitored and reviewed by the State of the Operator to ensure that there is no indication that the operator's experience is unsatisfactory.

2.2.1 Engine trend monitoring should include the following:

- a) an oil consumption monitoring programme based on the manufacturer's recommendations; and
- b) an engine condition monitoring programme describing the parameters to be monitored, the method of data collection and the corrective action process; this should be based on the manufacturer's recommendations. The monitoring is intended to detect engine deterioration at an early stage to allow for corrective action before safe operation is affected.

2.2.2 A reliability programme should be established covering the engine and associated systems. The engine programme should include engine hours flown in the period and the power loss rate for all causes established on an appropriate statistical basis. The event reporting process should cover all items relevant to the ability to operate safely in IMC. The data should be available for use by the type certificate holder and the State of Design so as to establish that the intended reliability levels are being achieved. Any sustained adverse trend should result in an immediate evaluation by the operator in consultation with the State(s) of Design and type certificate holders with a view to determining actions to restore the intended safety level.

Note.— The actual period selected should reflect the global utilization and the relevance of the experience included (e.g. early data may not be relevant due to subsequent mandatory modifications which affected the power loss rate). After the introduction of a new engine variant and while global utilization is relatively low, the total available experience may have to be used to try to achieve a statistically meaningful average.

2.3 Power loss rate should be determined as a moving average over an appropriate period. Power loss rate, rather than in-flight shutdown rate, has been used as it is considered to be more appropriate for a helicopter operating in performance Class 3. If a failure occurs on a helicopter operating in performance Class 1 or 2 that causes a major, but not total, loss of power on one engine, it is likely that the engine will be shut down since positive engine-out performance is still available, whereas on a helicopter operating in performance Class 3 it may well be decided to make use of the residual power to stretch the glide distance.

3. Operations manual

The operations manual should include all necessary information relevant to operations by helicopters operating in performance Class 3 in IMC. This should include all of the additional equipment, procedures and training required for such operations, route and/or area of operation and likely landing area (including planning and operating minima).

4. Operator certification or validation

The operator certification or validation process specified by the State of the Operator should ensure the adequacy of the operator's procedures for normal, abnormal and emergency operations, including actions following engine, systems or equipment failures. In addition to the normal requirements for operator certification or validation, the following items should be addressed in relation to operations by helicopters operating in performance Class 3 in IMC:

- a) confirmation of the achieved engine reliability of the helicopter engine combination (see Appendix 2, paragraph 1);
- b) specific and appropriate training and checking procedures as described in Appendix 2, paragraph 7;
- c) a maintenance programme which is extended to address the equipment and systems referred to in Appendix 2, paragraph 2;
- d) an MEL modified to address the equipment and systems necessary for operations in IMC;
- e) planning and operating minima appropriate to operations in IMC;
- f) departure and arrival procedures and any route/area limitations;
- g) pilot qualifications and experience; and
- h) the operations manual, including limitations, emergency procedures, routes or areas of operation, the MEL and normal procedures related to the equipment referred to in Appendix 2, paragraph 2.

5. Operational approval and maintenance programme requirements

5.1 Approval to undertake operations by helicopters in performance Class 3 in IMC specified in an air operator certificate or equivalent document should include the particular airframe/engine combinations, including the current type design standard for such operations, the specific helicopters approved, and the areas or routes of such operations.

5.2 The operator's maintenance control manual should include a statement of certification of the additional equipment required, and of the maintenance and reliability programme for such equipment, including the engine.

ATTACHMENT I. HEAD-UP DISPLAY (HUD), EQUIVALENT DISPLAYS AND VISION SYSTEMS

*Supplementary to Section II, Chapter 2, 2.2.8.1.1, Chapter 4, 4.16,
Section III, Chapter 2, 2.2.1.1, and Chapter 4, 4.11*

Introduction

The material in this attachment provides guidance for certified HUD and vision systems intended for operational use in aircraft engaged in international air navigation. A HUD, vision systems and hybrid systems may be installed and operated to provide guidance, enhance situational awareness and/or to obtain an operational credit by establishing minima below the heliport or landing location operating minima, for approach ban purposes, or reducing the visibility requirements or requiring fewer ground facilities as compensated for by airborne capabilities. HUD and vision systems may be installed separately or together as part of a hybrid system. Any operational credit to be obtained from their use requires approval from the State of the Operator. In the case of general aviation, to which this guidance is also applicable, approvals are granted by the State of Registry.

Note 1.— “Vision systems” is a generic term referring to the existing systems designed to provide images, i.e. enhanced vision systems (EVS), synthetic vision systems (SVS) and combined vision systems (CVS).

Note 2.— Operational credit can be granted only within the limits of the design approval.

Note 3.— Currently, operational credit has been given only to vision systems containing an image sensor providing a real-time image of the actual external scene on the HUD.

1. HUD and equivalent displays

1.1 General

1.1.1 A HUD presents flight information into the pilot’s forward external field of view without significantly restricting that external view.

1.1.2 A variety of flight information may be presented on a HUD depending on the intended flight operation, flight conditions, systems capabilities and operational approval. A HUD may include, but is not limited to, the following:

- a) airspeed;
- b) altitude;
- c) heading;
- d) vertical speed;
- e) angle of attack;

- f) flight path or velocity vector;
- g) attitude with bank and pitch references;
- h) course and glide path with deviation indications;
- i) status indications (e.g. navigation sensor, autopilot, flight director); and
- j) alerts and warning displays (e.g. ACAS, wind shear, ground proximity warning).

1.2 Operational applications

1.2.1 Flight operations with a HUD can improve situational awareness by combining flight information located on head-down displays with the external view to provide pilots with more immediate awareness of relevant flight parameters and situation information while they continuously view the external scene. This improved situational awareness can also reduce errors in flight operations and improve the pilot's ability to transition between instrument and visual references as meteorological conditions change. Flight operations applications may include the following:

- a) enhanced situational awareness during all flight operations, but especially during taxi, take-off, approach and landing;
- b) reduced flight technical error during take-off, approach and landing; and
- c) improvements in performance due to precise prediction of touchdown area and rapid recognition of and recovery from unusual attitudes.

1.2.2 A HUD may be used for the following purposes:

- a) to supplement conventional flight deck instrumentation in the performance of a particular task or operation. The primary cockpit instruments remain the primary means for manually controlling or manoeuvring the aircraft; and
- b) as a primary flight display;
 - 1) information presented by the HUD may be used by the pilot in lieu of scanning head-down displays. Operational approval of a HUD for such use allows the pilot to control the aircraft by reference to the HUD for approved ground or flight operations; and
 - 2) information presented by the HUD may be used as a means to achieve additional navigation or control performance. The required information is displayed on the HUD. Operational credit, in the form of lower minima, for a HUD used for this purpose may be approved for a particular aircraft or automatic flight control system. Additional credit may also be allowed when conducting HUD operations in situations where automated systems are otherwise used.

1.2.3 A HUD, as a stand-alone system, may qualify for operations with reduced visibility or RVR or replace some parts of the ground facilities such as touchdown zone and/or centre line lights. Examples and references to publications in this regard can be found in the *Manual of All-Weather Operations* (Doc 9365).

1.2.4 A HUD or equivalent display is one that has at least the following characteristics: it has a head-up presentation not requiring transition of visual attention from head down to head up; it displays sensor-derived imagery conformal to the pilot's external view; it permits simultaneous view of the EVS sensor imagery, required aircraft flight symbology, and the external view; and its display characteristics and dynamics are suitable for manual control of the aircraft. Before such systems can be used, the appropriate airworthiness and operational approvals should be obtained.

1.3 HUD training

1.3.1 Training requirements should be established, monitored and approved by the State of the Operator or the State of Registry for general aviation. Training requirements should include requirements for recent experience if the State determines that these requirements are significantly different than the current requirements for the use of conventional head-down instrumentation.

1.3.2 HUD training should address all flight operations for which the HUD is designed and operationally approved. Some training elements may require adjustments based on whether the helicopter has a single or dual HUD installation. Training should include contingency procedures required in the event of head-up display degradation or failure. HUD training should include the following elements as applicable to the intended use:

- a) an understanding of the HUD, its flight path, energy management concepts and symbology. This should include operations during critical flight events (e.g. ACAS traffic advisory/resolution advisory, upset and wind shear recovery, engine or system failure);
- b) HUD limitations and normal procedures, including maintenance and operational checks performed to ensure normal system function prior to use. These checks include pilot seat adjustment to attain and maintain appropriate viewing angles and verification of HUD operating modes;
- c) HUD use during low visibility operations, including taxi, take-off, instrument approach and landing in both day and night conditions. This training should include the transition from head-down to head-up and head-up to head-down operations;
- d) failure modes of the HUD and the impact of the failure modes or limitations on crew performance;
- e) crew coordination, monitoring and verbal call-out procedures for single HUD installations with head-down monitoring for the pilot not equipped with a HUD and head-up monitoring for the pilot equipped with a HUD;
- f) crew coordination, monitoring and verbal call-out procedures for dual HUD installations with use of a HUD by the pilot flying the aircraft and either head-up or head-down monitoring by the other pilot;
- g) consideration of the potential for loss of situational awareness due to “tunnel vision” (also known as cognitive tunnelling or attention tunnelling);
- h) any effects that weather, such as low ceilings and visibilities, may have on the performance of a HUD; and
- i) HUD airworthiness requirements.

2. Vision systems

2.1 General

2.1.1 Vision systems can display electronic real-time images of the actual external scene achieved through the use of image sensors (EVS) or display synthetic images, which are derived from the on-board avionic systems (SVS). Vision systems can also consist of a combination of these two systems or combined vision systems (CVS). Such a system may display electronic real-time images of the external scene using the EVS component of the system. However, the merging of EVS and SVS into a CVS is dependent on the intended function (e.g. whether or not there is intent to achieve operational credit).

2.1.2 The information from vision systems may be displayed on a head-up or head-down display. When enhanced vision imagery is displayed on a HUD, it should be presented to the pilot's forward external field of view without significantly restricting that external view.

2.1.3 The enhanced position fixing and guidance provided by SVS may provide additional safety for all phases of flight especially low visibility taxi, take-off, approach and landing operations.

2.1.4 Light emitting diode (LED) lights may not be visible to infrared-based vision systems due to the fact that LED lights are not incandescent, and they do not have a significant heat signature. Operators of such vision systems will need to acquire information about the LED implementation programmes at heliports or landing location where they operate.

2.2 Operational applications

2.2.1 Flight operations with enhanced vision image sensors allow the pilot to view an image of the external scene obscured by darkness or other visibility restrictions. When the external scene is partially obscured, enhanced vision imaging may allow the pilot to acquire an image of the external scene earlier than with natural or unaided vision. The improved acquisition of an image of the external scene may improve situational awareness.

2.2.2 Vision system imagery may also allow pilots to detect terrain or obstructions on the runway or taxiways. A vision system image can also provide visual cues to enable earlier runway alignment and a more stabilized approach.

2.2.3 The combined display of aircraft performance, guidance and imagery may allow the pilot to maintain a more stabilized approach and smoothly transition from enhanced visual references to natural visual references.

2.3 Vision systems training

2.3.1 Training requirements should be established, monitored and approved by the State of the Operator. Training requirements should include recency of experience requirements if the State of the Operator determines that these requirements are significantly different than the current requirements for the use of a HUD without enhanced vision imagery or conventional head-down instrumentation.

2.3.2 Training should address all flight operations for which the vision system is approved. This training should include contingency procedures required in the event of system degradation or failure. Training for situational awareness should not interfere with other required operations. Training for operational credit should also require training on the applicable HUD used to present the enhanced visual imagery. Training should include the following elements as applicable:

- a) an understanding of the system characteristics and operational constraints;
- b) normal procedures, controls, modes and system adjustments (e.g. sensor theory including radiant versus thermal energy and resulting images);
- c) operational constraints, normal procedures, controls, modes and system adjustments;
- d) limitations;
- e) airworthiness requirements;
- f) vision system display during low visibility operations, including taxi, take-off, instrument approach and landing; system use for instrument approach procedures in both day and night conditions;
- g) failure modes and the impact of failure modes or limitations upon crew performance, in particular, for two-pilot operations;

- h) crew coordination and monitoring procedures and pilot call-out responsibilities;
- i) transition from enhanced imagery to visual conditions during runway visual acquisition;
- j) rejected landing: with the loss of visual cues of the landing area, touchdown zone or rollout area;
- k) any effects that weather, such as low ceilings and visibilities, may have on the performance of the vision system; and
- l) effects of heliport or landing location lighting using LED lights.

2.4 Operational concepts

2.4.1 Instrument approach operations that involve the use of vision systems include the instrument phase and the visual phase. The instrument phase ends at the published MDA/H or DA/H unless a missed approach is initiated. The continued approach to landing from MDA/H or DA/H will be conducted using visual references. The visual references will be acquired by use of an EVS or CVS, natural vision or a combination of the two.

2.4.2 Down to a defined height, typically 30 m (100 ft), the visual references will be acquired by means of the vision system. Below this height the visual references should be solely based on natural vision. In the most advanced applications, the vision system is expected to be able to be used down to touchdown without the requirement for natural vision acquisition of visual references. Using the EVS or CVS does not change the classification of an instrument approach procedure, since the published DA/H remains unchanged and manoeuvring below DA/H is conducted by visual references acquired by means of the EVS or CVS.

2.4.3 In addition to the operational credit that EVS/CVS is able to provide, these systems may also provide an operational and safety advantage through improved situational awareness, earlier acquisition of visual references and smoother transition to references by natural vision. These advantages are more pronounced for Type A approach operations than for Type B approach operations.

2.5 Visual references

2.5.1 The required visual references do not change due to the use of an EVS or CVS, but those references are allowed to be acquired by means of either vision system until a certain height during the approach (see Figure I-1).

2.5.2 In regions that have developed requirements for operations with vision systems, the visual references are indicated in Table I-1.

3. Hybrid systems

3.1 A hybrid system generically means that two or more systems are combined. The hybrid system typically has improved performance compared to each of the component systems, which in turn may qualify for operational credit. Vision systems are normally part of a hybrid system, e.g. EVS is typically combined with a HUD. Including more components in the hybrid system normally enhances the performance of the system.

3.2 Table I-2 provides some examples of hybrid system components. Any combination of the listed systems may constitute a hybrid system. The degree of operational credit that may be given to a hybrid system depends on its performance (accuracy, integrity and availability) as assessed and determined by the certification and operational approval processes.

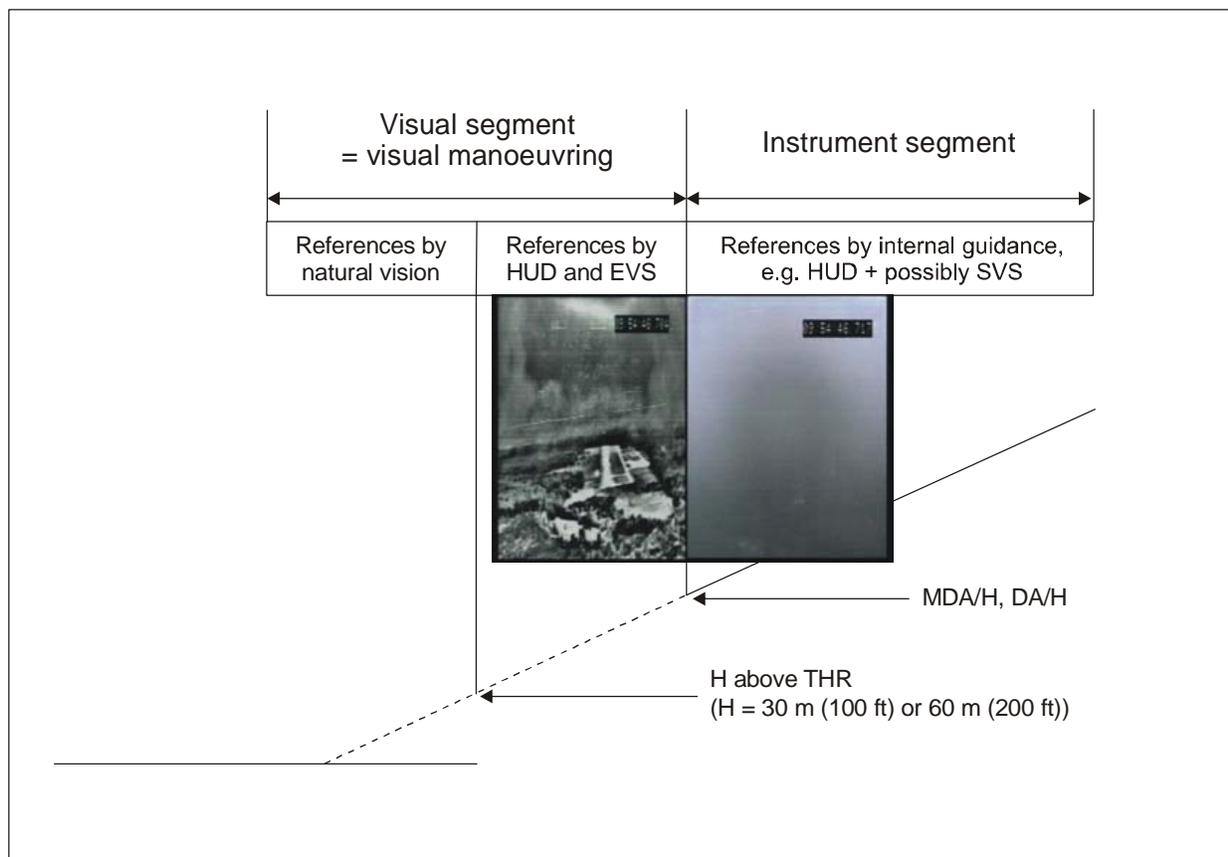


Figure I-1. EVS operations — transition from instrument to visual references

4. Operational credits

4.1 Aerodrome operating minima are expressed in terms of minimum visibility/RVR and MDA/H or DA/H. With respect to operational credit this means that the visibility/RVR requirements, established in the instrument approach procedure, may be reduced or satisfied for aircraft equipped with appropriately approved vision systems such as EVS. Reasons for granting operational credit may be when aircraft are better equipped than what was originally considered when designing the instrument approach procedure or when runway visual aids considered in the design of the procedure are not available but can be compensated for by on-board equipment.

4.2 Credits related to visibility/RVR can be given using at least three concepts. The first concept is to reduce the required RVR which will allow the aircraft to continue the approach beyond the approach ban point with a reported RVR lower than what was established for the approach procedure. Where a minimum visibility is prescribed, a second concept to grant operational credit may be used. In this case, the required minimum visibility is kept unchanged, but it is satisfied by means of the on-board equipment, typically an EVS. The result of both these concepts is that operations are allowed in meteorological conditions where otherwise they would not be possible. A third concept is to give operational credit by allowing operations in visibility/RVR which are not lower than those established for the approach procedure, but the approach operation is conducted with less facilities on the ground. One example of the latter is to allow Category II operations without touchdown and/or centre line lights, compensated for by additional on-board equipment, e.g. a HUD.

Table I-1. Examples of operational credits

OPERATIONS BELOW DA/DH OR MDA/MDH	
Example 1	Example 2
<p>For procedures designed to support Type A operations, the following visual references for the intended runway should be distinctly visible and identifiable:</p> <ul style="list-style-type: none"> • the approach lighting system; or • the runway threshold, identified by at least one of the following: <ul style="list-style-type: none"> — the beginning of the runway landing surface; — threshold lights; or — runway end identifier lights; and • the touchdown zone, identified by at least one of the following: <ul style="list-style-type: none"> — the runway touchdown zone landing surface; — touchdown zone lights; — touchdown zone markings; or — runway lights. 	<p>For procedures designed to support 3D Type A and Type B CAT I operations, the following visual references should be displayed and identifiable to the pilot on the EVS image:</p> <ul style="list-style-type: none"> • elements of the approach lighting system; or • the runway threshold, identified by at least one of the following: <ul style="list-style-type: none"> — the beginning of the runway landing surface; — threshold lights; — threshold identification lights; or — the touchdown zone, identified by at least one of the following: <ul style="list-style-type: none"> – the runway touchdown zone landing surface; – touchdown zone lights; – touchdown zone markings; or – runway lights.
Operations below 60 m (200 ft) above touchdown zone elevation	Operations below 60 m (200 ft) above threshold elevation
No additional requirements apply at 60 m (200 ft).	For procedures designed to support 3D Type A operations, the visual references are the same as those specified below for Type B CAT I operations.
Operations below 30 m (100 ft) above touchdown zone elevation	Operations below 30 m (100 ft) above threshold elevation
<p>The visibility should be sufficient for the following to be distinctly visible and identifiable to the pilot without reliance on the EVS:</p> <ul style="list-style-type: none"> • the lights or markings of the threshold; or • the lights or markings of the touchdown zone. 	<p>For procedures designed to support Type B CAT II operations, at least one of the visual references specified below should be distinctly visible and identifiable to the pilot without reliance on the EVS:</p> <ul style="list-style-type: none"> • the lights or markings of the threshold; or • the lights or markings of the touchdown zone.

4.3 Granting operational credits does not affect the classification of an instrument approach procedure since, as described in Standard 2.2.8.3, instrument approach procedures are designed to support a given instrument approach operation (i.e. type, category). However, the design of those procedures may not take into consideration on-board equipment that may compensate for facilities on the ground.

4.4 In order to provide optimum service, the ATS may have to be informed about the capabilities of better-equipped aircraft, e.g. which is the minimum RVR required.

Table I-2. Examples of hybrid system components

Systems based on image sensors	Systems not based on image sensors
EVS <ul style="list-style-type: none"> • Passive infrared sensors • Active infrared sensors • Passive millimetre wave radiometer • Active millimetre wave radar 	SVS
	Autoflight systems, flight control computers, automatic landing systems
	Systems for position fixing
CVS (where the EVS component as above qualifies for operational credit)	CVS (the SVS component)
	HUD, equivalent display
	ILS, GNSS

4.5 In addition to the operational credit that a HUD, vision systems and hybrid systems are able to provide, these systems will also provide an operational and safety advantage through improved situational awareness, earlier acquisition of visual references and smoother transition to references by natural vision. These advantages are more pronounced for 3D Type A approach operations than for Type B approach operations.

5. Operational procedures

5.1 It is not prohibited to use vision systems in connection with circling. However, due to the system layout of a vision system and the nature of a circling procedure, key visual references can be obtained only by natural vision, and operational credit is not feasible for existing vision systems. The vision system may provide additional situational awareness.

5.2 The operational procedures associated with the use of a HUD, vision systems and hybrid systems should be included in the operations manual. The instructions in the operations manual should include:

- a) any limitation that is imposed by the airworthiness or operational approvals;
- b) how operational credit affects:
 - 1) flight planning with respect to destination and alternate heliports or landing locations;
 - 2) ground operations;
 - 3) flight execution, e.g. approach ban and minimum visibility;
 - 4) crew resource management that takes into account the equipment configuration, e.g. the pilots may have different presentation equipment;
 - 5) standard operating procedures, e.g. use of autoflight systems, call-outs that may be particular to the vision system or hybrid system, criteria for stabilized approach;
 - 6) ATS flight plans and radio communication.

6. Approvals

6.1 General

6.1.1 An operator that wishes to conduct operations with a HUD or equivalent display, vision system or hybrid system will need to obtain certain approvals (see Annex 6, Part I, 4.2.8.1.1 and 6.23, and the corresponding requirements in Annex 6, Parts II and III). The extent of the approvals will depend on the intended operation and the complexity of the equipment.

6.1.2 Enhanced vision imagery may be used to improve situational awareness without a specific operational approval. However, the standard operating procedures for these types of operations need to be specified in the operations manual. An example of this type of operation may include an EVS or an SVS on a head-down display that is used only for situational awareness of the surrounding area of the aircraft during ground operations where the display is not in the pilot's primary field of view. For enhanced situational awareness, the installation and operational procedures need to ensure that the operation of the vision system does not interfere with normal procedures or the operation or use of other aircraft systems. In some cases, modifications to these normal procedures for other aircraft systems or equipment may be necessary to ensure compatibility.

6.1.3 When a vision system or a hybrid system with vision systems imagery is used for operational credit, operational approvals will typically require that the imagery be combined with flight guidance and presented on a HUD. Operational approvals may require that this information also be presented on a head-down display. Operational credit may be applied for any flight operation, but credit for instrument approach and take-off operations is most common.

6.1.4 When the application for approval relates to operational credits for systems not including a vision system, the guidance in this attachment may be used to the extent applicable as determined by the State of the Operator or the State of Registry for general aviation.

6.1.5 Operators should be aware that some States may require some information about the operational credit(s) which has been granted by the State of the Operator or the State of Registry for general aviation. Typically the approval from that State will have to be presented, and in some cases the State of the Aerodrome may wish to issue an approval or to validate the original approval.

6.2 Approvals for operational credit

To obtain operational credit the operator will need to specify the desired operational credit and submit a suitable application. The content of a suitable application should include:

- a) *Applicant details — required for all approval requests.* The official name and business or trading name(s), address, mailing address, e-mail address and contact telephone/fax numbers of the applicant.

Note.— For AOC holders, the company name, AOC number and e-mail address should be required.

- b) *Aircraft details — required for all approval requests.* Aircraft make(s), model(s) and registration mark(s).
- c) *Operator's vision system compliance list.* The contents of the compliance list are included in Table I-3. The compliance list should include the information that is relevant to the approval requested and the registration marks of the aircraft involved. If more than one type of aircraft/fleet is included in a single application a completed compliance list should be included for each aircraft/fleet.
- d) *Documents to be included with the application.* Copies of all documents referred to in column 4 of the operator's vision system compliance list (Table I-3) should be included when returning the completed application form to the civil aviation authority. There should be no need to send complete manuals; only the relevant sections/pages should be required.
- e) *Name, title and signature.*

Table I-3. Example of an AOC vision system compliance list

Main heading	Expanded areas to be addressed by the application	Sub-requirements	Operator's operations manual reference or document reference
1.0 Reference documents used in compiling the submission	<p>The submission should be based on current up-to-date regulatory material.</p> <p>A compliance statement showing how the criteria of the applicable regulations and requirements have been satisfied.</p>		
2.0 Aircraft flight manual (AFM)	A copy of the relevant AFM entry showing the aircraft certification basis for the vision system and any operational conditions.		
3.0 Feedback and reporting of significant problems	<p>An outline of the process for the reporting of failures in the operational use of procedures.</p> <p><i>Note.— In particular, significant problems with the vision system/HUD system, reporting on circumstances/locations where the vision system was unsatisfactory.</i></p>		
4.0 Instrument approach chart provider and operating minima	<p>The name of the provider of the relevant instrument approach charts.</p> <p>Confirmation that all heliport or landing location operating minima are established in accordance with the method acceptable to or criteria specified by (as applicable) the relevant authority.</p>		
5.0 Operations manual entries and standard operating procedures	<p>Manufacturer/operator-developed.</p> <p>Manufacturer's procedures are recommended as a starting point and should include at least the items in the sub-requirements column.</p>	<p>Definitions.</p> <p>Check that crew members are qualified for vision system/HUD operations.</p> <p>MEL handling.</p> <p>Equipment required for vision system operations.</p> <p>Types of approach where vision systems can be used.</p> <p>Statement that the autopilot/flight director should be used whenever possible.</p> <p>Minimum visual references for landing.</p> <p>Approach ban and RVR.</p> <p>Stabilized approach criteria.</p> <p>Correct seating and eye position.</p> <p>Crew coordination, e.g. duties of the pilot flying and the pilot not flying:</p>	

Main heading	Expanded areas to be addressed by the application	Sub-requirements	Operator's operations manual reference or document reference
		<ul style="list-style-type: none"> • limitations; • designation of handling and non-handling pilots; • use of automatic flight control system; • checklist handling; • approach briefing; • radio communications handling; • monitoring and cross-checking of instruments and radio aids; and • use of the repeater display by the pilot not flying. <p>Contingency procedures including:</p> <ul style="list-style-type: none"> • failures above and below decision height; • ILS deviation warnings; • autopilot disconnect; • auto-throttle disconnect; • electrical failures; • engine failure; • failures and loss of visual references at or below decision height; • vision system/HUD failure below normal decision height; • wind shear; • ACAS warnings; • EGPWS warnings. 	
6.0 Safety risk assessment		Operator's safety risk assessment.	

— END —

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