International Standards
and Recommended Practices

Annex 6
to the Convention on
International Civil Aviation

Operation of Aircraft

Part I
International Commercial
Air Transport — Aeroplanes

This edition incorporates all amendments adopted by the Council prior to 10 March 2001 and supersedes, on 1 November 2001, all previous editions of Part I of Annex 6.

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

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AMENDMENTS

The issue of amendments is announced regularly in the *ICAO Journal* and in the monthly *Supplement to the Catalogue of ICAO Publications and Audio-visual Training Aids*, which holders of this publication should consult. The space below is provided to keep a record of such amendments.

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ABBREVIATIONS AND SYMBOLS

(used in this Annex)

Abbreviations

AC	Alternating current
ACAS	Airborne collision avoidance system
ADREP	Accident/incident reporting
ADS	Automatic dependent surveillance
AFCS	Automatic flight control system
AGA	Aerodromes, air routes and ground aids
AIG	Accident investigation and prevention
AOC	Aeronautical operational control
AOC	Air operator certificate
APU	Auxiliary power unit
ASDA	Accelerate stop distance available
ASIA/PAC	Asia/Pacific
ATC	Air traffic control
ATM	Air traffic management
ATS	Air traffic services
CAS	Calibrated airspeed
CAT I	Category I
CAT II	Category II
CAT III	Category III
CAT IIIA	Category IIIA
CAT IIIB	Category IIIB
CAT IIIC	Category IIIC
cm	Centimetre
CDL	Configuration deviation list
CFIT	Controlled flight into terrain
CPDLC	Controller-pilot data link communications
CVR	Cockpit voice recorder
DA	Decision altitude
DA/H	Decision altitude/height
DC	Device control
D-FIS	Data link-flight information services
DH	Decision height
DME	Distance measuring equipment
DSTRK	Desired track
ECAM	Electronic centralized aircraft monitor
EFIS	Electronic flight instrument system
EGT	Exhaust gas temperature
EICAS	Engine indication and crew alerting system
ELT	Emergency locator transmitter
ELT(AD)	Automatically deployable ELT
ELT(AF)	Automatic fixed ELT
ELT(AP)	Automatic portable ELT
ELT(S)	Survival ELT
EPR	Engine pressure ratio
ETOPS	Extended range operations by turbine-engined aeroplanes
EUROCAE	European Organization for Civil Aviation Equipment
FDAU	Flight data acquisition unit
FDR	Flight data recorder
FL	Flight level
FM	Frequency modulation
ft	Foot
ft/min	Feet per minute
g	Normal acceleration
GCAS	Ground collision avoidance system
GNSS	Global navigation satellite system
GPWS	Ground proximity warning system

Abbreviations

hPa	Hectopascal
IFR	Instrument flight rules
ILS	Instrument landing system
IMC	Instrument meteorological conditions
INS	Inertial navigation system
ISA	International standard atmosphere
kg	Kilogram
kg/m^2	Kilogram per metre squared
km	Kilometre
km/h	Kilometre per hour
kt	Knot
kt/s	Knots per second
lb	Pound
LDA	Landing distance available
m	Metre
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
MNPS	Minimum navigation performance specifications
MOPS	Minimum Operational Performance Specification
m/s	Metres per second
m/s^2	Metres per second squared
N	Newton
N_1	High pressure turbine speed
N_2	Fan speed
N_3	Compressor speed
NAV	Navigation
NM	Nautical mile
OCA	Obstacle clearance altitude
OCA/H	Obstacle clearance altitude/height
OCH	Obstacle clearance height
PANS	Procedures for Air Navigation Services
RNP	Required navigation performance
RVR	Runway visual range
SICASP	Secondary Surveillance Radar Improvements and Collision Avoidance Systems Panel
SOP	Standard operating procedures
SST	Supersonic transport
STOL	Short take-off and landing
TAS	True airspeed
TAWS	Terrain awareness warning system
TCAS	Traffic alert and collision avoidance system
TLA	Thrust lever angle
TODA	Take-off distance available
TORA	Take-off run available
UTC	Coordinated universal time
VFR	Visual flight rules
V_D	Design diving speed
VMC	Visual meteorological conditions
V_{MC}	Minimum control speed with the critical engine inoperative
VOR	VHF omnidirectional radio range
V_{S_0}	Stalling speed or the minimum steady flight speed in the landing configuration

Abbreviations

V_{S_1}	Stalling speed or the minimum steady flight speed in a specified configuration
VSM	Vertical separation minima
VTOL	Vertical take-off and landing
WXR	Weather

Symbols

°C	Degrees Celsius
%	Per cent

PUBLICATIONS

(referred to in this Annex)

Convention on International Civil Aviation (Doc 7300)

European Organization for Civil Aviation Equipment (EUROCAE) Documents ED55 and ED56A

International Regulations for Preventing Collisions at Sea

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

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 II — *International General Aviation — Aeroplanes*
Part III — *International Operations — Helicopters*

Annex 7 — Aircraft Nationality and Registration Marks

Annex 8 — Airworthiness of Aircraft

Annex 9 — Facilitation

Annex 10 — Aeronautical Telecommunications

Volume III (Part I — *Digital Data Communication Systems,* Part II — *Voice Communication Systems)*
Volume IV *(Surveillance Radar 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*

Annex 15 — Aeronautical Information Services

Annex 16 — Environmental Protection
Volume I — *Aircraft Noise*

Annex 18 — The Safe Transport of Dangerous Goods by Air

Procedures for Air Navigation Services

OPS — Aircraft Operations (Doc 8168)
Volume I — *Flight Procedures*
Volume II — *Construction of Visual and Instrument Flight Procedures*

ATM — Air Traffic Management (Doc 4444)

Regional Supplementary Procedures (Doc 7030)

Manuals

Accident/Incident Reporting Manual (ADREP Manual) (Doc 9156)

Accident Prevention Manual (Doc 9422)

Airport Services Manual (Doc 9137)
Part 1 — *Rescue and Fire Fighting*
Part 8 — *Airport Operational Services*

Airworthiness Manual (Doc 9760)

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 Criteria for the Qualification of Flight Simulators (Doc 9625)

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

Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (Doc 9574)

Manual on Required Navigation Performance (RNP) (Doc 9613)

Preparation of an Operations Manual (Doc 9376)

Circulars

Guidance Material on SST Aircraft Operations (Circ. 126)

ANNEX 6 — PART I
INTERNATIONAL COMMERCIAL AIR TRANSPORT — AEROPLANES

FOREWORD

Historical background

Standards and Recommended Practices for the Operation of Aircraft — International Commercial Air Transport were first adopted by the Council on 10 December 1948 pursuant to the provisions of Article 37 of the Convention on International Civil Aviation (Chicago, 1944) and designated as Annex 6 to the Convention. They became effective on 15 July 1949. The Standards and Recommended Practices were based on recommendations of the Operations Division at its first session in April 1946, which were further developed at the second session of the Division in February 1947.

Amendments to the Annex, which included additional Standards and Recommended Practices as well as modifications to existing Standards, and which were based on recommendations of the Operations Division at its third and fourth sessions in February–March 1949 and March–April 1951, were adopted by the Council on 5 December 1950 (Amendments 1–127), 4 December 1951 (Amendments 128–131), 28 November 1952 (Amendments 132 and 133), 2 December 1952 (Amendment 134), 20 October 1953 (Amendment 135), 23 February 1956 (Amendment 136), 8 May 1956 (Amendment 137) and 15 May 1956 (Amendment 138), and became effective on 1 June 1951, 1 May 1952, 1 April 1953, 1 May 1953, 1 March 1954, 1 July 1956, 1 September 1956 and 15 September 1956 respectively.

The Third Air Navigation Conference (Montreal, September–October 1956) made, among other things, a complete review of Chapter 5 of the Annex. As a result of those recommendations, their submission to all Contracting States, and their review by the Air Navigation Commission, a complete new text of Chapter 5 was adopted by the Council as Amendment 139 on 13 June 1957 and became effective on 1 October 1957.

Additionally, the Council adopted Amendment 140 on 13 June 1957, containing amendments to Chapter 6 covering the marking of break-in points on aircraft and the characteristics of navigation lights, to Chapter 8 respecting the qualification of persons to certify aircraft as airworthy, to Chapter 9 respecting the route and aerodrome qualification of pilots and to Chapter 10 respecting requirements for licensing of flight operations officers, which became effective on 1 October 1957. Subsequent to the issuance of the fifth edition, Amendment 141 (4.1.1 and 4.1.2) was adopted by the Council on 12 May 1958 and became applicable on 1 December 1958. On 8 December 1959 the Council adopted Amendment 142 relating to the provisions in Chapter 6 for the carriage of portable emergency radio transmitters. The Amendment became effective on 1 May 1960 and applicable on 1 August 1960. On 2 December 1960 the Council adopted Amendment 143 relating to the provisions in Chapter 4 for co-ordination of operational instructions involving a change in the air traffic control flight plan. The Amendment became effective on 1 April 1961 and applicable on 1 July 1961. On 24 March 1961 the Council adopted Amendment 144 relating to the establishment of limitations upon flight duty periods and provision of rest periods for flight crew members, and the Attachment to the Annex of guidance material on the establishment of flight time and flight duty period limitations and rest periods. The Amendment became effective on 1 August 1961 and applicable on 1 October 1961. The Council on 24 March 1961 approved Amendment 145 containing the Note under 6.2.2 a). On 13 December 1961 the Council adopted Amendments 146 and 147 and approved Amendment 148. These relate respectively to the modernizing of the specifications concerning the provision and use of oxygen supply systems, the installation of high intensity anti-collision lights on aeroplanes and to purely editorial changes respecting references to other documents. The Amendments became effective on 1 April 1962 and applicable on 1 July 1962. On 8 April 1963 the Council adopted Amendment 149. This Amendment related to the specification of the circumstances under which emergency and survival equipment shall be carried on long-range over-water flights. The Amendment became effective on 1 August 1963 and applicable on 1 November 1963.

As a result of the adoption of Amendment 150, a sixth edition of the Annex was published. This was necessitated by the extensive nature of the Amendment which followed recommendations of the Fourth Air Navigation Conference (Montreal, November–December 1965) for extensive revision of the Annex, chiefly with the aim of bringing it up to date to meet the operational needs of high performance turbo-jet aeroplanes. Furthermore, on the recommendation of the Conference, the applicability of the Annex is now limited to ''aeroplanes'' engaged in scheduled and non-scheduled international air transport operations. Previously this limitation applied only to non-scheduled international air transport operations. Amendment 150 was adopted by the Council on 14 December 1966, became effective on 14 April 1967 and applicable on 24 August 1967.

The Council, on 8 November 1967, adopted Amendment 151 which redefined ''Aircraft'' as a result of adoption

by Council of Amendment 2 to Annex 7 to the Convention and amended 5.2.7.2.2 to cater for three-engined aeroplanes. The Amendment became effective on 8 March 1968 and applicable on 22 August 1968.

Amendment 152 was adopted by the Council on 23 January 1969. Besides revising certain paragraphs in Chapters 4, 7 and 8 to give them more precision, the Amendment also adds a provision in Chapter 4 which prohibits, when passengers are being carried, the in-flight simulation of emergency situations affecting the flight characteristics of the aeroplane. The opportunity presented by this Amendment was also taken to introduce changes to the Annex as a consequence of the adoption by the Council of a companion document — International Standards and Recommended Practices — *Operation of Aircraft* — Annex 6, Part II — *International General Aviation*. These changes consisted of designating this document, previously known as Annex 6, ''Annex 6, Part I, First Edition''. Amendment 152 became effective on 23 May 1969 and applicable on 18 September 1969.

Consequent to the adoption of Annex 6, Part III, *International Operations — Helicopters*, an amendment to the title was introduced to indicate that Annex 6, Part I was applicable only to aeroplanes.

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 present edition of Annex 6, Part I, contains Standards and Recommended Practices adopted by the International Civil Aviation Organization as the minimum Standards applicable to the operation of aeroplanes by operators authorized to conduct international commercial air transport operations. These international commercial air transport operations include scheduled international air services and non-scheduled international air transport operations for remuneration or hire.

In conjunction, these two types of operations include all international air transport operations conducted for remuneration or hire by aeroplanes. The distinction between them lies in the fact that scheduled international air services are especially provided for in the Convention in contradistinction to international air transport operations in general, of which non-scheduled international air transport operations for remuneration or hire were considered most urgently to require the establishment of International Standards and Recommended Practices. It is no longer considered necessary to differentiate in the Standards and Recommended Practices between scheduled international air services and non-scheduled international air transport operations.

The purpose of Annex 6, Part I, is to contribute to the safety of international air navigation by providing criteria of safe operating practice and to contribute to the efficiency and regularity of international air navigation by encouraging States to facilitate the passage over their territories of aeroplanes in international commercial air transport belonging to other States that operate in conformity with such Standards.

Chapter 5

An element of the safety of an operation is the intrinsic safety of the aircraft, that is, its level of airworthiness. The level of airworthiness of an aircraft is, however, not fully defined by the application of the airworthiness Standards of Annex 8, but also requires the application of those Standards in the present Annex that are complementary to them.

As originally adopted and also as amended by Amendments 1 to 138, the Annex contained a chapter ''Aeroplane Operating Limitations'' which included general provisions applicable to the operation of all aeroplanes within the scope of the Annex, a section or sections applicable to aeroplanes certificated in ICAO categories according to the then existent Annex 8, and a section applicable to aeroplanes not so certificated.

At its fourth session, the Operations Division, collaborating with the Airworthiness Division, made, in addition to the proposals that resulted in Amendments 128 to 133, recommendations concerning the use of a performance code as an alternative to the one prescribed for ICAO Category A aeroplanes in which some essential climb values had the status of Recommended Practices. Further, the Airworthiness Division made recommendations concerning certain aspects of the certification in ICAO categories. As a result of those recommendations, the Council, on 2 December 1952, adopted Amendment 134 (which became effective 1 May 1953), and approved the incorporation of the alternative performance code as Attachment A but stated its belief that since agreement had not yet been reached on Standards covering performance, there existed no basis for certification in ICAO Category A. It urged the Contracting States to refrain from such certification pending the becoming effective of Standards on performance or until such time as the Council decides on the basic policy on airworthiness.

The Assembly at its seventh session (June 1953) endorsed the action already taken by the Council and the Air Navigation Commission to initiate a fundamental study of ICAO policy on international airworthiness and directed the Council to complete the study as rapidly as practicable.

In pursuing such study, the Air Navigation Commission was helped by an international body of experts designated as the ''Airworthiness Panel'', which contributed to the preparation of the work of the Third Air Navigation Conference.

As a result of these studies, a revised policy on international airworthiness was developed and it was approved by the Council in 1956. According to this policy the principle of certification in an ICAO Category was abandoned. Instead, Annex 8 included broad Standards which defined, for application by the competent national authorities, the complete minimum international basis for the recognition by States of certificates of airworthiness for the purpose of the flight of aircraft of other States into or over their territories, thereby achieving, among other purposes, protection of other aircraft, third persons and property. It was considered that this met the obligation of the Organization under Article 37 of the Convention to adopt international Standards of airworthiness.

It was recognized that the ICAO Standards of airworthiness would not replace national regulations and that national codes of airworthiness containing the full scope and extent of detail considered necessary by individual States would be necessary as the basis for the certification of individual aircraft. Each State would establish its own comprehensive and detailed code of airworthiness or would select a comprehensive and detailed code established by another Contracting State. The level of airworthiness defined by this code would be indicated by the Standards, supplemented, if necessary, by Acceptable Means of Compliance.

A revised text consistent with the above principles was prepared for Chapter 5 of Annex 6. It included: a) broad Standards that were complementary to the Standards related to aeroplane performance in Annex 8; and b) two Acceptable Means of Compliance which illustrated by examples the level of performance intended by the broad Standards. To adopt a code giving an appreciably lower level of performance than that illustrated by these Acceptable Means of Compliance was considered to be a violation of the Standards in Chapter 5 of this Annex.

Present policy on international airworthiness. There had been some concern about the slow progress that had been made over the years with respect to developing supplementary airworthiness specifications in the form of Acceptable Means of Compliance. It was noted that the majority of the Acceptable Means of Compliance in Annexes 6 and 8 had been developed in 1957 and were therefore applicable to only those aeroplane types operating at that time. No effort had been made to update the specifications in these Acceptable Means of Compliance nor had there been any recommendations from the Airworthiness Committee for upgrading of any of the Provisional Acceptable Means of Compliance, which had been developed as potential material for full-fledged Acceptable Means of Compliance. The Air Navigation Commission therefore requested the Airworthiness Committee to review the progress made by it since its inception with a view to determining whether or not desired results had been achieved and to recommend any changes to improve the development of detailed airworthiness specifications.

The Airworthiness Committee at its Ninth Meeting (Montreal, November/December 1970) made a detailed study of the problems and recommended that the concept of developing airworthiness specifications in the form of Acceptable Means of Compliance and Provisional Acceptable Means of Compliance be abandoned and a provision be made for an airworthiness technical manual to be prepared and published by ICAO to include guidance material intended to facilitate the development and uniformity of national airworthiness codes by Contracting States.

The Air Navigation Commission reviewed the recommendations of the Airworthiness Committee in the light of the history of the development of the airworthiness policy approved by the Council in 1956. It came to the conclusion that the basic objectives and principles on which the ICAO airworthiness policy had been based were sound and did not require any significant change. It was also concluded that the main reason for the slow progress in the development of airworthiness specifications in the form of Acceptable Means of Compliance and Provisional Acceptable Means of Compliance was the degree of mandatory status to the former implied by the following statement included in the Forewords of Annexes 6 and 8:

> ''To adopt a code giving an appreciably lower level of airworthiness than that given in an Acceptable Means of Compliance would be a violation of the Standard supplemented by that Acceptable Means of Compliance.''

Several approaches were examined by the Air Navigation Commission to eliminate this difficulty. Finally, it came to the conclusion that the idea of developing airworthiness specifications in the form of Acceptable Means of Compliance and Provisional Acceptable Means of Compliance should be abandoned and ICAO should declare that the States' obligations, for the purpose of Article 33 of the Convention, shall be met by their compliance with the broad Standards in Annex 8 supplemented, as necessary, by airworthiness technical guidance material, devoid of all mandatory implications or obligations. Also the requirement that each Contracting State should either establish its own comprehensive and detailed code of airworthiness or select a comprehensive and detailed code established by another Contracting State should be retained.

The Council on 15 March 1972 approved the above approach to form the basis for the present policy of ICAO in the field of airworthiness.

It also approved the issuance of the airworthiness guidance material under the title of *Airworthiness Technical Manual*. It was understood that the guidance material would have no formal status and its main purpose would be to provide guidance to Contracting States in developing the detailed national airworthiness code mentioned in 2.2 of Part II of Annex 8.

With respect to Annex 6, Part I, it was agreed that the guidance material in the Acceptable Means of Compliance for Aeroplane Performance Operating Limitations should be

edited suitably and retained in the Annex but in the form of an Attachment (green pages).

Performance Standards of Annex 8. Chapter 2, Part IIIA, and Sub-part B, Part IIIB, of Annex 8 contain aeroplane performance Standards that are complementary to the Standards in Chapter 5 of this Annex. Both state broad objectives. The Council has urged Contracting States not to impose on visiting aeroplanes, not exempted by Article 41, operational requirements other than those established by the State of Registry, provided that those requirements assure the level of performance equivalent to that intended by the Standards of Chapter 5 of this Annex and the complementary Standards of Chapter 2, Part IIIA, and Sub-part B, Part IIIB, of Annex 8.

In respect of aircraft exempted by Article 41, Chapter 5 of this Annex contains a Recommended Practice to the effect that the State of Registry should ensure that the level of performance specified in 5.2 applicable to aeroplanes not exempted should be met as far as practicable by those aeroplanes. The Council has urged Contracting States not to impose on visiting aircraft exempted by Article 41 requirements other than those established by the State of Registry provided that in establishing those requirements the State of Registry complied with the Recommended Practice. These recommendations complement one made by the Council in respect of aircraft exempted by Article 41, to the effect that Contracting States apply as far as practicable to aeroplanes over 5 700 kg mass intended for the carriage of passengers or cargo or mail in international air navigation, the Standards of Parts IIIA and IIIB of Annex 8.

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 incorporate, by reference, other specifications having the status of Recommended Practices. In such cases, 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.

Table A. Amendments to Annex 6

Amendment	*Source(s)*	*Subject(s)*	*Adopted* *Effective* *Applicable*
1st Edition	Derived from Sixth Edition of Annex 6, including Amendment 152		23 January 1969 23 May 1969 18 September 1969
1 (2nd Edition)	Sixth Air Navigation Conference	a) A shift in emphasis of the responsibility for the establishment of minimum en-route flight altitudes from the operator to the State flown over; b) the requirement for additional instruments in aeroplanes operated as controlled VFR flights in the en-route phase; and, of special importance; c) the permitting of aeroplanes, when unable to navigate by visual references to landmarks, to be navigated by equipment other than radio navigation equipment, e.g. solely by self-contained navigation means, provided that certain equipment capabilities are met, thus eliminating any requirement for the carriage of radio navigation equipment.	25 May 1970 25 September 1970 4 February 1971
2	Special Meeting on Aircraft Noise in the Vicinity of Aerodromes (1969) and the Second Meeting of the Supersonic Transport Panel	a) The weight of an aeroplane at the start of take-off or at the expected time of landing not to exceed, except in prescribed circumstances, the relative maximum weights at which compliance has been demonstrated with the applicable Noise Certification Standards; b) the carriage on board an aeroplane of a document attesting noise certification; c) all aeroplanes intended to be operated above 15 000 m (49 000 ft) to carry equipment to measure and indicate continuously the total cosmic radiation being received.	2 April 1971 2 August 1971 6 January 1972
3	Council action in pursuance of Assembly Resolution A17-10	Inclusion in the Annex of a Recommended Practice to the effect that, in all passenger-carrying aeroplanes, the flight crew compartment door should be capable of being locked from within the compartment.	10 December 1971 10 April 1972 7 December 1972
4 (3rd Edition)	Air Navigation Commission Review of the Annex	a) Deletion from Chapter 2 of the provision which allowed, in prescribed circumstances, certain specifications classed as Standards to have the status of Recommended Practices; b) introduction of the term “Aerodrome operating minima” in lieu of “Aerodrome meteorological minima”; c) introduction of the terms “Decision height”, “Instrument meteorological conditions”, “Runway visual range” and “Visual meteorological conditions”; d) Introduction of provisions to require the operator to provide a copy of its Operations Manual to the State of Registry and to incorporate in the Manual certain mandatory material; e) the inclusion of an updated list of the supplies, etc., to be carried aboard aircraft in first-aid kits; f) a change in the equivalent of 5 700 kg from 12 500 lb to 12 566 lb;	27 June 1972 27 October 1972 1 March 1973

Amendment	*Source(s)*	*Subject(s)*	*Adopted* *Effective* *Applicable*
		g) the introduction of a reference to the need for certain types of aeroplanes to be equipped with a Mach number indicator; h) the introduction of a provision for cabin attendants to be seated and secured during certain prescribed flight phases.	
5	Seventh Air Navigation Conference	Inclusion in the Annex of definitions of "Flight recorder" and "Maximum weight" (of aircraft) and revision of the specifications for the carriage, recording parameters and operation of flight recorders.	29 May 1973 1 October 1973 23 May 1974
6	In pursuance of new policy on international airworthiness and action in pursuance of Assembly Resolution A18-16	Replacement of the Acceptable Means of Compliance on Aeroplane Performance Operating Limitations by guidance material on the subject in the form of an Attachment, and incorporation of provisions for emergency power supply to operate attitude indicating instruments on the total failure of the main electrical generating system. The opportunity presented by this Amendment was also taken to revise the Introductory Note to Chapter 3 of the Annex. The revision points to a practical method for States to discharge their functions in the cases of lease, charter, and interchange of aircraft in international operations.	30 October 1973 28 February 1974 23 May 1974
7	Council action in pursuance of Assembly Resolutions A17-10 and A18-10	Introduced provisions relating to practices to be followed in the event that an aircraft is being subjected to unlawful interference.	7 December 1973 7 April 1974 23 May 1974
8	Pursuant to an Air Navigation Commission study concerning the interception of civil aircraft	Introduced provisions designed to reduce the risk for intercepted aircraft.	4 February 1975 4 June 1975 9 October 1975
9	Accident Investigation and Prevention Divisional Meeting (1974). Fifth Meeting of the Supersonic Transport Panel. Consequent to amendments to Annexes 3 and 14	Introduced requirements for the safeguarding and preservation of flight recorder records of aeroplanes involved in accidents and incidents, provision and use of flight crew restraining devices, procedures to be followed in the event of excessive cosmic radiation exposure during flight, and the maintenance of records for crew members on total cosmic radiation dosages. The Amendment also provided amplification of the specifications for the type of timepiece required for operations in accordance with Instrument Flight Rules and controlled VFR flights and provided a cross-reference to guidance material on SST fuel supplies. The opportunity presented by this Amendment was also taken to introduce changes to the Annex as a result of the adoption by the Council of amendments to companion documents — Annex 3 and Annex 14. These changes consist of the elimination of reference to PANS-MET and the revision of the definitions of Aerodrome, Runway Visual Range, Take-off Run Available and Landing Distance Available.	7 April 1976 7 August 1976 30 December 1976
10	ASIA/PAC Regional Air Navigation Meeting (1973)	The requirement for the carriage of survival radio equipment over those areas in which search and rescue would be especially difficult to be determined by States rather than regional air navigation agreement.	16 June 1976 16 October 1976 6 October 1977
11	Seventh Air Navigation Conference and Air Navigation Commission Study	Required the operator to establish operational procedures designed to ensure that an aeroplane conducting precision approaches crosses the threshold by a safe margin.	23 June 1977 23 October 1977 23 February 1978

Amendment	*Source(s)*	*Subject(s)*	*Adopted* *Effective* *Applicable*
12	Air Navigation Commission Study	Required the fitting of ground proximity warning systems to certain aeroplanes.	15 December 1977 15 April 1978 10 August 1978
13	Air Navigation Commission Study	Required the fitting of seats with safety harness and their use by cabin attendants assigned emergency evacuation duties.	13 December 1978 13 April 1979 29 November 1979
14	Air Navigation Commission Study	New definition of "operational control" and introduction of requirements for navigation equipment to meet minimum navigational performance specifications (MNPS)	2 April 1980 2 August 1980 27 November 1980
15	Air Navigation Commission Study	Revision of the provisions relating to exterior lights to align with new provisions in Annexes 2 and 8, and requirements to include a checklist of emergency and safety equipment, including instructions for its use, in the Operations Manual.	22 March 1982 22 July 1982 25 November 1982
16 (4th Edition)	Third and Fourth meetings of the Operations Panel, AGA Divisional Meeting (1981), amendments consequent to adoption of Annex 18 and an Air Navigation Study	Introduced provisions related to aircraft operating procedures for noise abatement, development and use of instrument flight procedures, authority and competence to taxi aeroplanes and refuelling with passengers on board. Changes to the Annex were introduced as a result of adoption by the Council of Annex 18 in respect to the carriage of dangerous goods and requirements for crew training programmes in their carriage in commercial aeroplanes. The provisions in respect of aerodromes operating minima were revised to clarify the requirements and to include a requirement for RVR information. Units of measurement were brought in line with the provisions of Annex 5, and the Note in Chapter 3 concerning lease, charter and interchange was updated.	29 March 1983 29 July 1983 24 November 1983
17	Accident Prevention and Investigation Divisional Meeting, AIG (1979)	Revision of the provisions relating to flight recorders. Introduction of related guidance material in an attachment.	6 March 1985 29 July 1985 21 November 1985
18	Seventh meeting of the Obstacle Clearance Panel, Air Navigation Commission studies and a proposal by a State	Provision of climb performance data with all engines operating; extended range operations by aeroplanes with two power-units; the provision of obstacle data; take-off alignment distance accountability.	25 March 1986 27 July 1986 20 November 1986
19 (5th Edition)	Air Navigation Commission review of the Annex, Stage I. Third meeting of the Visual Flight Rules Operations Panel. Air Navigation Commission Study	a) Introduction of new definitions for commercial air transport operations, air operator certificate, master minimum equipment list and minimum equipment list. Introduction of revised definitions of aerial work and general aviation to Annex 6, Part I. Revision of the definition of alternate aerodrome to introduce take-off, en-route and destination alternate aerodromes; b) elimination of the differences between the specifications for scheduled and non-scheduled operations; c) introduction of the concept of the applicability of Annex 6, Part I to the operation of aeroplanes by operators authorized to conduct international commercial air transport operations; d) requirements for the issue of an air operator certificate and the introduction of guidance material; e) requirements for the development of minimum equipment lists and the introduction of guidance material;	19 March 1990 30 July 1990 15 November 1990

Amendment	*Source(s)*	*Subject(s)*	*Adopted Effective Applicable*
		f) requirements for the specification of alternate aerodromes; g) requirement for the provision of an aircraft operating manual; h) requirement for the operator to establish an accident prevention and flight safety programme and specifications related to carry-on baggage; i) differentiation in Annex 6, Part I between operational and ATS flight plans; j) requirements for the pilot-in-command to demonstrate knowledge of long-range navigation procedures where appropriate; k) elimination of the term "controlled VFR flight" and recognition that a VFR flight may be a controlled flight; l) amendment to Chapter 13 — Security to make the recommendation on the provision of a lockable flight crew compartment door applicable to all aeroplanes rather than only passenger-carrying aeroplanes, to require guidance material to support the aeroplane search procedure checklist, and to require the operator to establish a training programme for employees in preventative measures and techniques in relation to acts of sabotage or unlawful interference; m) introduction of guidance material concerning flight data recording of important operational information in aeroplanes with electronic displays; n) revision of the requirements for the contents of the operations manual; o) requirements concerning carry-on baggage; p) change of the expression "flight check system" to "checklist";	
20	Fifth meeting of the Operations Panel, Seventh and Eighth meetings of the Review of the General Concept of Separation Panel, Accident Investigation Divisional meeting (AIG/1992), Third meeting of the Continuing Airworthiness Panel, Air Navigation Commission studies	a) Revision of definitions of aerodrome operating minima, decision altitude/height, minimum descent altitude/height and obstacle clearance altitude/height; b) introduction of new definitions for emergency locator transmitters (ELTs), required navigation performance (RNP) and RNP type; c) introduction of the definition for the classification of instrument approach and landing operations; d) introduction of a reference to the *Continuing Airworthiness Manual;* e) revision of the requirements concerning the use of engraving metal foil flight data recorders; f) introduction of carriage requirements for emergency locator transmitters (ELTs) to replace provisions regarding survival radio equipment and emergency location beacon; g) 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), provisions to permit the uniform implementation of 300 m (1 000 ft) VSM above FL 290 and reference to the requirements relating to operations in RNP airspace in the operations manual; h) revision of the requirements concerning maintenance inspection, modifications and repairs and continuing airworthiness information.	21 March 1994 25 July 1994 10 November 1994

Amendment	*Source(s)*	*Subject(s)*	*Adopted Effective Applicable*
21 (6th Edition)	Air Navigation Commission studies, Fourteenth meeting of the Dangerous Goods Panel, editorial amendment, text alignment with Annex 6, Part II and/or Part III, consequential amendment	a) Introduction of new and revised definitions for cabin attendant, flight manual, large aeroplane, operations manual and small aeroplane; b) revision of the provisions concerning operating facilities, flight preparation, flight time, flight duty periods and rest periods for crew members, oxygen supply and extended range operations (ETOPS); c) new requirements for determining the length of the runway available; d) revised and new provisions concerning ground proximity warning systems (GPWS), medical supplies, oxygen equipment for aeroplanes on high altitude flights; e) revision of the provisions concerning aeroplanes operated in accordance with instrument flight rules (IFR); f) inclusion of references to the ICAO *Manual of Criteria for the Qualification of Flight Simulators* (Doc 9625) and 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 officer to align with Annex 1; h) revision of the contents of the operations manual and new provisions concerning aerodrome operating minima, oxygen supply, flight and duty time limitations, departure contingency procedures, instructions for mass and balance control and instructions and training requirements for the avoidance of controlled flight into terrain (CFIT) and policy for the use of ground proximity warning systems (GPWS); i) new provisions on flight time, flight duty periods and rest periods for cabin attendants and revision of the provisions concerning training; and j) revised and new requirements related to the incorporation of security into aircraft design.	8 March 1995 24 July 1995 9 November 1995
22	Fourth and Fifth meetings of the Secondary Surveillance Radar Improvements and Collision Avoidance Systems Panel (SICASP/4 and 5)	Requirements concerning pressure-altitude reporting transponders and carriage of airborne collision avoidance systems (ACAS).	19 February 1996 15 July 1996 7 November 1996
23 (7th Edition)	First meeting of the Flight Recorder Panel, Fourth meeting of the Continuing Airworthiness Panel, ICAO and Industry CFIT Task Force, Air Navigation Commission studies, Amendment 162 to Annex 1, Amendment 38 to Annex 11, editorial amendment	a) Introduction of new and revised definitions for aircraft operating manual, configuration deviation list, ETOPS en-route alternate, Human Factors principles, human performance, master minimum equipment list, maintenance, psychoactive substances and required navigation performance; b) revision of the notes concerning lease and interchange; c) new and revised requirements concerning flight recorders; d) introduction of a note concerning the use of psychoactive substances; e) new provisions concerning airborne forward-looking wind shear warning systems;	19 March 1998 20 July 1998 5 November 1998

Amendment	*Source(s)*	*Subject(s)*	*Adopted Effective Applicable*
		f) new and revised provisions concerning continuing airworthiness to reflect the use of approved maintenance organizations and to clarify the responsibilities of the operator and the maintenance organization; g) new and revised provisions concerning the content of an operations manual relocated in an appendix and a new Recommended Practice for the carriage of the ground proximity warning system in piston-engined aeroplanes; h) 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; i) new provisions related to the de/anti-icing of aircraft on the ground, aeroplane performance operating limitations, mass limitation, sensitive pressure altimeters and recent experience of the co-pilot; j) new provisions concerning the carriage of airborne collision avoidance (ACAS) systems and pressure-altitude reporting transponders; and k) new provisions concerning Human Factors.	
24	Second meeting of the Flight Recorder Panel, 32nd Session of the Assembly, Air Navigation Commission studies	a) Change of terminology from “cabin attendant” to “cabin crew”; b) revised definitions; c) new provisions concerning the mandatory carriage of ELTs operating on 406 MHz and 121.5 MHz, the addition of a predictive terrain hazard warning function to the ground proximity warning system (GPWS) and the introduction of an implementation date for the recording of digital communications.	15 March 1999 19 July 1999 4 November 1999
25	Air Navigation Commission studies	a) Revised definitions; and b) introduction of requirements for the provision of RVR and criteria for instrument approach operations, and revision of the duties of the pilot-in-command.	15 March 2000 17 July 2000 2 November 2000
26 (8th Edition)	Second meeting of the Flight Recorder Panel, AIG Divisional Meeting (1999), Third meeting of the Global Navigation Satellite System Panel, Fifth meeting of the Continuing Airworthiness Panel, Air Navigation Commission studies	a) Update the provisions pertaining to flight recorders, including the recording of digital communications; FDR requirements for new aircraft; revised parameter listings; introduction of two-hour duration CVRs; b) new provisions pertaining to flight data analysis programmes; c) amendment of the classification of instrument approach and landing operations; d) new provisions pertaining to approach with vertical guidance (APV) operations; e) new definitions and update of provisions pertaining to maintenance-related requirements; and f) translation into English of documents attesting noise certification.	9 March 2001 16 July 2001 1 November 2001
27	Air Navigation Commission studies	a) Revised requirements for the ground proximity warning system (GPWS) and forward looking terrain avoidance function; and b) new and revised requirements for the incorporation of security into aircraft design.	15 March 2002 15 July 2002 28 November 2002

Amendment	*Source(s)*	*Subject(s)*	*Adopted* *Effective* *Applicable*
28	Separation and Airspace Safety Panel and Air Navigation Commission studies	a) New provision 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; d) Authorization by the State of the Operator for operations in RNP airspace; and e) New provision concerning the content of an operations manual in regard to the airborne collision avoidance system (ACAS).	13 March 2003 14 July 2003 27 November 2003

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

CHAPTER 1. DEFINITIONS

When the following terms are used in the Standards and Recommended Practices for operation of aircraft in international commercial air transport, 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.

Aerodrome operating minima. The limits of usability of an aerodrome for:

a) take-off, expressed in terms of runway visual range and/or visibility and, if necessary, cloud conditions;

b) landing in precision approach and landing operations, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H) as appropriate to the category of the operation;

c) landing in approach and landing operations with vertical guidance, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H); and

d) landing in non-precision approach and landing operations, expressed in terms of visibility and/or runway visual range, minimum descent altitude/height (MDA/H) and, if necessary, cloud conditions.

Aeroplane. A power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight.

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.

Alternate aerodrome. An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing. Alternate aerodromes include the following:

Take-off alternate. An alternate aerodrome at which an aircraft can land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure.

En-route alternate. An aerodrome at which an aircraft would be able to land after experiencing an abnormal or emergency condition while en route.

ETOPS en-route alternate. A suitable and appropriate alternate aerodrome at which an aeroplane would be able to land after experiencing an engine shutdown or other abnormal or emergency condition while en route in an ETOPS operation.

Destination alternate. An alternate aerodrome to which an aircraft may proceed should it become either impossible or inadvisable to land at the aerodrome of intended landing.

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

Approach and landing operations using instrument approach procedures. Instrument approach and landing operations are classified as follows:

Non-precision approach and landing operations. An instrument approach and landing which utilizes lateral guidance but does not utilize vertical guidance.

Approach and landing operations with vertical guidance. An instrument approach and landing which utilizes lateral and vertical guidance but does not meet the requirements established for precision approach and landing operations.

Precision approach and landing operations. An instrument approach and landing using precision lateral and vertical guidance with minima as determined by the category of operation.

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

a) a ground-based navigation aid; or

b) computer generated navigation data.

Categories of precision approach and landing operations:

Category I (CAT I) operation. A precision instrument approach and landing with 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.

Category II (CAT II) operation. A precision instrument approach and landing with 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 350 m.

Category IIIA (CAT IIIA) operation. A precision instrument approach and landing with:

a) a decision height lower than 30 m (100 ft) or no decision height; and

b) a runway visual range not less than 200 m.

Category IIIB (CAT IIIB) operation. A precision instrument approach and landing with:

a) a decision height lower than 15 m (50 ft) or no decision height; and

b) a runway visual range less than 200 m but not less than 50 m.

Category IIIC (CAT IIIC) operation. A precision instrument approach and landing with no decision height and no runway visual range limitations.

Note.— Where decision height (DH) and runway visual range (RVR) fall into different categories of operation, the instrument approach and landing 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).

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.

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.

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

Cruising level. A level maintained during a significant portion of a flight.

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 Intructions.

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

Decision altitude (DA) or ***decision height (DH)***. A specified altitude or height in the precision approach or approach with vertical guidance 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".

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.

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

Flight Data Analysis. A process of analysing recorded flight data in order to improve the safety of flight operations.

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 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 inter-related 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 time — aeroplanes. The total time from the moment an aeroplane first moves for the purpose of taking off until the moment it finally comes to rest at the end of the flight.

Note.— Flight time as here defined is synonymous with the term "block to block" time or "chock to chock" time in general usage which is measured from the time an aeroplane first moves for the purpose of taking off until it finally stops at the end of the flight.

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.

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 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.

Large aeroplane. An aeroplane of a maximum certificated take-off mass of over 5 700 kg.

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.

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

* As defined in Annex 2.

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 non-precision approach or circling approach 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.

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.

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 approaches 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 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".

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 aeroplane performance, other operating limitations and relevant expected conditions on the route to be followed and at the aerodromes concerned.

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

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.

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.

Pressure-altitude. An atmospheric pressure expressed in terms of altitude which corresponds to that pressure in the Standard Atmosphere*.

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 navigation performance (RNP). A statement of the navigation performance necessary for operation within a defined airspace.

Note.— Navigation performance and requirements are defined for a particular RNP type and/or application.

Rest period. Any period of time on the ground during which a flight crew member is relieved of all duties by the operator.

* As defined in Annex 8.

RNP type. A containment value expressed as a distance in nautical miles from the intended position within which flights would be for at least 95 per cent of the total flying time.

Example.— RNP 4 represents a navigation accuracy of plus or minus 7.4 km (4 NM) on a 95 per cent containment basis.

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.

Small aeroplane. An aeroplane of a maximum certificated take-off mass of 5 700 kg or less.

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 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 flight trainer. 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.

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.

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* As defined in Annex 2.

CHAPTER 2. APPLICABILITY

The Standards and Recommended Practices contained in Annex 6, Part I, shall be applicable to the operation of aeroplanes by operators authorized to conduct international commercial air transport operations.

Note 1.— Standards and Recommended Practices applicable to international general aviation operations with aeroplanes are to be found in Annex 6, Part II.

Note 2.— Standards and Recommended Practices applicable to international commercial air transport operations or international general aviation operations with helicopters are to be found in Annex 6, Part III.

CHAPTER 3. 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 aeroplanes not all of which are registered in the same Contracting State, nothing in this Part 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.

3.1 Compliance with laws, regulations and procedures

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

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

3.1.3 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 aeroplanes registered in that State are not affected by this provision.

3.1.4 If an emergency situation which endangers the safety of the aeroplane 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.

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

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

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

3.2 Accident prevention and flight safety programme

3.2.1 An operator shall establish and maintain an accident prevention and flight safety programme.

Note.— Guidance on accident prevention is contained in the Accident Prevention Manual *(Doc 9422) and in the* Preparation of an Operations Manual *(Doc 9376).*

3.2.2 **Recommendation.—** *From 1 January 2002, an operator of an aeroplane of a certificated take-off mass in excess of 20 000 kg should establish and maintain a flight data analysis programme as part of its accident prevention and flight safety programme.*

3.2.3 From 1 January 2005, an operator of an aeroplane of a maximum certificated take-off mass in excess of 27 000 kg

shall establish and maintain a flight data analysis programme as part of its accident prevention and flight safety programme.

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.

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

Note.— Guidance on flight data analysis programmes is contained in the Accident Prevention Manual (*Doc 9422*).

3.3 Flight safety documents system

An operator shall establish a flight safety documents system, for the use and guidance of operational personnel.

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

3.4 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.

3.5 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 4. FLIGHT OPERATIONS

4.1 Operating facilities

4.1.1 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 aeroplane 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.

4.1.2 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.

4.1.3 Subject to their published conditions of use, aerodromes and their facilities shall be kept continuously available for flight operations during their published hours of operations, irrespective of weather conditions.

4.2 Operational certification and supervision

4.2.1 The air operator certificate

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

4.2.1.2 The air operator certificate or equivalent document shall authorize the operator to conduct commercial air trans-port operations in accordance with such conditions and limitations as may be specified.

4.2.1.3 The issue of an air operator certificate or equivalent document 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 F contains guidance on the issue of an air operator certificate.

4.2.1.4 The continued validity of an air operator certificate or equivalent document shall depend upon the operator maintaining the requirements of 4.2.1.3 under the supervision of the State of the Operator.

4.2.1.5 The air operator certificate or equivalent document shall contain at least the following:

a) operator's identification (name, location);

b) date of issue and period of validity;

c) description of the types of operations authorized;

d) the type(s) of aircraft authorized for use; and

e) authorized areas of operation or routes.

4.2.1.6 The State of the Operator shall establish a system for both the certification and the continued surveillance of the operator to ensure that the required standards of operations established in 4.2 are maintained.

4.2.2 Operations manual

4.2.2.1 An operator shall provide, for the use and guidance of operations personnel concerned, an operations manual in accordance with Appendix 2. The operations manual shall be amended or revised as is necessary to ensure that the information contained therein is kept up to date. All such amendments or revisions shall be issued to all personnel that are required to use this manual.

4.2.2.2 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.— Requirements for the organization and content of an operations manual are provided in Appendix 2.

Note 2.— Specific items in the operations manual require the approval of the State of the Operator in accordance with the Standards in 4.2.7, 6.1.2, 9.3.1, 12.4 and 13.4.1.

4.2.3 Operating instructions — general

4.2.3.1 An operator shall ensure that all operations personnel are properly instructed in their particular duties and

responsibilities and the relationship of such duties to the operation as a whole.

4.2.3.2 An aeroplane shall not be taxied on the movement area of an aerodrome unless the person at the controls:

a) has been duly authorized by the operator or a designated agent;

b) is fully competent to taxi the aeroplane;

c) is qualified to use the radio telephone; and

d) has received instruction from a competent person in respect of aerodrome layout, routes, signs, marking, lights, air traffic control (ATC) signals and instructions, phraseology and procedures, and is able to conform to the operational standards required for safe aeroplane movement at the aerodrome.

4.2.3.3 **Recommendation.—** *The operator should issue operating instructions and provide information on aeroplane climb performance with all engines operating to enable the pilot-in-command to determine the climb gradient that can be achieved during the departure phase for the existing take-off conditions and intended take-off technique. This information should be included in the operations manual.*

4.2.4 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.

4.2.5 Checklists

The checklists provided in accordance with 6.1.3 shall be used by flight crews prior to, during and after all phases of operations, and in emergency, to ensure compliance with the operating procedures contained in the aircraft operating manual and the aeroplane flight manual or other documents associated with the certificate of airworthiness and otherwise in the operations manual, are followed. The design and utilization of checklists shall observe Human Factors principles.

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

4.2.6 Minimum flight altitudes

4.2.6.1 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.

4.2.6.2 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.

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

4.2.6.4 **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 aeroplane 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.

4.2.7 Aerodrome operating minima

4.2.7.1 The State of the Operator shall require that the operator establish aerodrome operating minima for each aerodrome 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 aerodromes by the State in which the aerodrome is located, except when specifically approved by that State.

Note.— This Standard does not require the State in which the aerodrome is located to establish aerodrome operating minima.

4.2.7.2 The State of the Operator shall require that in establishing the aerodrome operating minima which will apply to any particular operation, full account shall be taken of:

a) the type, performance and handling characteristics of the aeroplane;

b) the composition of the flight crew, their competence and experience;

c) the dimensions and characteristics of the runways which may be selected for use;

d) the adequacy and performance of the available visual and non-visual ground aids;

e) the equipment available on the aeroplane for the purpose of navigation and/or control of the flight path during the approach to landing and the 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.

Note.— Guidance on the establishment of aerodrome operating minima is contained in the Manual of All-Weather Operations *(Doc 9365).*

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

4.2.7.4 **Recommendation.—** *For instrument approach and landing operations, aerodrome operating minima below 800 m visibility should not be authorized unless RVR information is provided.*

4.2.8 Threshold crossing height for precision approaches

An operator shall establish operational procedures designed to ensure that an aeroplane being used to conduct precision approaches crosses the threshold by a safe margin, with the aeroplane in the landing configuration and attitude.

4.2.9 Fuel and oil records

4.2.9.1 An operator shall maintain fuel and oil records to enable the State of the Operator to ascertain that, for each flight, the requirements of 4.3.6 have been complied with.

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

4.2.10 Crew

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

4.2.10.2 *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.

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

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

4.2.10.4 For each flight of an aeroplane above 15 000 m (49 000 ft), the operator shall maintain records so that the total cosmic radiation dose received by each crew member over a period of 12 consecutive months can be determined.

Note.— Guidance on the maintenance of cumulative radiation records is given in Circular 126 — Guidance Material on SST Aircraft Operations.

4.2.11 Passengers

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

a) seat belts;

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.

4.2.11.2 The operator shall inform the passengers of the location and general manner of use of the principal emergency equipment carried for collective use.

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

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

4.3 Flight preparation

4.3.1 A flight shall not be commenced until flight preparation forms have been completed certifying that the pilot-in-command is satisfied that:

a) the aeroplane is airworthy;

b) the instruments and equipment prescribed in Chapter 6, for the particular type of operation to be undertaken, are installed and are sufficient for the flight;

c) a maintenance release as prescribed in 8.7 has been issued in respect of the aeroplane;

d) the mass of the aeroplane and centre of gravity location are such that the flight can be conducted safely, taking into account the flight conditions expected;

e) any load carried is properly distributed and safely secured;

f) a check has been completed indicating that the operating limitations of Chapter 5 can be complied with for the flight to be undertaken; and

g) the Standards of 4.3.3 relating to operational flight planning have been complied with.

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

4.3.3 Operational flight planning

4.3.3.1 An operational flight plan shall be completed for every intended flight. The operational flight plan shall be approved and signed by the pilot-in-command and, where applicable, signed by the flight operations officer/flight dispatcher, and a copy shall be filed with the operator or a designated agent, or, if these procedures are not possible, it shall be left with the aerodrome authority or on record in a suitable place at the point of departure.

Note.— The duties of a flight operations officer/flight dispatcher are contained in 4.6.

4.3.3.2 The operations manual must describe the content and use of the operational flight plan.

4.3.4 Alternate aerodromes

4.3.4.1 *Take-off alternate aerodrome*

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

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

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

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

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

4.3.4.2 *En-route alternate aerodromes*

En-route alternate aerodromes, required by 4.7 for extended range operations by aeroplanes with two turbine power-units, shall be selected and specified in the operational and air traffic services (ATS) flight plans.

4.3.4.3 *Destination alternate aerodromes*

For a flight to be conducted in accordance with the instrument flight rules, at least one destination alternate aerodrome shall be selected and specified in the operational and ATS flight plans, 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 aerodrome of intended landing, and for a reasonable period before and after such time, the approach and landing may be made under visual meteorological conditions; or

b) the aerodrome of intended landing is isolated and there is no suitable destination alternate aerodrome.

4.3.5 Weather conditions

4.3.5.1 A flight to be conducted in accordance with the visual flight rules 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 under the visual flight rules will, at the appropriate time, be such as to render compliance with these rules possible.

4.3.5.2 A flight to be conducted in accordance with instrument flight rules shall not be commenced unless information is available which indicates that conditions at the aerodrome of intended landing or, where a destination alternate is required, at least one destination alternate aerodrome will, at the estimated time of arrival, be at or above the aerodrome operating minima.

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

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

4.3.5.4 A flight to be planned or expected to operate in suspected or known ground icing conditions shall not take off unless the aeroplane 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 aeroplane 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).*

4.3.6 Fuel and oil supply

Note.— Fuel and oil reserves for supersonic aeroplanes will require special consideration to account for the particular operating characteristics of this type of aeroplane. Guidance on fuel supplies for supersonic aeroplanes is given in Circular 126 — Guidance Material on SST Aircraft Operations.

4.3.6.1 *All aeroplanes.* A flight shall not be commenced unless, taking into account both the meteorological conditions and any delays that are expected in flight, the aeroplane 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.

4.3.6.2 *Propeller-driven aeroplanes.* The fuel and oil carried in order to comply with 4.3.6.1 shall, in the case of propeller-driven aeroplanes, be at least the amount sufficient to allow the aeroplane:

4.3.6.2.1 When a destination alternate aerodrome is required, either:

a) to fly to the aerodrome to which the flight is planned thence to the most critical (in terms of fuel consumption) alternate aerodrome specified in the operational and ATS flight plans and thereafter for a period of 45 minutes; or

b) to fly to the alternate aerodrome via any predetermined point and thereafter for 45 minutes, provided that this shall not be less than the amount required to fly to the aerodrome to which the flight is planned and thereafter for:

1) 45 minutes plus 15 per cent of the flight time planned to be spent at the cruising level(s), or

2) two hours,

whichever is less.

4.3.6.2.2 When a destination alternate aerodrome is not required:

a) in terms of 4.3.4.3 a), to fly to the aerodrome to which the flight is planned and thereafter for a period of 45 minutes; or

b) in terms of 4.3.4.3 b), to fly to the aerodrome to which the flight is planned and thereafter for:

1) 45 minutes plus 15 per cent of the flight time planned to be spent at the cruising level(s), or

2) two hours,

whichever is less.

4.3.6.3 *Aeroplanes equipped with turbo-jet engines.* The fuel and oil carried in order to comply with 4.3.6.1 shall, in the case of turbo-jet aeroplanes, be at least the amount sufficient to allow the aeroplane:

4.3.6.3.1 When a destination alternate aerodrome is required, either:

a) to fly to and execute an approach, and a missed approach, at the aerodrome to which the flight is planned, and thereafter:

1) to fly to the alternate aerodrome specified in the operational and ATS flight plans; and then

2) to fly for 30 minutes at holding speed at 450 m (1 500 ft) above the alternate aerodrome under standard temperature conditions, and approach and land; and

3) to have an additional amount of fuel sufficient 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; or

b) to fly to the alternate aerodrome via any predeter-mined point and thereafter for 30 minutes at 450 m (1 500 ft) above the alternate aerodrome, due provision having been made for an additional amount of fuel sufficient to provide for the increased consumption on the occurrence of any of the poten-tial contingencies specified by the operator to the satisfaction of the State of the Operator; provided that fuel shall not be less than the amount of fuel required to fly to the aerodrome to which the flight is planned and thereafter for two hours at normal cruise consumption.

4.3.6.3.2 When a destination alternate aerodrome is not required:

a) in terms of 4.3.4.3 a), to fly to the aerodrome to which the flight is planned and additionally:

1) to fly 30 minutes at holding speed at 450 m (150 0ft) above the aerodrome to which the flight is planned under standard temperature conditions; and

2) to have an additional amount of fuel, sufficient 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; and

b) in terms of 4.3.4.3 b), to fly to the aerodrome to which the flight is planned and thereafter for a period of two hours at normal cruise consumption.

4.3.6.4 In computing the fuel and oil required in 4.3.6.1 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 aerodrome, including a missed approach;

d) the procedures prescribed in the operations manual for loss of pressurization, where applicable, or failure of one power unit while en route; and

e) any other conditions that may delay the landing of the aeroplane or increase fuel and/or oil consumption.

Note.— Nothing in 4.3.6 precludes amendment of a flight plan in flight in order to replan the flight to another aerodrome, provided that the requirements of 4.3.6 can be complied with from the point where the flight has been replanned.

4.3.7 Refuelling with passengers on board

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

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

Note 1.— The provisions of 4.3.7.1 do not necessarily require the deployment of integral aeroplane stairs or the opening of emergency exits as a prerequisite to refuelling.

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

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

4.3.8 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*

4.3.8.1 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.

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

4.4 In-flight procedures

4.4.1 Aerodrome operating minima

4.4.1.1 A flight shall not be continued towards the aerodrome of intended landing, unless the latest available information indicates that at the expected time of arrival, a landing can be effected at that aerodrome or at least one destination alternate aerodrome, in compliance with the operating minima established in accordance with 4.2.7.1.

4.4.1.2 An instrument approach shall not be continued beyond the outer marker fix in case of precision approach, or below 300 m (1 000 ft) above the aerodrome in case of non-precision approach, unless the reported visibility or controlling RVR is above the specified minimum.

4.4.1.3 If, after passing the outer marker fix in case of precision approach, or after descending below 300 m (1 000 ft) above the aerodrome in case of non-precision approach, 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, an aeroplane shall not continue its approach-to-land at any aerodrome beyond a point at which the limits of the operating minima specified for that aerodrome would be infringed.

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

4.4.2 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).*

4.4.3 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.

4.4.4 Flight crew members at duty stations

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

4.4.4.2 *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 aeroplane or for physiological needs.

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

4.4.4.4 *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 harnesses 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.

4.4.5 Use of oxygen

4.4.5.1 All flight crew members, when engaged in performing duties essential to the safe operation of an aeroplane in flight, shall use breathing oxygen continuously whenever the circumstances prevail for which its supply has been required in 4.3.8.1 or 4.3.8.2.

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

4.4.6 Safeguarding of cabin crew and passengers in pressurized aeroplanes 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.

4.4.7 In-flight operational instructions

Operational instructions involving a change in the ATS flight plan shall, when practicable, be coordinated with the appropriate ATS unit before transmission to the aeroplane.

Note.— When the above coordination has not been possible, operational instructions do not relieve a pilot of the responsibility for obtaining an appropriate clearance from an ATS unit, if applicable, before making a change in flight plan.

4.4.8 Instrument flight procedures

4.4.8.1 One or more instrument approach procedures designed in accordance with the classification of instrument approach and landing operations shall be approved and promulgated by the State in which the aerodrome is located to serve each instrument runway or aerodrome utilized for instrument flight operations.

4.4.8.2 All aeroplanes operated in accordance with instrument flight rules shall comply with the instrument flight procedures approved by the State in which the aerodrome is located.

Note 1.— Definitions for the classification of instrument approach and landing operations are in Chapter 1.

Note 2.— Operational procedures recommended for the guidance of operations personnel involved in instrument flight operations are described in PANS-OPS (Doc 8168), Volume I.

Note 3.— Criteria for the construction of instrument flight procedures for the guidance of procedure specialists are provided in PANS-OPS (Doc 8168), Volume II.

4.4.9 Aeroplane operating procedures for noise abatement

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

4.4.9.2 **Recommendation.—** *Noise abatement procedures specified by an operator for any one aeroplane type should be the same for all aerodromes.*

4.5 Duties of pilot-in-command

4.5.1 The pilot-in-command shall be responsible for the safety of all crew members, passengers and cargo on board when the doors are closed. The pilot-in-command shall also be responsible for the operation and safety of the aeroplane from the moment the aeroplane is ready to move for the purpose of taking off until the moment it finally comes to rest at the end of the flight and the engine(s) used as primary propulsion units are shut down.

4.5.2 The pilot-in-command shall ensure that the checklists specified in 4.2.5 are complied with in detail.

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

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

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

4.5.5 The pilot-in-command shall be responsible for the journey log book or the general declaration containing the information listed in 11.4.1.

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".

4.6 Duties of flight operations officer/ flight dispatcher

4.6.1 A flight operations officer/flight dispatcher when employed in conjunction with a method of flight supervision in accordance with 4.2.1 shall:

a) assist the pilot-in-command in flight preparation and provide the relevant information required;

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;

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; and

d) in the event of an emergency, initiate such procedures as may be outlined in the operations manual.

4.6.2 A flight operations officer/flight dispatcher shall avoid taking any action that would conflict with the procedures established by:

a) air traffic control;

b) the meteorological service; or

c) the communications service.

4.7 Additional requirements for extended range operations by aeroplanes with two turbine power-units (ETOPS)

4.7.1 Unless the operation has been specifically approved by the State of the Operator, an aeroplane with two turbine power-units shall not, except as provided in 4.7.4, be operated on a route where the flight time at single engine cruise speed to an adequate en-route alternate aerodrome exceeds a threshold time established for such operations by that State.

Note 1.— Guidance on the value of the threshold time is contained in Attachment E.

Note 2.— In the context of the approval of operations at which the requirements of 5.2.11 can be met, guidance material on adequate and suitable alternate aerodromes is contained in Attachment E.

4.7.2 In approving the operation, the State of the Operator shall ensure that:

a) the airworthiness certification of the aeroplane type;

b) the reliability of the propulsion system; and

c) the operator's maintenance procedures, operating practices, flight dispatch procedures and crew training programmes;

provide the overall level of safety intended by the provisions of Annexes 6 and 8. In making this assessment, account shall be taken of the route to be flown, the anticipated operating conditions and the location of adequate en-route alternate aerodromes.

Note 1.— Guidance on compliance with the requirements of this provision is contained in Attachment E.

Note 2.— The Airworthiness Manual *(Doc 9760) contains guidance on the level of performance and reliability of aeroplane systems intended by 4.7.2, as well as guidance on continuing airworthiness aspects of the requirements of 4.7.2.*

4.7.3 A flight to be conducted in accordance with 4.7.1 shall not be commenced unless, during the possible period of arrival, the required en-route alternate aerodrome(s) will be available and the available information indicates that conditions at those aerodromes will be at or above the aerodrome operating minima approved for the operation.

4.7.4 **Recommendation.—** *The State of the Operator of an aeroplane type with two turbine power-units which, prior to 25 March 1986 was authorized and operating on a route where the flight time at single-engine cruise speed to an adequate en-route alternate aerodrome exceeded the threshold time established for such operations in accordance with 4.7.1 should give consideration to permitting such an operation to continue on that route after that date.*

4.8 Carry-on baggage

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

CHAPTER 5. AEROPLANE PERFORMANCE OPERATING LIMITATIONS

5.1 General

5.1.1 Aeroplanes shall be operated in accordance with a comprehensive and detailed code of performance established by the State of Registry in compliance with the applicable Standards of this chapter.

5.1.2 Single-engined aeroplanes shall only be operated in conditions of weather and light, and over such routes and diversions therefrom, that permit a safe forced landing to be executed in the event of engine failure.

5.1.3 **Recommendation.—** *For aeroplanes for which Parts IIIA and IIIB of Annex 8 is not applicable because of the exemption provided for in Article 41 of the Convention, the State of Registry should ensure that the level of performance specified in 5.2 should be met as far as practicable.*

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

5.2.1 The Standards contained in 5.2.2 to 5.2.11 inclusive are applicable to the aeroplanes to which Parts IIIA and IIIB 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 5.1.1, they are to be supplemented by national requirements prepared by Contracting States.

5.2.2 The level of performance defined by the appropriate parts of the comprehensive and detailed national code referred to in 5.1.1 for the aeroplanes designated in 5.2.1 shall be at least substantially equivalent to the overall level embodied in the Standards of this chapter.

Note.— Attachment C contains guidance material which indicates by examples the level of performance intended by the Standards and Recommended Practices of this chapter.

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

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

5.2.5 A flight shall not be commenced unless the performance information provided in the flight manual indicates that the Standards of 5.2.6 to 5.2.11 can be complied with for the flight to be undertaken.

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

5.2.7 Mass limitations

a) The mass of the aeroplane at the start of take-off shall not exceed the mass at which 5.2.8 is complied with, nor the mass at which 5.2.9, 5.2.10 and 5.2.11 are complied with, allowing for expected reductions in mass as the flight proceeds, and for such fuel jettisoning as is envisaged in applying 5.2.9 and 5.2.10 and, in respect of alternate aerodromes, 5.2.7 c) and 5.2.11.

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

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

d) In no case shall the mass at the start of take-off, or at the expected time of landing at the aerodrome of intended landing and at any destination alternate aerodrome, exceed the relevant maximum masses at which compliance has been demonstrated with the applicable noise certification Standards in Annex 16, Volume I, unless otherwise authorized in exceptional circumstances for a

certain aerodrome or a runway where there is no noise disturbance problem, by the competent authority of the State in which the aerodrome is situated.

5.2.8 *Take-off.* The aeroplane shall be able, in the event of a critical power-unit failing at any point in the take-off, either to discontinue the take-off and stop within the accelerate-stop distance available, or to continue the take-off and clear all obstacles along the flight path by an adequate margin until the aeroplane is in a position to comply with 5.2.9.

Note.— "An adequate margin" referred to in this provision is illustrated by the appropriate examples included in Attachment C.

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

5.2.9 *En route — one power-unit inoperative.* The aeroplane shall be able, in the event of the critical power-unit becoming inoperative at any point along the route or planned diversions therefrom, to continue the flight to an aerodrome at which the Standard of 5.2.11 can be met, without flying below the minimum flight altitude at any point.

5.2.10 *En route — two power-units inoperative.* In the case of aeroplanes having three or more power-units, on any part of a route where the location of en-route alternate aerodromes and the total duration of the flight are such that the probability of a second power-unit becoming inoperative must be allowed for if the general level of safety implied by the Standards of this chapter is to be maintained, the aeroplane shall be able, in the event of any two power-units becoming inoperative, to continue the flight to an en-route alternate aerodrome and land.

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

5.3 Obstacle data

5.3.1 Obstacle data shall be provided to enable the operator to develop procedures to comply with 5.2.8.

Note.— See Annex 4 and Annex 15 for methods of presentation of certain obstacle data.

5.3.2 The operator shall take account of charting accuracy when assessing compliance with 5.2.8.

CHAPTER 6. AEROPLANE INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS

Note.— Specifications for the provision of aeroplane communication and navigation equipment are contained in Chapter 7.

6.1 General

6.1.1 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 aeroplanes according to the aeroplane 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.

6.1.2 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 aeroplane's compliance with the airworthiness requirements applicable in the State of Registry.

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

6.1.3 The operator shall provide operations staff and flight crew with an aircraft operating manual, for each aircraft type operated, containing the normal, abnormal and emergency procedures relating to the operation of the aircraft. The manual shall include details of the aircraft systems and of the checklists to be used. The design of the manual shall observe Human Factors principles.

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

6.2 All aeroplanes on all flights

6.2.1 An aeroplane shall be equipped with instruments which will enable the flight crew to control the flight path of the aeroplane, carry out any required procedural manoeuvres and observe the operating limitations of the aeroplane in the expected operating conditions.

6.2.2 An aeroplane shall be equipped with:

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

Recommendation.— *Medical supplies should comprise:*

1) one or more first-aid kits; and

2) a medical kit, for the use of medical doctors or other qualified persons in treating in-flight medical emergencies for aeroplanes authorized to carry more than 250 passengers.

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

b) portable fire extinguishers of a type which, when discharged, will not cause dangerous contamination of the air within the aeroplane. 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.— Any portable fire extinguisher so fitted in accordance with the certificate of airworthiness of the aeroplane may count as one prescribed.

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

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

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

1) when seat belts are to be fastened;

2) when and how oxygen equipment is to be used if the carriage of oxygen is required;

3) restrictions on smoking;

4) location and use of life jackets or equivalent individual flotation devices where their carriage is required; and

5) location and method of opening emergency exits; and

e) spare electrical fuses of appropriate ratings for replacement of those accessible in flight.

6.2.3 An aeroplane shall carry:

a) the operations manual prescribed in 4.2.2, or those parts of it that pertain to flight operations;

b) the flight manual for the aeroplane, or other documents containing performance data required for the application of Chapter 5 and any other information necessary for the operation of the aeroplane within the terms of its certificate of airworthiness, unless these data are available in the operations manual; and

c) 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.

6.2.4 Marking of break-in points

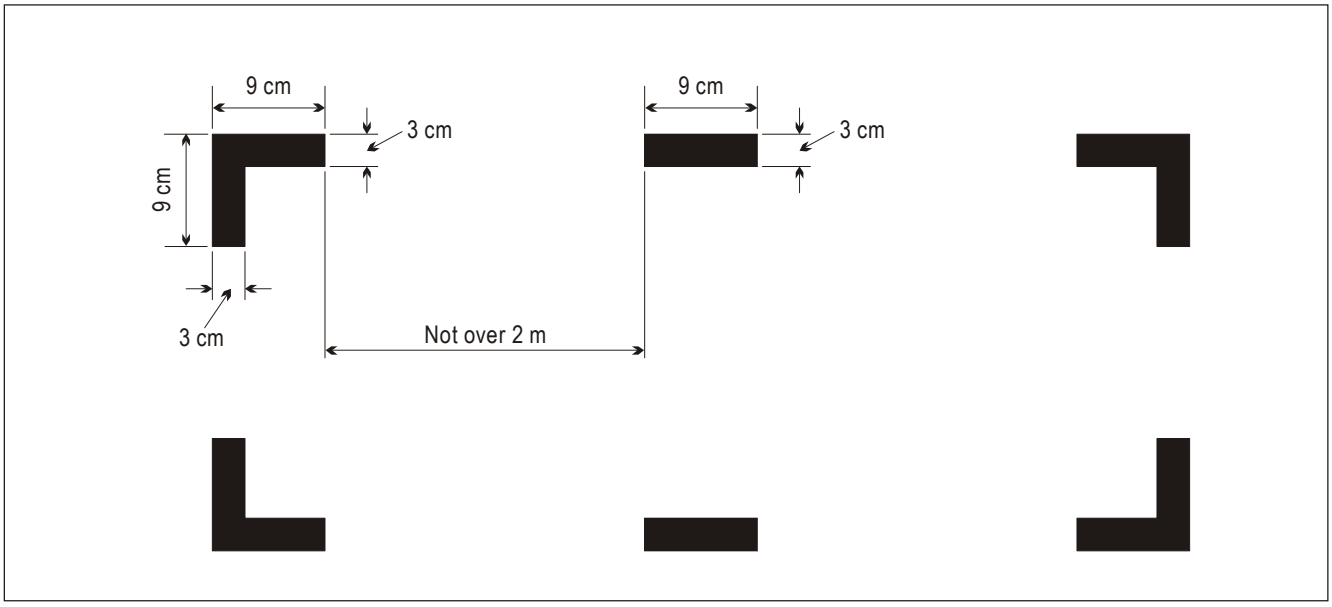
6.2.4.1 If areas of the fuselage suitable for break-in by rescue crews in emergency are marked on an aeroplane such areas shall be marked as shown below (see figure following). The colour of the markings shall be red or yellow, and if necessary they shall be outlined in white to contrast with the background.

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

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

6.3 Flight recorders

Note 1.— Flight recorders comprise two systems, a flight data recorder (FDR) and a cockpit voice recorder (CVR).



MARKING OF BREAK-IN POINTS (see 6.2.4)

Note 2.— Combination recorders (FDR/CVR) can only be used to meet the flight recorder equipage requirements as specifically indicated in this Annex.

Note 3.— Detailed guidance on flight recorders is contained in Attachment D.

6.3.1 Flight data recorders — types

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

6.3.1.2 Types II and IIA FDRs shall record the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power and configuration of lift and drag devices.

6.3.1.3 The use of engraving metal foil FDRs shall be discontinued by 1 January 1995.

6.3.1.4 **Recommendation.—** *The use of analogue FDRs using frequency modulation (FM) should be discontinued by 5 November 1998.*

6.3.1.4.1 The use of photographic film FDRs shall be discontinued from 1 January 2003.

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

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

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

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

6.3.1.6 **Recommendation.—** *All aeroplanes of a maximum certificated take-off mass over 5 700 kg, required to be equipped with a FDR and a CVR, may alternatively be equipped with two combination recorders (FDR/CVR).*

6.3.1.7 **Recommendation.—** *All multi-engined turbine-powered aeroplanes of a maximum certificated take-off mass of 5 700 kg or less, required to be equipped with a FDR and/or a CVR, may alternatively be equipped with one combination recorder (FDR/CVR).*

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

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

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

6.3.1.8.2 The following parameters satisfy the requirements for attitude:

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

6.3.1.8.3 The following parameters satisfy the requirements for engine power:

- Engine thrust/power: propulsive thrust/power on each engine, cockpit thrust/power lever position
- Thrust reverse status*
- Engine thrust command*
- Engine thrust target*
- Engine bleed valve position*
- Additional engine parameters*: EPR, N_1, indicated vibration level, N_2, EGT, TLA, fuel flow, fuel cut-off lever position, N_3

6.3.1.8.4 The following parameters satisfy the requirements for configuration:

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

6.3.1.8.5 The following parameters satisfy the requirements for operation:

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

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

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

6.3.2 Flight data recorders — duration

All FDRs shall be capable of retaining the information recorded during at least the last 25 hours of their operation, except for the Type IIA FDR which shall be capable of retaining the information recorded during at least the last 30 minutes of its operation.

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

6.3.3.1 All aeroplanes of a maximum certificated take-off mass of over 27 000 kg shall be equipped with a Type I FDR.

6.3.3.2 All aeroplanes of a maximum certificated take-off mass of over 5 700 kg, up to and including 27 000 kg, shall be equipped with a Type II FDR.

6.3.3.3 **Recommendation.—** *All multi-engined turbine-powered aeroplanes of a maximum certificated take-off mass*

of 5 700 kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 1990 should be equipped with a Type IIA FDR.

6.3.4 Flight data recorders — aeroplanes for which the individual certificate of airworthiness was first issued on or after 1 January 1987 but before 1 January 1989

6.3.4.1 All turbine-engined aeroplanes of a maximum certificated take-off mass of over 5 700 kg, except those in 6.3.4.3, shall be equipped with a FDR which shall record time, altitude, airspeed, normal acceleration and heading.

6.3.4.2 **Recommendation.—** *All turbine-engined aeroplanes of a maximum certificated take-off mass of over 5 700 kg, except those in 6.3.4.3, should be equipped with a FDR which shall record time, altitude, airspeed, normal acceleration, heading and such additional parameters as are necessary to determine pitch attitude, roll attitude, radio transmission keying and power on each engine.*

6.3.4.3 All turbine-engined aeroplanes of a maximum certificated take-off mass of over 27 000 kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 shall be equipped with a Type II FDR.

6.3.5 Flight data recorders — aeroplanes for which the individual certificate of airworthiness was first issued before 1 January 1987

6.3.5.1 All turbine-engined aeroplanes of a maximum certificated take-off mass of over 5 700 kg shall be equipped with a FDR which shall record time, altitude, airspeed, normal acceleration and heading.

6.3.5.2 **Recommendation.—** *All turbine-engined aeroplanes of a maximum certificated take-off mass of over 27 000 kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 should be equipped with a FDR which should record, in addition to time, altitude, airspeed, normal acceleration and heading, such additional parameters as are necessary to meet the objectives of determining:*

a) the attitude of the aeroplane in achieving its flight path; and

b) the basic forces acting upon the aeroplane resulting in the achieved flight path and the origin of such basic forces.

6.3.6 Flight data recorders — aeroplanes for which the individual certificate of airworthiness is first issued after 1 January 2005

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

6.3.7 Cockpit voice recorders — aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 1987

6.3.7.1 All aeroplanes of a maximum certificated take-off mass of over 5 700 kg shall be equipped with a CVR, the objective of which is the recording of the aural environment on the flight deck during flight time.

6.3.7.2 **Recommendation.—** *All multi-engined turbine-powered aeroplanes of a maximum certificated take-off mass of 5 700 kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 1990 should be equipped with a CVR, the objective of which is the recording of the aural environment on the flight deck during flight time.*

6.3.8 Cockpit voice recorders — aeroplanes for which the individual certificate of airworthiness was first issued before 1 January 1987

Note.— CVR performance requirements are as contained in the Minimum Operational Performance Specifications (MOPS) document for Flight Recorder Systems of the European Organization for Civil Aviation Equipment (EUROCAE) or equivalent documents.

6.3.8.1 All turbine-engined aeroplanes of a maximum certificated take-off mass of over 27 000 kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 shall be equipped with a CVR, the objective of which is the recording of the aural environment on the flight deck during flight time.

6.3.8.2 **Recommendation.—** *All turbine-engined aeroplanes of a maximum certificated take-off mass of over 5 700 kg up to and including 27000 kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 should be equipped with a CVR, the objective of which is the recording of the aural environment on the flight deck during flight time.*

6.3.9 Cockpit voice recorders — duration

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

6.3.9.2 **Recommendation.—** *A CVR, installed in aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1990, should be capable of retaining the information recorded during at least the last two hours of its operation.*

6.3.9.3 A CVR, installed in aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the

individual certificate of airworthiness is first issued after 1 January 2003, shall be capable of retaining the information recorded during at least the last two hours of its operation.

6.3.10 Flight recorders — 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.

Note.— Industry crashworthiness and fire protection specifications can be found in documents such as the European Organization for Civil Aviation Equipment (EUROCAE) documents ED55 and ED56A.

6.3.11 Flight recorders — operation

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

6.3.11.2 To preserve flight recorder records, flight recorders shall be de-activated upon completion of flight time following an accident or incident. The flight recorders shall not be re-activated before their disposition as determined in accordance with Annex 13.

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 11.6.

6.3.12 Flight recorders — continued serviceability

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

Note.— Procedures for the inspections of the FDR and CVR systems are given in Attachment D.

6.4 All aeroplanes operated as VFR flights

6.4.1 All aeroplanes when operated as VFR flights 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.

6.4.2 VFR flights which are operated as controlled flights shall be equipped in accordance with 6.9.

6.5 All aeroplanes on flights over water

6.5.1 Seaplanes

All seaplanes for all flights 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;

b) equipment for making the sound signals prescribed in the International Regulations for Preventing Collisions at Sea, where applicable; and

c) one sea anchor (drogue).

Note.— "Seaplanes" includes amphibians operated as seaplanes.

6.5.2 Landplanes

6.5.2.1 Landplanes shall carry the equipment prescribed in 6.5.2.2:

a) when flying over water and at a distance of more than 93 km (50 NM) away from the shore, in the case of landplanes operated in accordance with 5.2.9 or 5.2.10;

b) when flying en route over water beyond gliding distance from the shore, in the case of all other landplanes; and

c) when taking off or landing at an aerodrome 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 a likelihood of a ditching.

6.5.2.2 The equipment referred to in 6.5.2.1 shall comprise 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.— ''Landplanes'' includes amphibians operated as landplanes.

6.5.3 All aeroplanes on long-range over-water flights

6.5.3.1 In addition to the equipment prescribed in 6.5.1 or 6.5.2 whichever is applicable, the following equipment shall be installed in all aeroplanes when used over routes on which the aeroplane may be over water and at more than a distance corresponding to 120 minutes at cruising speed or 740 km (400 NM), whichever is the lesser, away from land suitable for making an emergency landing in the case of aircraft operated in accordance with 5.2.9 or 5.2.10, and 30 minutes or 185 km (100 NM), whichever is the lesser, for all other aeroplanes:

a) life-saving rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in emergency, provided with such life-saving equipment including means of sustaining life as is appropriate to the flight to be undertaken; and

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

6.5.3.2 Each life jacket and equivalent individual flotation device, when carried in accordance with 6.5.1 a), 6.5.2.1 and 6.5.2.2, shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons, except where the requirement of 6.5.2.1 c) is met by the provision of individual flotation devices other than life jackets.

6.6 All aeroplanes on flights over designated land areas

Aeroplanes, 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.

6.7 All aeroplanes 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*

6.7.1 An aeroplane intended to be operated at flight altitudes at which the atmospheric pressure is less than 700 hPa in personnel compartments shall be equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in 4.3.8.1.

6.7.2 An aeroplane intended to be operated at flight altitudes at which the atmospheric pressure is less than 700 hPa but which is provided with means of maintaining pressures greater than 700 hPa in personnel compartments shall be provided with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in 4.3.8.2.

6.7.3 Pressurized aeroplanes newly introduced into service on or after 1 July 1962 and intended to be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa shall be equipped with a device to provide positive warning to the pilot of any dangerous loss of pressurization.

6.7.4 **Recommendation.—** *Pressurized aeroplanes introduced into service before 1 July 1962 and intended to be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa should be equipped with a device to provide positive warning to the pilot of any dangerous loss of pressurization.*

6.7.5 An aeroplane intended to be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa, or which, if operated at flight altitudes at which the atmospheric pressure is more than 376 hPa, 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 is first issued on or after 9 November 1998, shall be provided with automatically deployable oxygen equipment to satisfy the requirements of 4.3.8.2. The total number of oxygen dispensing units shall exceed the number of passenger and cabin crew seats by at least 10 per cent.

6.7.6 **Recommendation.—** *An aeroplane intended to be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa, or which, if operated at flight altitudes at which the atmospheric pressure is more than 376 hPa 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 first issued before 9 November 1998, should be provided with automatically deployable oxygen equipment to satisfy the requirements of 4.3.8.2. The total number of oxygen dispensing units should exceed the number of passenger and cabin crew seats by at least 10 per cent.*

6.8 All aeroplanes in icing conditions

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

6.9 All aeroplanes operated in accordance with instrument flight rules

6.9.1 All aeroplanes when operated in accordance with the instrument flight rules, or when the aeroplane cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be equipped with:

a) a magnetic compass;

b) an accurate timepiece indicating the time in hours, minutes and seconds;

c) two sensitive pressure altimeters with counter drum-pointer or equivalent presentation;

Note.— Neither three-pointer nor drum-pointer altimeters satisfy the requirement in 6.9.1 c).

d) an airspeed indicating system with means of preventing malfunctioning due to either condensation or icing;

e) a turn and slip indicator;

f) an attitude indicator (artificial horizon);

g) a heading indicator (directional gyroscope);

Note.— The requirements of 6.9.1 e), f) and g) may be met by combinations of instruments or by integrated flight director systems provided that the safeguards against total failure, inherent in the three separate instruments, are retained.

h) a means of indicating whether the power supply to the gyroscopic 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; and

k) such additional instruments or equipment as may be prescribed by the appropriate authority.

6.9.2 All aeroplanes over 5 700 kg — Emergency power supply for electrically operated attitude indicating instruments

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

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

6.10 All aeroplanes when operated at night

All aeroplanes, when operated at night shall be equipped with:

a) all equipment specified in 6.9;

b) the lights required by Annex 2 for aircraft in flight or operating on the movement area of an aerodrome;

Note.— Specifications for lights meeting the requirements of Annex 2 for navigation lights are contained in Appendix 1. The general characteristics of lights are specified in Annex 8. Detailed specifications for lights meeting the requirements of Annex 2 for aircraft in flight or operating on the movement area of an aerodrome are contained in the Airworthiness Manual *(Doc 9760).*

c) two landing lights;

Note.— Aeroplanes not certificated in accordance with Annex 8 which are equipped with a single landing light having two separately energized filaments will be considered to have complied with 6.10 c).

d) illumination for all instruments and equipment that are essential for the safe operation of the aeroplane that are used by the flight crew;

e) lights in all passenger compartments; and

f) an electric torch for each crew member station

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6.11 Pressurized aeroplanes when carrying passengers — weather radar

Recommendation.— *Pressurized aeroplanes when carrying passengers should be equipped with operative weather radar whenever such aeroplanes are being operated in areas where thunderstorms or other potentially hazardous weather conditions, regarded as detectable with airborne*

weather radar, may be expected to exist along the route either at night or under instrument meteorological conditions.

6.12 All aeroplanes operated above 15 000 m (49 000 ft) — radiation indicator

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

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

6.13 All aeroplanes complying with the noise certification Standards in Annex 16, Volume I

An aeroplane 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.— The attestation may be contained in any document, carried on board, approved by the State of Registry.

6.14 Mach number indicator

All aeroplanes with speed limitations expressed in terms of Mach number, shall be equipped with a Mach number indicator.

Note.— This does not preclude the use of the airspeed indicator to derive Mach number for ATS purposes.

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

6.15.1 All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers shall be equipped with a ground proximity warning system.

6.15.2 All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15 000 kg or authorized to carry more than 30 passengers, for which the individual certificate of airworthiness is first issued on or after 1 January 2001, shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

6.15.3 From 1 January 2003, all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15 000 kg or authorized to carry more than 30 passengers shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

6.15.4 All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers, for which the individual certificate of airworthiness is first issued on or after 1 January 2004, shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

6.15.5 From 1 January 2007, all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers, shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

6.15.6 **Recommendation.—** *All turbine-engined aeroplanes of a maximum certificated take-off mass of 5 700 kg or less and authorized to carry more than five but not more than nine passengers should be equipped with a ground proximity warning system which provides the warnings of 6.15.9 a) and c), warning of unsafe terrain clearance and a forward looking terrain avoidance function.*

6.15.7 From 1 January 2007 all piston-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers shall be equipped with a ground proximity warning system which provides the warnings in 6.15.9 a) and c), warning of unsafe terrain clearance and a forward looking terrain avoidance function.

6.15.8 A ground proximity warning system shall provide automatically a timely and distinctive warning to the flight crew when the aeroplane is in potentially hazardous proximity to the earth's surface.

6.15.9 A ground proximity warning system shall provide, unless otherwise specified herein, warnings of the following circumstances:

a) excessive descent rate;

b) excessive terrain closure rate;

c) excessive altitude loss after take-off or go-around;

d) unsafe terrain clearance while not in landing configuration;

1) gear not locked down;

2) flaps not in a landing position; and

e) excessive descent below the instrument glide path.

6.16 Aeroplanes carrying passengers — cabin crew seats

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

All aeroplanes shall be equipped with a forward or rearward facing (within 15 degrees of the longitudinal axis of the aeroplane) seat, fitted with a safety harness for the use of each cabin crew member required to satisfy the intent of 12.1 in respect of emergency evacuation.

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

Recommendation.— *All aeroplanes should be equipped with a forward or rearward facing (within 15 degrees of the longitudinal axis of the aeroplane) seat, fitted with a safety harness for the use of each cabin crew member required to satisfy the intent of 12.1 in respect of emergency evacuation.*

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

6.16.3 Cabin crew seats provided in accordance with 6.16.1 and 6.16.2 shall be located near floor level and other emergency exits as required by the State of Registry for emergency evacuation.

6.17 Emergency locator transmitter (ELT)

6.17.1 Except as provided for in 6.17.2, until 1 January 2005 all aeroplanes operated on long-range over-water flights as described in 6.5.3 shall be equipped with at least two ELT(S).

6.17.2 All aeroplanes for which the individual certificate of airworthiness is first issued after 1 January 2002, operated on long-range over-water flights as described in 6.5.3, shall be equipped with at least two ELTs, one of which shall be automatic.

6.17.3 From 1 January 2005, all aeroplanes operated on long-range over-water flights as described in 6.5.3 shall be equipped with at least two ELTs, one of which shall be automatic.

6.17.4 Except as provided for in 6.17.5, until 1 January 2005 aeroplanes on flights over designated land areas as described in 6.6 shall be equipped with at least one ELT(S).

6.17.5 All aeroplanes for which the individual certificate of airworthiness is first issued after 1 January 2002, on flights over designated land areas as described in 6.6, shall be equipped with at least one automatic ELT.

6.17.6 From 1 January 2005, aeroplanes on flights over designated land areas as described in 6.6 shall be equipped with at least one automatic ELT.

6.17.7 **Recommendation.—** *All aeroplanes should carry an automatic ELT.*

6.17.8 ELT equipment carried to satisfy the requirements of 6.17.1, 6.17.2, 6.17.3, 6.17.4, 6.17.5, 6.17.6 and 6.17.7 shall operate in accordance with the relevant provisions of Annex 10, Volume III.

6.18 Aeroplanes required to be equipped with an airborne collision avoidance system (ACAS II)

6.18.1 From 1 January 2003, all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15 000 kg or authorized to carry more than 30 passengers shall be equipped with an airborne collision avoidance system (ACAS II).

6.18.2 From 1 January 2005, all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than 19 passengers shall be equipped with an airborne collision avoidance system (ACAS II).

6.18.3 **Recommendation.—** *All aeroplanes should be equipped with an airborne collision avoidance system (ACAS II).*

6.18.4 An airborne collision avoidance system shall operate in accordance with the relevant provisions of Annex 10, Volume IV.

6.19 Aeroplanes required to be equipped with a pressure-altitude reporting transponder

All aeroplanes shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of Annex 10, Volume IV.

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

6.20 Microphones

All flight crew members required to be on flight deck duty shall communicate through boom or throat microphones below the transition level/altitude.

6.21 Turbo-jet aeroplanes — forward-looking wind shear warning system

6.21.1 **Recommendation.—** *All turbo-jet aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers should be equipped with a forward-looking wind shear warning system.*

6.21.2 **Recommendation.—** *A forward-looking wind shear warning system should be capable of providing the pilot with a timely aural and visual warning of wind shear ahead of the aircraft, and the information required to permit the pilot to safely commence and continue a missed approach or go-around or to execute an escape manoeuvre if necessary. The system should also provide an indication to the pilot when the limits specified for the certification of automatic landing equipment are being approached, when such equipment is in use.*

CHAPTER 7. AEROPLANE COMMUNICATION AND NAVIGATION EQUIPMENT

7.1 Communication equipment

7.1.1 An aeroplane shall be provided with radio communication equipment capable of:

a) conducting two-way communication for aerodrome control purposes;

b) receiving meteorological information at any time during flight; and

c) conducting two-way communication at any time during flight with at least one aeronautical station and with such other aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.

Note.— The requirements of 7.1.1 are considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.

7.1.2 The radio communication equipment required in accordance with 7.1.1 shall provide for communications on the aeronautical emergency frequency 121.5 MHz.

7.2 Navigation equipment

7.2.1 An aeroplane 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 the visual flight rules is accomplished by visual reference to landmarks.

7.2.2 For flights in defined portions of airspace or on routes where an RNP type has been prescribed, an aeroplane shall, in addition to the requirements specified in 7.2.1:

a) be provided with navigation equipment which will enable it to operate in accordance with the prescribed RNP type(s); and

b) be authorized by the State of the Operator for operations in such airspace.

Note.— Information on RNP and associated procedures, and guidance concerning the approval process, are contained in the Manual on Required Navigation Performance (RNP) *(Doc 9613). This document also contains a comprehensive list of references to other documents produced by States and international bodies concerning navigation systems and RNP.*

7.2.3 For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, minimum navigation performance specifications (MNPS) are prescribed, an aeroplane shall be provided with navigation equipment which:

a) continuously provides indications to the flight crew of adherence to or departure from track to the required degree of accuracy at any point along that track; and

b) has been authorized by the State of the Operator for MNPS operations concerned.

Note.— The prescribed minimum navigation performance specifications and the procedures governing their application are published in the Regional Supplementary Procedures *(Doc 7030).*

7.2.4 For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, a vertical separation minimum (VSM) of 300 m (1 000 ft) is applied above FL 290, an aeroplane:

a) shall be provided with equipment which is capable of:

1) indicating to the flight crew the flight level being flown;

2) automatically maintaining a selected flight level;

3) providing an alert to the flight crew when a deviation occurs from the selected flight level. The threshold for the alert shall not exceed ± 90 m (300 ft); and

4) automatically reporting pressure-altitude; and

b) shall be authorized by the State of the Operator for operation in the airspace concerned.

7.2.5 The aeroplane 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 aeroplane to navigate in accordance with 7.2.1 and where applicable 7.2.2, 7.2.3 and 7.2.4.

Note.— Guidance material relating to aircraft equipment necessary for flight in airspace where a 300 m (1 000 ft) VSM is applied above FL 290 is contained in the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (Doc 9574).

7.2.6 On flights in which it is intended to land in instrument meteorological conditions, an aeroplane shall be provided with radio equipment capable of receiving signals providing guidance to a point from which a visual landing can be effected. This equipment shall be capable of providing such guidance at each aerodrome at which it is intended to land in instrument meteorological conditions and at any designated alternate aerodromes.

7.3 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 8. AEROPLANE MAINTENANCE

Note 1.— For the purpose of this chapter, "aeroplane" includes: powerplants, propellers, 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).*

8.1 Operator's maintenance responsibilities

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

a) each aeroplane they operate is maintained in an airworthy condition;

b) the operational and emergency equipment necessary for an intended flight is serviceable;

c) the Certificate of Airworthiness of each aeroplane they operate remains valid.

8.1.2 An operator shall not operate an aeroplane unless it is maintained and released to service by an organization approved in accordance with 8.7, or under an equivalent system, either of which shall be acceptable to the State of Registry.

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

8.1.4 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.

8.1.5 The operator shall ensure that the maintenance of its aeroplanes is performed in accordance with the maintenance programme.

8.2 Operator's maintenance control manual

8.2.1 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 11.2.

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

8.2.3 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.

8.2.4 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.

8.3 Maintenance programme

8.3.1 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 11.3. 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).*

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

8.4 Maintenance records

8.4.1 An operator shall ensure that the following records are kept for the periods mentioned in 8.4.2:

a) the total time in service (hours, calendar time and cycles, as appropriate) of the aeroplane and all life limited components;

b) the current status of compliance with all mandatory continuing airworthiness information;

c) appropriate details of modifications and repairs;

d) the time in service (hours, calendar time and cycles, as appropriate) since the last overhaul of the aeroplane or its components subject to a mandatory overhaul life;

e) the current status of the aeroplane's compliance with the maintenance programme; and

f) the detailed maintenance records to show that all requirements for the signing of a maintenance release have been met.

8.4.2 The records in 8.4.1 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 8.4.1 f) for a minimum period of one year after the signing of the maintenance release.

8.4.3 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.

Note.— In the context of 8.4.3, a judgement on what should be considered as a temporary change of operator will need to be made by the State of Registry in the light of the need to exercise control over the records, which will depend on access to them and the opportunity to update them.

8.5 Continuing airworthiness information

8.5.1 The operator of an aeroplane over 5 700 kg maximum certificated take-off 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, 4.3.5 and 4.3.8.

8.5.2 The operator of an aeroplane over 5 700 kg maximum certificated take-off 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 the interpretation of "the organization responsible for the type design" is contained in the Airworthiness Manual *(Doc 9760).*

8.6 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.

8.7 Approved maintenance organization

8.7.1 Issue of approval

8.7.1.1 The issue of a maintenance organization approval by a State shall be dependent upon the applicant demonstrating compliance with the requirements of 8.7 for such organizations.

8.7.1.2 The approval document shall contain at least the following:

a) organization's name and location;

b) date of issue and period of validity;

c) terms of approval.

8.7.1.3 The continued validity of the approval shall depend upon the organization remaining in compliance with the requirements of 8.7 for an approved maintenance organization.

8.7.2 Maintenance organization's procedures manual

8.7.2.1 The maintenance organization shall provide for the use and guidance of maintenance personnel concerned a procedures manual which may be issued in separate parts containing the following information:

a) a general description of the scope of work authorized under the organization's terms of approval;

b) a description of the organization's procedures and quality or inspection system in accordance with 8.7.3;

c) a general description of the organization's facilities;

d) names and duties of the person or persons required by 8.7.5.1;

e) a description of the procedures used to establish the competence of maintenance personnel as required by 8.7.5.3;

f) a description of the method used for the completion and retention of the maintenance records required by 8.7.6;

g) a description of the procedures for preparing the maintenance release and the circumstances under which the release is to be signed;

h) the personnel authorized to sign the maintenance release and the scope of their authorization;

i) a description, when applicable, of the additional procedures for complying with an operator's maintenance procedures and requirements;

j) a description of the procedures for complying with the service information reporting requirements of Annex 8, Part II, 4.3.5 and 4.3.8; and

k) a description of the procedure for receiving, assessing, amending and distributing within the maintenance organization all necessary airworthiness data from the type certificate holder or type design organization.

8.7.2.2 The maintenance organization shall ensure that the procedures manual is amended as necessary to keep the information contained therein up to date.

8.7.2.3 Copies of all amendments to the procedures manual shall be furnished promptly to all organizations or persons to whom the manual has been issued.

8.7.3 Maintenance procedures and quality assurance system

8.7.3.1 The maintenance organization shall establish procedures, acceptable to the State granting the approval, which ensure good maintenance practices and compliance with all relevant requirements of this chapter.

8.7.3.2 The maintenance organization shall ensure compliance with 8.7.3.1 by either establishing an independent quality assurance system to monitor compliance with and adequacy of the procedures, or by providing a system of inspection to ensure that all maintenance is properly performed.

8.7.4 Facilities

8.7.4.1 The facilities and working environment shall be appropriate for the task to be performed.

8.7.4.2 The maintenance organization shall have the necessary technical data, equipment, tools and material to perform the work for which it is approved.

8.7.4.3 Storage facilities shall be provided for parts, equipment, tools and material. Storage conditions shall be such as to provide security and prevent deterioration of and damage to stored items.

8.7.5 Personnel

8.7.5.1 The maintenance organization shall nominate a person or group of persons whose responsibilities include ensuring that the maintenance organization is in compliance with 8.7 the requirements for an approved maintenance organization.

8.7.5.2 The maintenance organization shall employ the necessary personnel to plan, perform, supervise, inspect and release the work to be performed.

8.7.5.3 The competence of maintenance personnel shall be established in accordance with a procedure and to a level acceptable to the State granting the approval. The person signing a maintenance release shall be qualified in accordance with Annex 1.

8.7.5.4 The maintenance organization shall ensure that all maintenance personnel receive initial and continuation training appropriate to their assigned tasks and responsibilities. The training programme established by the maintenance organization shall include training in knowledge and skills related to human performance, including co-ordination with other maintenance personnel and flight crew.

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).*

8.7.6 Records

8.7.6.1 The maintenance organization shall retain detailed maintenance records to show that all requirements for the signing of a maintenance release have been met.

8.7.6.2 The records required by 8.7.6.1 shall be kept for a minimum period of one year after the signing of the maintenance release

8.8 Maintenance release

8.8.1 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.

8.8.2 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) 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 9. AEROPLANE FLIGHT CREW

9.1 Composition of the flight crew

9.1.1 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 aeroplane used, the type of operation involved and the duration of flight between points where flight crews are changed.

9.1.2 Radio operator

The flight crew shall include at least one member who holds a valid licence, issued or rendered valid by the State of Registry, authorizing operation of the type of radio transmitting equipment to be used.

9.1.3 Flight engineer

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

9.1.4 Flight navigator

The flight crew shall include at least one member who holds a flight navigator licence in all operations where, as determined by the State of the Operator, navigation necessary for the safe conduct of the flight cannot be adequately accomplished by the pilots from the pilot station.

9.2 Flight crew member emergency duties

An operator shall, for each type of aeroplane, assign to all flight crew members the necessary functions they are to perform in an emergency or in a situation requiring emergency evacuation. 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 aeroplane.

9.3 Flight crew member training programmes

9.3.1 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. Ground and flight training facilities and properly qualified instructors as determined by the State of the Operator shall be provided. The training programme shall consist of ground and flight training in the type(s) of aeroplane on which the flight crew member serves, and shall include proper flight crew coordination and training in all types of emergency or abnormal situations or procedures caused by powerplant, airframe or systems malfunctions, fire or other abnormalities. The training programme shall also include training in knowledge and skills related to human performance and in the transport of dangerous goods. The training for each flight crew member, particularly that relating to abnormal or emergency procedures, shall 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. The training programme shall 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 4.2.4 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 aeroplane synthetic flight trainers approved by the State for that purpose.

Note 3.— The scope of the recurrent training required by 9.2 and 9.3 may be varied and need not be as extensive as the initial training given in a particular type of aeroplane.

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).*

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

a) the use, to the extent deemed feasible by the State of the Operator, of aeroplane synthetic flight trainers approved by that State for that purpose; or

b) the completion within the appropriate period of the proficiency check required by 9.4.4 in that type of aeroplane.

9.4 Qualifications

9.4.1 Recent experience — pilot-in-command

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

9.4.2 Recent experience — co-pilot

An operator shall not assign a co-pilot to operate at the flight controls during take-off and landing unless, on the same type of aeroplane within the preceding 90 days, that co-pilot has operated the flight controls, as pilot-in-command or as co-pilot, during three take-offs and landings or has otherwise demonstrated competence to act as co-pilot on a flight simulator approved for the purpose.

9.4.3 Pilot-in-command route and airport qualification

9.4.3.1 An operator shall not utilize a pilot as pilot-in-command of an aeroplane on a route or route segment for which that pilot is not currently qualified until such pilot has complied with 9.4.3.2 and 9.4.3.3.

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

a) the route to be flown, and the aerodromes which are to be used. 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 navigational facilities and procedures, including any long-range navigation procedures, associated with the route along 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.

9.4.3.3 A pilot-in-command shall have made an actual approach into each aerodrome of landing on the route, accompanied by a pilot who is qualified for the aerodrome, as a member of the flight crew or as an observer on the flight deck, unless:

a) the approach to the aerodrome is not over difficult terrain and the instrument approach procedures and aids available are similar to those with which the pilot is familiar, and a margin to be approved by the State of the Operator is added to the normal operating minima, or there is reasonable certainty that approach and landing can be made in visual meteorological conditions; or

b) the descent from the initial approach altitude can be made by day in visual meteorological conditions; or

c) the operator qualifies the pilot-in-command to land at the aerodrome concerned by means of an adequate pictorial presentation; or

d) the aerodrome concerned is adjacent to another aerodrome at which the pilot-in-command is currently qualified to land.

9.4.3.4 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.

9.4.3.5 An operator shall not continue to utilize a pilot as a pilot-in-command on a route unless, within the preceding 12 months, the pilot has made at least one trip between the terminal points of that route 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 trip on a route in close proximity and over similar terrain, prior to again serving as a pilot-in-command on that route, that pilot must requalify in accordance with 9.4.3.2 and 9.4.3.3.

9.4.4 Pilot proficiency checks

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. Where the operation may be conducted under instrument flight rules, an operator shall ensure that the pilot's competence to comply with such rules is demonstrated to either a check pilot of the operator or 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 1.— Flight simulators approved by the State of the Operator may be used for those parts of the checks for which they are specifically approved.

Note 2.— See ICAO Manual of Criteria for the Qualification of Flight Simulators *(Doc 9625).*

9.5 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.

9.6 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 10. FLIGHT OPERATIONS OFFICER/FLIGHT DISPATCHER

10.1 A flight operations officer/flight dispatcher, when employed in conjunction with an approved method of flight supervision requiring the services of licensed flight operations officers/flight dispatchers, shall be licensed in accordance with the provisions of Annex 1.

Note.— The above provisions do not necessarily require a flight operations officer/flight dispatcher to hold the licence specified in Annex 1. In accordance with 4.2.1 the method of flight supervision is subject to approval by the State of the Operator which may accept proof of qualifications other than the holding of the licence.

10.2 **Recommendation.—** *A flight operations officer/flight dispatcher should not be assigned to duty unless that officer has:*

a) made within the preceding 12 months, at least a one-way qualification flight on the flight deck of an aeroplane over any area in which that individual is authorized to exercise flight supervision. The flight should include landings at as many aerodromes as practicable;

b) demonstrated to the operator a knowledge of:

1) the contents of the operations manual described in Appendix 2;

2) the radio equipment in the aeroplanes used; and

3) the navigation equipment in the aeroplanes used;

c) 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 aeroplanes used;

3) the peculiarities and limitations of each navigation system which is used by the operation; and

4) the aeroplane loading instructions;

d) demonstrated to the operator knowledge and skills related to human performance relevant to dispatch duties; and

e) demonstrated to the operator the ability to perform the duties specified in 4.6.

10.3 **Recommendation.—** *A flight operations officer/flight dispatcher assigned to duty should maintain complete familiarization with all features of the operation 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).*

10.4 **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 10.2 are met.*

CHAPTER 11. 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 4.2.9

Maintenance records — see 8.4

Flight time records — see 4.2.10.3

Flight preparation forms — see 4.3

Operational flight plan — see 4.3.3.1

Pilot-in-command route and airport qualification records — see 9.4.3.4

11.1 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.

11.2 Operator's maintenance control manual

The operator's maintenance control manual provided in accordance with 8.2, which may be issued in separate parts, shall contain the following information:

a) a description of the procedures required by 8.1.1 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 8.1.4;

c) a reference to the maintenance programme required by 8.3.1;

d) a description of the methods used for the completion and retention of the operator's maintenance records required by 8.4;

e) a description of the procedures for monitoring, assessing and reporting maintenance and operational experience required by 8.5.1;

f) a description of the procedures for complying with the service information reporting requirements of Annex 8, Part II, 4.3.5 and 4.3.8;

g) a description of procedures for assessing continuing airworthiness information and implementing any resulting actions, as required by 8.5.2;

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 aircraft types and models to which the manual applies;

k) a description of procedures for ensuring that unserviceabilities affecting airworthiness are recorded and rectified; and

l) a description of the procedures for advising the State of Registry of significant in-service occurrences.

11.3 Maintenance programme

11.3.1 A maintenance programme for each aeroplane as required by 8.3 shall contain the following information:

a) maintenance tasks and the intervals at which these are to be performed, taking into account the anticipated utilization of the aeroplane;

b) when applicable, a continuing structural integrity programme;

c) procedures for changing or deviating from a) and b) above; and

d) when applicable, condition monitoring and reliability programme descriptions for aircraft systems, components and powerplants.

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

11.3.3 **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.*

11.4 Journey log book

11.4.1 **Recommendation.—** *The aeroplane journey log book should contain the following items and the corresponding roman numerals:*

I — *Aeroplane nationality and registration.*

II — *Date.*

III — *Names of crew members.*

IV — *Duty assignments of crew members.*

V — *Place of departure.*

VI — *Place of arrival.*

VII — *Time of departure.*

VIII — *Time of arrival.*

IX — *Hours of flight.*

X — *Nature of flight (private, aerial work, scheduled or non-scheduled).*

XI — *Incidents, observations, if any.*

XII — *Signature of person in charge.*

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

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

11.5 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 aeroplanes 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.

11.6 Flight recorder records

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

CHAPTER 12. CABIN CREW

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

12.2 Cabin crew at emergency evacuation stations

Each cabin crew member assigned to emergency evacuation duties shall occupy a seat provided in accordance with 6.16 during take-off and landing and whenever the pilot-in-command so directs.

12.3 Protection of cabin crew during flight

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

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.

12.4 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 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 which the cabin crew member 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 and first-aid kits;

c) when serving on aeroplanes operated above 3 000 m (10 000 ft), knowledgeable as regards the effect of lack of oxygen and, in the case of pressurized aeroplanes, 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 has completed the dangerous goods training programme required by Annex 18; and

f) knowledgeable about human performance as related to passenger cabin safety duties including flight crew-cabin crew coordination.

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).*

12.5 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 13. SECURITY*

13.1 Domestic commercial operations

Recommendation.— *International Standards and Recommended Practices set forth in this Chapter should be applied by all Contracting States also in case of domestic commercial operations (air services).*

13.2 Security of the flight crew compartment

13.2.1 In all aeroplanes which are equipped with a flight crew compartment door, this door shall be capable of being locked, and means shall be provided by which cabin crew can discreetly notify the flight crew in the event of suspicious activity or security breaches in the cabin.

13.2.2 From 1 November 2003, all passenger-carrying aeroplanes of a maximum certificated take-off mass in excess of 45 500 kg or with a passenger seating capacity greater than 60 shall be equipped with an approved flight crew compartment door that is designed to resist penetration by small arms fire and grenade shrapnel, and to resist forcible intrusions by unauthorized persons. This door shall be capable of being locked and unlocked from either pilot's station.

13.2.3 In all aeroplanes which are equipped with a flight crew compartment door in accordance with 13.2.2:

a) this door shall be closed and locked from the time all external doors are closed following embarkation until any such door is opened for disembarkation, except when necessary to permit access and egress by authorized persons; and

b) means shall be provided for monitoring from either pilot's station the entire door area outside the flight crew compartment to identify persons requesting entry and to detect suspicious behaviour or potential threat.

13.2.4 **Recommendation.—** *All passenger-carrying aeroplanes should be equipped with an approved flight crew compartment door, where practicable, that is designed to resist penetration by small arms fire and grenade shrapnel, and to resist forcible intrusions by unauthorized persons. This door should be capable of being locked and unlocked from either pilot's station.*

13.2.5 **Recommendation.—** *In all aeroplanes which are equipped with a flight crew compartment door in accordance with 13.2.4:*

a) the door should be closed and locked from the time all external doors are closed following embarkation until any such door is opened for disembarkation, except when necessary to permit access and egress by authorized persons; and

b) means should be provided for monitoring from either pilot's station the entire door area outside the flight crew compartment to identify persons requesting entry and to detect suspicious behaviour or potential threat.

13.3 Aeroplane 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 and for inspecting aeroplanes for concealed weapons, explosives or other dangerous devices when a well-founded suspicion exists that the aeroplane may be the object of an act of unlawful interference. The checklist shall be supported by guidance on the appropriate course of action to be taken should a bomb or suspicious object be found and information on the least-risk bomb location specific to the aeroplane.

13.4 Training programmes

13.4.1 An operator shall establish and maintain an approved security training programme which ensures crew members act in the most appropriate manner to minimize the consequences of acts of unlawful interference. As a minimum, this programme shall include the following elements:

a) determination of the seriousness of any occurrence;

b) crew communication and coordination;

c) appropriate self-defense responses;

d) use of non-lethal protective devices assigned to crew members whose use is authorized by the State of the Operator;

e) understanding of behaviour of terrorists so as to facilitate the ability of crew members to cope with hijacker behaviour and passenger responses;

f) live situational training exercises regarding various threat conditions;

g) flight deck procedures to protect the aeroplane; and

h) aeroplane search procedures and guidance on least-risk bomb locations where practicable.

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

13.5 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.

13.6 Miscellaneous

13.6.1 **Recommendation.—** *Specialized means of attenuating and directing the blast should be provided for use at the least-risk bomb location.*

13.6.2 **Recommendation.—** *Where an operator accepts the carriage of weapons removed from passengers, the aeroplane should have provision for stowing such weapons in a place so that they are inaccessible to any person during flight time.*

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

APPENDIX 1. LIGHTS TO BE DISPLAYED BY AEROPLANES

(Note.— See Chapter 6, 6.10)

1. Terminology

When the following terms are used in this Appendix, they have the following meanings:

Angles of coverage.

a) Angle of coverage A is formed by two intersecting vertical planes making angles of 70 degrees to the right and 70 degrees to the left respectively, looking aft along the longitudinal axis to a vertical plane passing through the longitudinal axis.

b) Angle of coverage F is formed by two intersecting vertical planes making angles of 110 degrees to the right and 110 degrees to the left respectively, looking forward along the longitudinal axis to a vertical plane passing through the longitudinal axis.

c) Angle of coverage L is formed by two intersecting vertical planes, one parallel to the longitudinal axis of the aeroplane, and the other 110 degrees to the left of the first, when looking forward along the longitudinal axis.

d) Angle of coverage R is formed by two intersecting vertical planes, one parallel to the longitudinal axis of the aeroplane, and the other 110 degrees to the right of the first, when looking forward along the longitudinal axis.

Horizontal plane. The plane containing the longitudinal axis and perpendicular to the plane of symmetry of the aeroplane.

Longitudinal axis of the aeroplane. A selected axis parallel to the direction of flight at a normal cruising speed, and passing through the centre of gravity of the aeroplane.

Making way. An aeroplane on the surface of the water is "making way" when it is under way and has a velocity relative to the water.

Under command. An aeroplane on the surface of the water is "under command" when it is able to execute manoeuvres as required by the International Regulations for Preventing Collisions at Sea for the purpose of avoiding other vessels.

Under way. An aeroplane on the surface of the water is "under way" when it is not aground or moored to the ground or to any fixed object on the land or in the water.

Vertical planes. Planes perpendicular to the horizontal plane.

Visible. Visible on a dark night with a clear atmosphere.

2. Navigation lights to be displayed in the air

Note.— The lights specified herein are intended to meet the requirements of Annex 2 for navigation lights.

As illustrated in Figure 1, the following unobstructed navigation lights shall be displayed:

a) a red light projected above and below the horizontal plane through angle of coverage L;

b) a green light projected above and below the horizontal plane through angle of coverage R;

c) a white light projected above and below the horizontal plane rearward through angle of coverage A.

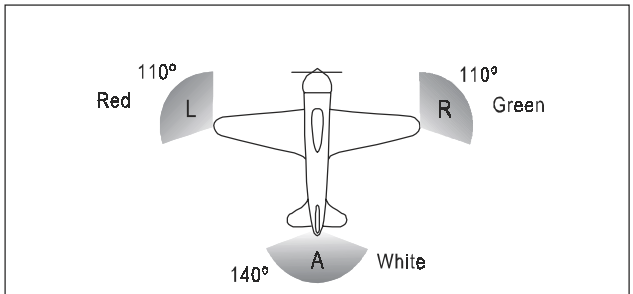


Figure 1

3. Lights to be displayed on the water

3.1 General

Note.— The lights specified herein are intended to meet the requirements of Annex 2 for lights to be displayed by aeroplanes on the water.

The International Regulations for Preventing Collisions at Sea require different lights to be displayed in each of the following circumstances:

a) when under way;

b) when towing another vessel or aeroplane;

c) when being towed;

d) when not under command and not making way;

e) when making way but not under command;

f) when at anchor;

g) when aground.

The lights required by aeroplanes in each case are described below.

3.2 When under way

As illustrated in Figure 2, the following appearing as steady unobstructed lights:

a) a red light projected above and below the horizontal through angle of coverage L;

b) a green light projected above and below the horizontal through angle of coverage R;

c) a white light projected above and below the horizontal through angle of coverage A; and

d) a white light projected through angle of coverage F.

The lights described in 3.2 a), b) and c) should be visible at a distance of at least 3.7 km (2 NM). The light described in 3.2 d) should be visible at a distance of 9.3 km (5 NM) when fitted to an aeroplane of 20 m or more in length or visible at a distance of 5.6 km (3 NM) when fitted to an aeroplane of less than 20 m in length.

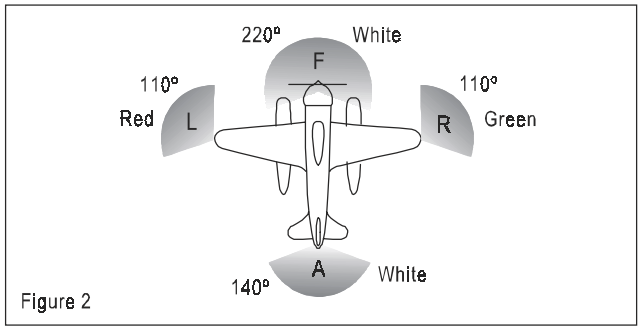


Figure 2

3.3 When towing another vessel or aeroplane

As illustrated in Figure 3, the following appearing as steady, unobstructed lights:

a) the lights described in 3.2;

b) a second light having the same characteristics as the light described in 3.2 d) and mounted in a vertical line at least 2 m above or below it; and

c) a yellow light having otherwise the same characteristics as the light described in 3.2 c) and mounted in a vertical line at least 2 m above it.

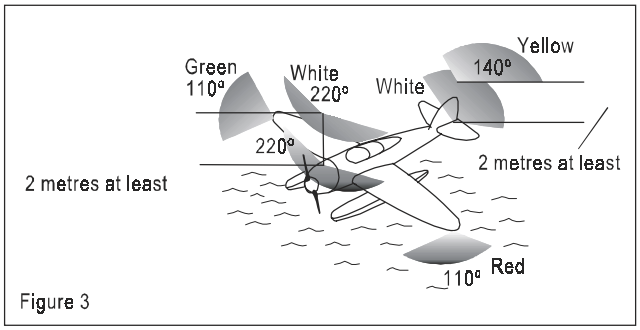


Figure 3

3.4 When being towed

The lights described in 3.2 a), b) and c) appearing as steady, unobstructed lights.

3.5 When not under command and not making way

As illustrated in Figure 4, two steady red lights placed where they can best be seen, one vertically over the other and not less than 1 m apart, and of such a character as to be visible all around the horizon at a distance of at least 3.7 km (2 NM).

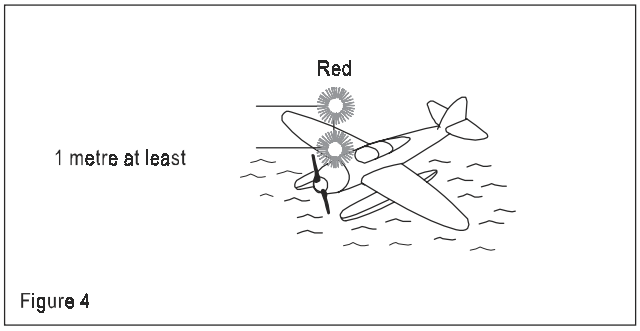


Figure 4

3.6 When making way but not under command

As illustrated in Figure 5, the lights described in 3.5 plus the lights described in 3.2 a), b) and c).

Note.— The display of lights prescribed in 3.5 and 3.6 is to be taken by other aircraft as signals that the aeroplane showing them is not under command and cannot therefore get out of the way. They are not signals of aeroplanes in distress and requiring assistance.

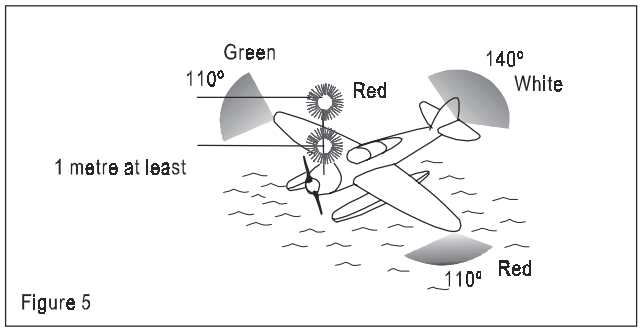


Figure 5

3.7 When at anchor

a) If less than 50 m in length, where it can best be seen, a steady white light (Figure 6), visible all around the horizon at a distance of at least 3.7 km (2 NM).

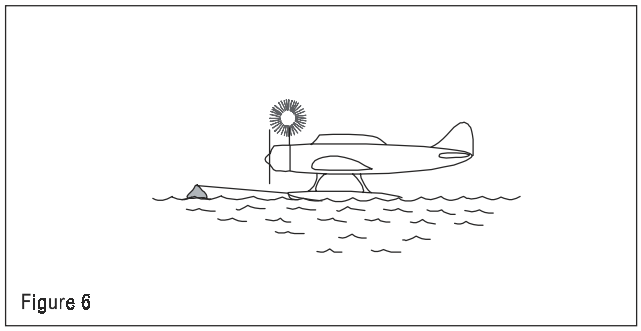


Figure 6

b) If 50 m or more in length, where they can best be seen, a steady white forward light and a steady white rear light (Figure 7) both visible all around the horizon at a distance of at least 5.6 km (3 NM).

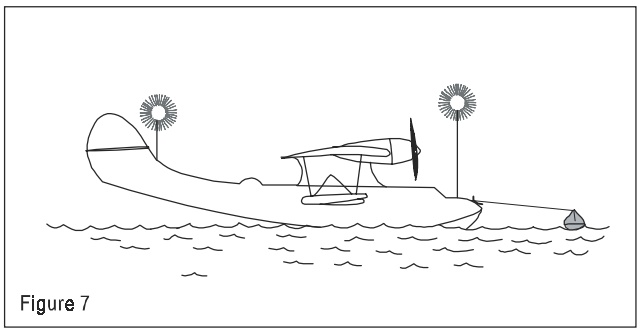
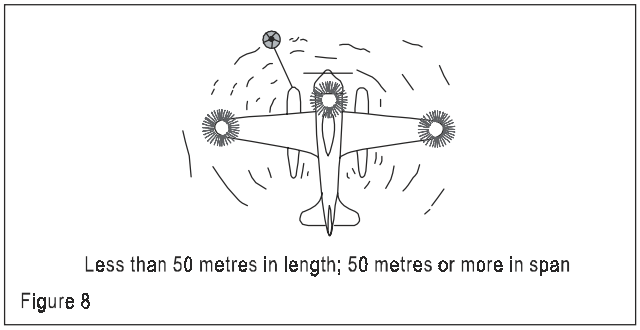
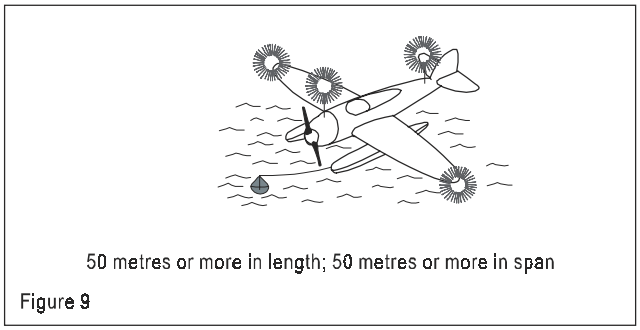


Figure 7

c) If 50 m or more in span a steady white light on each side (Figures 8 and 9) to indicate the maximum span and visible, so far as practicable, all around the horizon at a distance of at least 1.9 km (1 NM).


Less than 50 metres in length; 50 metres or more in span
Figure 8


50 metres or more in length; 50 metres or more in span
Figure 9

3.8 When aground

The lights prescribed in 3.7 and in addition two steady red lights in vertical line, at least 1 m apart so placed as to be visible all around the horizon.

APPENDIX 2. ORGANIZATION AND CONTENTS OF AN OPERATIONS MANUAL

(See Chapter 4, 4.2.2.1)

1. Organization

1.1 **Recommendation.—** *An operations manual, which may be issued in separate parts corresponding to specific aspects of operations, provided in accordance with Chapter 4, 4.2.2.1 should be organized with the following structure:*

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 Chapter 4, 4.2.2.1 shall 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 shall 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 as required by Chapter 4, 4.2.10.2.

2.1.3 A list of the navigational equipment to be carried including any requirements relating to operations in RNP airspace.

2.1.4 Where relevant to the operations, the long-range navigation procedures, engine failure procedure for ETOPS and the nomination and utilization of diversion aerodromes.

2.1.5 The circumstances in which a radio listening watch is to be maintained.

2.1.6 The method for determining minimum flight altitudes.

2.1.7 The methods for determining aerodrome operating minima.

2.1.8 Safety precautions during refuelling with passengers on board.

2.1.9 Ground handling arrangements and procedures.

2.1.10 Procedures, as prescribed in Annex 12, for pilots-in-command observing an accident.

2.1.11 The flight crew for each type of operation including the designation of the succession of command.

2.1.12 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 the failure of one or more powerplants while en route.

2.1.13 The conditions under which oxygen shall be used and the amount of oxygen determined in accordance with Chapter 4, 4.3.8.2.

2.1.14 Instructions for mass and balance control.

2.1.15 Instructions for the conduct and control of ground de-icing/anti-icing operations.

2.1.16 The specifications for the operational flight plan.

2.1.17 Standard operating procedures (SOP) for each phase of flight.

2.1.18 Instructions on the use of normal checklists and the timing of their use.

2.1.19 Departure contingency procedures.

2.1.20 Instructions on the maintenance of altitude awareness and the use of automated or flight crew altitude call-out.

2.1.21 Instructions on the use of autopilots and auto-throttles in IMC.

2.1.22 Instructions on the clarification and acceptance of ATC clearances, particularly where terrain clearance is involved.

2.1.23 Departure and approach briefings.

2.1.24 Route and destination familiarization.

2.1.25 Stabilized approach procedure.

2.1.26 Limitation on high rates of descent near the surface.

2.1.27 Conditions required to commence or to continue an instrument approach.

2.1.28 Instructions for the conduct of precision and non-precision instrument approach procedures.

2.1.29 Allocation of flight crew duties and procedures for the management of crew workload during night and IMC instrument approach and landing operations.

2.1.30 Instructions and training requirements for the avoidance of controlled flight into terrain and policy for the use of the ground proximity warning system (GPWS).

2.1.31 Policy, instructions, procedures and training requirements for the avoidance of collisions and the use of the airborne collision avoidance system (ACAS).

Note.— Procedures for the operation of ACAS are contained in PANS-OPS (Doc 8168), Volume I, Part VIII, Chapter 3, and in PANS-ATM (Doc 4444), Chapters 12 and 15.

2.1.32 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.

2.1.33 For aeroplanes intended to be operated above 15 000 m (49 000 ft):

a) information which will enable the pilot to determine the best course of action to take in the event of exposure to solar cosmic radiation; and

b) procedures in the event that a decision to descend is taken, covering:

1) the necessity of giving the appropriate ATS unit prior warning of the situation and of obtaining a provisional descent clearance; and

2) the action to be taken in the event that communication with the ATS unit cannot be established or is interrupted.

Note.— Guidance material on the information to be provided is contained in Circular 126 — Guidance Material on SST Aircraft Operations.

2.1.34 Details of the accident prevention and flight safety programme provided in accordance with Chapter 3, 3.2, including a statement of safety policy and the responsibility of personnel.

2.1.35 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).

2.1.36 Security instructions and guidance.

2.1.37 The search procedure checklist provided in accordance with Chapter 13, 13.3.

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 Chapter 6, 6.1.3.

2.2.3 Operating instructions and information on climb performance with all engines operating, if provided in accordance with Chapter 4, 4.2.3.3.

2.2.4 Flight planning data for pre-flight and in-flight planning with different thrust/power and speed settings.

2.2.5 Instructions and data for mass and balance calculations.

2.2.6 Instructions for aircraft loading and securing of load.

2.2.7 Aircraft systems, associated controls and instructions for their use, as required by Chapter 6, 6.1.3.

2.2.8 The minimum equipment list and configuration deviation list for the aeroplane types operated and specific operations authorized, including any requirements relating to operations in RNP airspace.

2.2.9 Checklist of emergency and safety equipment and instructions for its use.

2.2.10 Emergency evacuation procedures, including type-specific procedures, crew coordination, assignment of crew's emergency positions and the emergency duties assigned to each crew member.

2.2.11 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.

2.2.12 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.

2.2.13 The ground-air visual signal code for use by survivors, as contained in Annex 12.

2.3 Routes and aerodromes

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 Aerodrome operating minima for each of the aerodromes that are likely to be used as aerodromes of intended landing or as alternate aerodromes.

2.3.4 The increase of aerodrome operating minima in case of degradation of approach or aerodrome facilities.

2.3.5 The necessary information for compliance with all flight profiles required by regulations, including but not limited to, the determination of:

a) take-off runway length requirements for dry, wet and contaminated conditions, including those dictated by system failures which affect the take-off distance;

b) take-off climb limitations;

c) en-route climb limitations;

d) approach climb limitations and landing climb limitations;

e) landing runway length requirements for dry, wet and contaminated conditions, including systems failures which affect the landing distance; and

f) supplementary information, such as tire speed limitations.

2.4 Training

2.4.1 Details of the flight crew training programme, as required by Chapter 9, 9.3.

2.4.2 Details of the cabin crew duties training programme as required by Chapter 12, 12.4.

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 Chapter 4, 4.2.1.

Note.— Details of the flight operations officer/flight dispatcher training programme are contained in Chapter 10, 10.2.

ATTACHMENT A. FLIGHT TIME AND FLIGHT DUTY PERIOD LIMITATIONS

Supplementary to Chapter 4, 4.2.10.3

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 this Part 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. Definitions

2.1 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.

2.2 Flight duty periods

2.2.1 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 flight crew members may be required to carry out from the moment they report at their place of employment on the day of a flight until they are 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 flight crew members are performing a task assigned to them by the operator. Such a task should, therefore, only be taken into account when making provisions for rest periods as one among many factors which could lead to fatigue.

2.2.2 The definition does not imply the inclusion of such periods as time taken for a flight crew member to travel from home to the place of employment.

2.2.3 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.

2.3 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.

3. Types of limitations

3.1 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.

3.2 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.

ATTACHMENT B. FIRST-AID MEDICAL SUPPLIES

Supplementary to Chapter 6, 6.2.2 a)

TYPES, NUMBER, LOCATION AND CONTENTS OF MEDICAL SUPPLIES

1. Types

Two types of medical supplies should be provided: first-aid kit(s) for carriage in all aeroplanes and a medical kit for carriage where the aeroplane is authorized to carry more than 250 passengers.

2. Number of first-aid kits

The number of first-aid kits should be appropriate to the number of passengers which the aeroplane is authorized to carry:

Passenger	*First-aid kits*
0 – 50	1
51 – 150	2
151 – 250	3
More than 250	4

3. Location

3.1 It is essential that the required first-aid kits be distributed as evenly as practicable throughout the passenger cabin. They should be readily accessible to cabin crew, and, in view of the possible use of medical supplies outside the aeroplane in an emergency situation, they should be located near an exit.

3.2 The medical kit, when carried, should be stored in an appropriate secure location.

4. Contents

4.1 Different factors must be taken into consideration in deciding the contents of first-aid kits and medical kits. The following are typical contents of first-aid and medical kits for carriage aboard an aeroplane.

4.1.1 *First-aid kit:*

— a handbook on first aid
— ''ground-air visual signal code for use by survivors'' as contained in Annex 12
— materials for treating injuries
— ophthalmic ointment
— a decongestant nasal spray
— insect repellant
— emollient eye drops
— sunburn cream
— water-miscible antiseptic/skin cleanser
— materials for treatment of extensive burns
— oral drugs as follows: analgesic, antispasmodic, central nervous system stimulant, circulatory stimulant, coronary vasodilator, antidiarrhoeic and motion sickness medications
— an artificial plastic airway and splints.

4.1.2 *Medical kit:*

Equipment
— one pair of sterile surgical gloves
— sphygmomanometer
— stethoscope
— sterile scissors
— haemostatic forceps
— haemostatic bandages or tourniquet
— sterile equipment for suturing wounds
— disposable syringes and needles
— disposable scalpel handle and blade

Drugs
— coronary vasodilators
— analgesics
— diuretics
— anti-allergics
— steroids
— sedatives
— ergometrine
— where compatible with regulations of the appropriate authority, a narcotic drug in injectable form
— injectable broncho dilator.

Note.— The United Nations Conference for Adoption of a Single Convention on Narcotic Drugs in March 1961 adopted such a Convention, Article 32 of which contains special provisions concerning the carriage of drugs in medical kits of aircraft engaged in international flight.

ATTACHMENT C. AEROPLANE PERFORMANCE OPERATING LIMITATIONS

Example 1

Purpose and scope

The purpose of the following example is to illustrate the level of performance intended by the provisions of Chapter 5 as applicable to the types of aeroplanes described below.

The Standards and Recommended Practices in Annex 6 effective on 14 July 1949 contained specifications similar to those adopted by some Contracting States for inclusion in their national performance codes. A very substantial number of civil transport aeroplanes have been manufactured and are being operated in accordance with these codes. Those aeroplanes are powered with reciprocating engines including turbo-compound design. They embrace twin-engined and four-engined aeroplanes over a mass range from approximately 4 200 kg to 70 000 kg over a stalling speed range, V_{S0} from approximately 100 to 175 km/h (55 to 95 kt) and over a wing loading range from approximately 120 to 360 kg/m^2. Cruising speeds range over 555 km/h (300 kt). Those aeroplanes have been used in a very wide range of altitude, air temperature and humidity conditions. At a later date, the code was applied with respect to the evaluation of certification of the so-called "first generation" of turboprop and turbo-jet aeroplanes.

Although only past experience can warrant the fact that this example illustrates the level of performance intended by the Standards and Recommended Practices of Chapter 5, it is considered to be applicable over a wide range of aeroplane characteristics and atmospheric conditions. Reservation should however be made concerning the application of this example with respect to conditions of high air temperatures. In certain extreme cases, it has been found desirable to apply additional temperature and/or humidity accountability, particularly for the obstacle limited take-off flight path.

This example is not intended for application to aeroplanes having short take-off and landing (STOL) or vertical take-off and landing (VTOL) capabilities.

No detailed study has been made of the applicability of this example to operations in all-weather conditions. The validity of this example has not therefore been established for operations which may involve low decision heights and be associated with low minima operating techniques and procedures.

1. Definitions

CAS (Calibrated airspeed). The calibrated airspeed is equal to the airspeed indicator reading corrected for position and instrument error. (As a result of the sea level adiabatic compressible flow correction to the airspeed instrument dial, CAS is equal to the true airspeed (TAS) in Standard Atmosphere at sea level.)

Declared distances.

a) Take-off run available (TORA). The length of runway declared available and suitable for the ground run of an aeroplane taking off.

b) Take-off distance available (TODA). The length of the take-off run available plus the length of the clearway, if provided.

c) Accelerate-stop distance available (ASDA). The length of the take-off run available plus the length of the stopway, if provided.

d) Landing distance available (LDA). The length of runway which is declared available and suitable for the ground run of an aeroplane landing.

Note.— The calculation of declared distances is described in Annex 14, Volume I, Attachment A.

Height. The vertical distance of a level, a point, or an object considered as a point, measured from a specified datum.

Note.— For the purposes of this example, the point referred to above is the lowest part of the aeroplane and the specified datum is the take-off or landing surface, whichever is applicable.

Landing surface. That part of the surface of an aerodrome which the aerodrome authority has declared available for the normal ground or water run of aircraft landing in a particular direction.

Take-off surface. That part of the surface of an aerodrome which the aerodrome authority has declared available for the normal ground or water run of aircraft taking off in a particular direction.

V_{S0} A stalling speed or minimum steady flight speed in the landing configuration. *(Note.— See 2.4.)*

V_{S1} A stalling speed or minimum steady flight speed. *(Note.— See 2.5.)*

Note.— See Chapter 1 and Annexes 8 and 14, Volume I, for other definitions.

2. Stalling speed — minimum steady flight speed

2.1 For the purpose of this example, the stalling speed is the speed at which an angle of attack greater than that of maximum lift is reached, or, if greater, the speed at which a large amplitude pitching or rolling motion, not immediately controllable, is encountered, when the manoeuvre described in 2.3 is executed.

Note.— It should be noted that an uncontrollable pitching motion of small amplitude associated with pre-stall buffeting does not necessarily indicate that the stalling speed has been reached.

2.2 The minimum steady flight speed is that obtained while maintaining the elevator control in the most rearward possible position when the manoeuvre described in 2.3 is executed. This speed would not apply when the stalling speed defined in 2.1 occurs before the elevator control reaches its stops.

2.3 Determination of stalling speed — Minimum steady flight speed

2.3.1 The aeroplane is trimmed for a speed of approximately $1.4V_{S_1}$. From a value sufficiently above the stalling speed to ensure that a steady rate of decrease is obtainable, the speed is reduced in straight flight at a rate not exceeding 0.5 m/s^2 (1 kt/s) until the stalling speed or the minimum steady flight speed, defined in 2.1 and 2.2, is reached.

2.3.2 For the purpose of measuring stalling speed and minimum steady flight speed, the instrumentation is such that the probable error of measurement is known.

2.4 V_{S_0}

V_{S_0} denotes the stalling speed if obtained in flight tests conducted in accordance with 2.3, or the minimum steady flight speed, CAS, as defined in 2.2, with:

a) engines at not more than sufficient power for zero thrust at a speed not greater than 110 per cent of the stalling speed;

b) propeller pitch controls in the position recommended for normal use during take-off;

c) landing gear extended;

d) wing flaps in the landing position;

e) cowl flaps and radiator shutters closed or nearly closed;

f) centre of gravity in that position within the permissible landing range which gives the maximum value of stalling speed or of minimum steady flight speed;

g) aeroplane mass equal to the mass involved in the specification under consideration.

2.5 V_{S_1}

V_{S_1} denotes the stalling speed if obtained in flight tests conducted in accordance with 2.3, or the minimum steady flight speed, CAS, as defined in 2.2, with:

a) engines at not more than sufficient power for zero thrust at a speed not greater than 110 per cent of the stalling speed;

b) propeller pitch controls in the position recommended for normal use during take-off;

c) aeroplane in the configuration in all other respects and at the mass prescribed in the specification under consideration.

3. Take-off

3.1 Mass

The mass of the aeroplane at take-off is not to exceed the maximum take-off mass specified in the flight manual for the altitude at which the take-off is to be made.

3.2 Performance

The performance of the aeroplane as determined from the information contained in the flight manual is such that:

a) the accelerate-stop distance required does not exceed the accelerate-stop distance available;

b) the take-off distance required does not exceed the take-off distance available;

c) the take-off path provides a vertical clearance of not less than 15.2 m up to D = 500 m (50 ft up to D = 1 500 ft) and 15.2 + 0.01 [D – 500] m (50 + 0.01 [D – 1 500] ft) thereafter, above all obstacles lying within 60 m plus half the wing span of the aeroplane plus 0.125D on either side of the flight path, except that obstacles lying beyond 1 500 m on either side of the flight path need not be cleared.

The distance D is the horizontal distance that the aeroplane has travelled from the end of the take-off distance available.

Note.— This need not be carried beyond the point at which the aeroplane would be able, without further gaining in height, to commence a landing procedure at the aerodrome of take-off or, alternatively, has attained the minimum safe altitude for commencing flight to another aerodrome.

However, the lateral obstacle clearance is liable to be reduced (below the values stated above) when, and to the extent that, this is warranted by special provisions or conditions which assist the pilot to avoid inadvertent lateral deviations from the intended flight path. For example, particularly in poor weather conditions, a precise radio aid may assist the pilot to maintain the intended flight path. Also, when the take-off is made in sufficiently good visibility conditions, it may, in some cases, be possible to avoid obstacles which are clearly visible but may be within the lateral limits noted in 3.2 c).

Note 1.— The procedures used in defining the accelerate-stop distance required, the take-off distance required and the take-off flight path are described in the Appendix to this example.

Note 2.— In some national codes similar to this example, the specification for "performance" at take-off is such that no credit can be taken for any increase in length of accelerate-stop distance available and take-off distance available beyond the length specified in Section 1 for take-off run available. Those codes specify a vertical clearance of not less than 15.2 m (50 ft) above all obstacles lying within 60 m on either side of the flight path while still within the confines of the aerodrome, and 90 m on either side of the flight path when outside those confines. It is to be observed that those codes are such that they do not provide for an alternative to the method of elements (see the Appendix to this example) in the determination of the take-off path. It is considered that those codes are compatible with the general intent of this example.

3.3 Conditions

For the purpose of 3.1 and 3.2, the performance is that corresponding to:

a) the mass of the aeroplane at the start of take-off;

b) an altitude equal to the elevation of the aerodrome;

and for the purpose of 3.2:

c) the ambient temperature at the time of take-off for 3.2 a) and b) only;

d) the runway slope in the direction of take-off (landplanes);

e) not more than 50 per cent of the reported wind component opposite to the direction of take-off, and not less than 150 per cent of the reported wind component in the direction of take-off. In certain cases of operation of seaplanes, it has been found necessary to take account of the reported wind component normal to the direction of take-off.

3.4 Critical point

In applying 3.2 the critical point chosen for establishing compliance with 3.2 a) is not nearer to the starting point than that used for establishing compliance with 3.2 b) and 3.2 c).

3.5 Turns

In case the flight path includes a turn with bank greater than 15 degrees, the clearances specified in 3.2 c) are increased by an adequate amount during the turn, and the distance D is measured along the intended track.

4. En route

4.1 One power-unit inoperative

4.1.1 At all points along the route or planned diversion therefrom, the aeroplane is capable, at the minimum flight altitudes en route, of a steady rate of climb with one power-unit inoperative, as determined from the flight manual, of at least

1) $K \left(\frac{V_{S_0}}{185.2} \right)^2$ m/s, V_{S_0} being expressed in km/h;

2) $K \left(\frac{V_{S_0}}{100} \right)^2$ m/s, V_{S_0} being expressed in kt;

3) $K \left(\frac{V_{S_0}}{100} \right)^2$ ft/min, V_{S_0} being expressed in kt;

and K having the following value:

$K = 4.04 - \frac{5.40}{N}$ in the case of 1) and 2); and

$K = 797 - \frac{1\,060}{N}$ in the case of 3)

where N is the number of power-units installed.

It should be noted that minimum flight altitudes are usually considered to be not less than 300 m (1 000 ft) above terrain along and adjacent to the flight path.

4.1.2 As an alternative to 4.1.1 the aeroplane is operated at an all power-unit operating altitude such that, in the event of a power-unit failure, it is possible to continue the flight to an aerodrome where a landing can be made in accordance with 5.3, the flight path clearing all terrain and obstructions along the route within 8 km (4.3 NM) on either side of the intended track by at least 600 m (2 000 ft). In addition, if such a procedure is utilized, the following provisions are complied with:

a) the rate of climb, as determined from the flight manual for the appropriate mass and altitude, used in calculating the flight path is diminished by an amount equal to

1) $K\left(\frac{V_{S_0}}{185.2}\right)^2$ m/s, V_{S_0} being expressed in km/h;

2) $K\left(\frac{V_{S_0}}{100}\right)^2$ m/s, V_{S_0} being expressed in kt;

3) $K\left(\frac{V_{S_0}}{100}\right)^2$ ft/min, V_{S_0} being expressed in kt;

and K having the following value:

$K = 4.04 - \frac{5.40}{N}$ in the case of 1) and 2); and

$K = 797 - \frac{1\,060}{N}$ in the case of 3)

where N is the number of power-units installed;

b) the aeroplane complies with 4.1.1 at 300 m (1 000 ft) above the aerodrome used as an alternate in this procedure;

c) after the power-unit failure considered, account is taken of the effect of winds and temperatures on the flight path;

d) it is assumed that the mass of the aeroplane as it proceeds along its intended track is progressively reduced by normal consumption of fuel and oil;

e) it is customary to assume such fuel jettisoning as is consistent with reaching the aerodrome in question.

4.2 Two power-units inoperative
(applicable only to aeroplanes with four power-units)

The possibility of two power-units becoming inoperative when the aeroplane is more than 90 minutes at all power-units operating cruising speed from an en-route alternate aerodrome is catered for. This is done by verifying that at whatever such point such a double failure may occur, the aeroplane in the configuration and with the engine power specified in the flight manual can thereafter reach the alternate aerodrome without coming below the minimum flight altitude. It is customary to assume such fuel jettisoning as is consistent with reaching the aerodrome in question.

5. Landing

5.1 Mass

The calculated mass for the expected time of landing at the aerodrome of intended landing or any destination alternate aerodrome is not to exceed the maximum specified in the flight manual for the elevation of that aerodrome.

5.2 Landing distance

5.2.1 *Aerodrome of intended landing*

The landing distance at the aerodrome of the intended landing, as determined from the flight manual, is not to exceed 60 per cent of the landing distance available on:

a) the most suitable landing surface for a landing in still air; and, if more severe,

b) any other landing surface that may be required for landing because of expected wind conditions at the time of arrival.

5.2.2 *Alternate aerodromes*

The landing distance at any alternate aerodrome, as determined from the flight manual, is not to exceed 70 per cent of the landing distance available on:

a) the most suitable landing surface for a landing in still air; and, if more severe,

b) any other landing surface that may be required for landing because of expected wind conditions at the time of arrival.

Note.— The procedure used in determining the landing distance is described in the Appendix to this example.

5.3 Conditions

For the purpose of 5.2, the landing distances are not to exceed those corresponding to:

a) the calculated mass of the aeroplane for the expected time of landing;

b) an altitude equal to the elevation of the aerodrome;

c) for the purpose of 5.2.1 a) and 5.2.2 a), still air;

d) for the purpose of 5.2.1 b) and 5.2.2 b), not more than 50 per cent of the expected wind component along the landing path and opposite to the direction of landing and not less than 150 per cent of the expected wind component in the direction of landing.

APPENDIX TO EXAMPLE 1 ON AEROPLANE PERFORMANCE OPERATING LIMITATIONS — PROCEDURES USED IN DETERMINING TAKE-OFF AND LANDING PERFORMANCE

1. General

1.1 Unless otherwise specified, Standard Atmosphere and still air conditions are applied.

1.2 Engine powers are based on a water vapour pressure corresponding to 80 per cent relative humidity in standard conditions. When performance is established for temperature above standard, the water vapour pressure for a given altitude is assumed to remain at the value stated above for standard atmospheric conditions.

1.3 Each set of performance data required for a particular flight condition is determined with the powerplant accessories absorbing the normal amount of power appropriate to that flight condition.

1.4 Various wing flap positions are selected. These positions are permitted to be made variable with mass, altitude and temperature in so far as this is considered consistent with acceptable operating practices.

1.5 The position of the centre of gravity is selected within the permissible range so that the performance achieved in the configuration and power indicated in the specification under consideration is a minimum.

1.6 The performance of the aeroplane is determined in such a manner that under all conditions the approved limitations for the powerplant are not exceeded.

1.7 The determined performance is so scheduled that it can serve directly in showing compliance with the aeroplane performance operating limitations.

2. Take-off

2.1 General

2.1.1 The take-off performance data are determined:

a) for the following conditions:

1) sea level;

2) aeroplane mass equal to the maximum take-off mass at sea level;

3) level, smooth, dry and hard take-off surfaces (landplanes);

4) smooth water of declared density (seaplanes);

b) over selected ranges of the following variables:

1) atmospheric conditions, namely: altitude and also pressure-altitude and temperature;

2) aeroplane mass;

3) steady wind velocity parallel to the direction of take-off;

4) steady wind velocity normal to the direction of take-off (seaplanes);

5) uniform take-off surface slope (landplanes);

6) type of take-off surface (landplanes);

7) water surface condition (seaplanes);

8) density of water (seaplanes);

9) strength of current (seaplanes).

2.1.2 The methods of correcting the performance data to obtain data for adverse atmospheric conditions include appropriate allowance for any increased airspeeds and cowl flap or radiator shutter openings necessary under such conditions to maintain engine temperatures within appropriate limits.

2.1.3 For seaplanes appropriate interpretations of the term landing gear, etc., are made to provide for the operation of retractable floats, if employed.

2.2 Take-off safety speed

2.2.1 The take-off safety speed is an airspeed (CAS) so selected that it is not less than:

a) $1.20V_{S_1}$, for aeroplanes with two power-units;

b) $1.15V_{S_1}$, for aeroplanes having more than two power-units;

c) 1.10 times the minimum control speed, V_{MC} established as prescribed in 2.3;

where V_{S_1} is appropriate to the configuration, as described in 2.3.1 b), c) and d).

2.3 Minimum control speed

2.3.1 The minimum control speed, V_{MC}, is determined not to exceed a speed equal to $1.2V_{S_1}$, where V_{S_1} corresponds with the maximum certificated take-off mass with:

a) maximum take-off power on all power-units;

b) landing gear retracted;

c) wing flaps in take-off position;

d) cowl flaps and radiator shutters in the position recommended for normal use during take-off;

e) aeroplane trimmed for take-off;

f) aeroplane airborne and ground effect negligible.

2.3.2 The minimum control speed is such that, when any one power-unit is made inoperative at that speed, it is possible to recover control of the aeroplane with the one power-unit still inoperative and to maintain the aeroplane in straight flight at that speed either with zero yaw or with a bank not in excess of 5 degrees.

2.3.3 From the time at which the power-unit is made inoperative to the time at which recovery is complete, exceptional skill, alertness, or strength on the part of the pilot is not required to prevent any loss of altitude other than that implicit in the loss of performance or any change of heading in excess of 20 degrees, nor does the aeroplane assume any dangerous attitude.

2.3.4 It is demonstrated that to maintain the aeroplane in steady straight flight at this speed after recovery and before retrimming does not require a rudder control force exceeding 800 N and does not make it necessary for the flight crew to reduce the power of the remaining power-units.

2.4 Critical point

2.4.1 The critical point is a selected point at which, for the purpose of determining the accelerate-stop distance and the take-off path, failure of the critical power-unit is assumed to occur. The pilot is provided with a ready and reliable means of determining when the critical point has been reached.

2.4.2 If the critical point is located so that the airspeed at that point is less than the take-off safety speed, it is demonstrated that, in the event of sudden failure of the critical power-unit at all speeds down to the lowest speed corresponding with the critical point, the aeroplane is controllable satisfactorily and that the take-off can be continued safely, using normal piloting skill, without reducing the thrust of the remaining power-units.

2.5 Accelerate-stop distance required

2.5.1 The accelerate-stop distance required is the distance required to reach the critical point from a standing start and, assuming the critical power-unit to fail suddenly at this point, to stop if a landplane, or to bring the aeroplane to a speed of approximately 6 km/h (3 kt) if a seaplane.

2.5.2 Use of braking means in addition to, or in lieu of, wheel brakes is permitted in determining this distance, provided that they are reliable and that the manner of their employment is such that consistent results can be expected under normal conditions of operation, and provided that exceptional skill is not required to control the aeroplane.

2.5.3 The landing gear remains extended throughout this distance.

2.6 Take-off path

2.6.1 *General*

2.6.1.1 The take-off path is determined either by the method of elements, 2.6.2, or by the continuous method, 2.6.3, or by any acceptable combination of the two.

2.6.1.2 Adjustment of the provisions of 2.6.2.1 c) 1) and 2.6.3.1 c) is permitted when the take-off path would be affected by the use of an automatic pitch changing device, provided that a level of performance safety exemplified by 2.6 is demonstrated.

2.6.2 *Method of elements*

2.6.2.1 In order to define the take-off path, the following elements are determined:

a) The distance required to accelerate the aeroplane from a standing start to the point at which the take-off safety speed is first attained, subject to the following provisions:

1) the critical power-unit is made inoperative at the critical point;

2) the aeroplane remains on or close to the ground;

3) the landing gear remains extended.

b) The horizontal distance traversed and the height attained by the aeroplane operating at the take-off safety speed during the time required to retract the landing gear, retraction being initiated at the end of 2.6.2.1 a) with:

1) the critical power-unit inoperative, its propeller windmilling, and the propeller pitch control in the position recommended for normal use during take-off, except that, if the completion of the retraction of the landing gear occurs later than the completion of the stopping of the propeller initiated in accordance with 2.6.2.1 c) 1), the propeller may be assumed to be stopped throughout the remainder of the time required to retract the landing gear;

2) the landing gear extended.

c) When the completion of the retraction of the landing gear occurs earlier than the completion of the stopping of the propeller, the horizontal distance traversed and the height attained by the aeroplane in the time elapsed from the end of 2.6.2.1 b) until the rotation of the inoperative propeller has been stopped, when:

1) the operation of stopping the propeller is initiated not earlier than the instant the aeroplane has attained a total height of 15.2 m (50 ft) above the take-off surface;

2) the aeroplane speed is equal to the take-off safety speed;

3) the landing gear is retracted;

4) the inoperative propeller is windmilling with the propeller pitch control in the position recommended for normal use during take-off.

d) The horizontal distance traversed and the height attained by the aeroplane in the time elapsed from the end of 2.6.2.1 c) until the time limit on the use of take-off power is reached, while operating at the take-off safety speed, with:

1) the inoperative propeller stopped;

2) the landing gear retracted.

The elapsed time from the start of the take-off need not extend beyond a total of 5 minutes.

e) The slope of the flight path with the aeroplane in the configuration prescribed in 2.6.2.1 d) and with the remaining power-unit(s) operating within the maximum continuous power limitations, where the time limit on the use of take-off power is less than 5 minutes.

2.6.2.2 If satisfactory data are available, the variations in drag of the propeller during feathering and of the landing gear throughout the period of retraction are permitted to be taken into account in determining the appropriate portions of the elements.

2.6.2.3 During the take-off and subsequent climb represented by the elements, the wing flap control setting is not changed, except that changes made before the critical point has been reached, and not earlier than 1 minute after the critical point has been passed, are permitted; in this case, it is demonstrated that such changes can be accomplished without undue skill, concentration, or effort on the part of the pilot.

2.6.3 *Continuous method*

2.6.3.1 The take-off path is determined from an actual take-off during which:

a) the critical power-unit is made inoperative at the critical point;

b) the climb-away is not initiated until the take-off safety speed has been reached and the airspeed does not fall below this value in the subsequent climb;

c) retraction of the landing gear is not initiated before the aeroplane reaches the take-off safety speed;

d) the wing flap control setting is not changed, except that changes made before the critical point has been reached, and not earlier than 1 minute after the critical point has been passed, are permitted; in this case, it is demonstrated that such changes can be accomplished without undue skill, concentration, or effort on the part of the pilot;

e) the operation of stopping the propeller is not initiated until the aeroplane has cleared a point 15.2 m (50 ft) above the take-off surface.

2.6.3.2 Suitable methods are provided and employed to take into account, and to correct for, any vertical gradient of wind velocity which may exist during the take-off.

2.7 Take-off distance required

The take-off distance required is the horizontal distance along the take-off flight path from the start of the take-off to a point where the aeroplane attains a height of 15.2 m (50 ft) above the take-off surface.

2.8 Temperature accountability

Operating correction factors for take-off mass and take-off distance are determined to account for temperature above and below those of the Standard Atmosphere. These factors are obtained as follows:

a) For any specific aeroplane type the average full temperature accountability is computed for the range of mass and altitudes above sea level, and for ambient temperatures expected in operation. Account is taken of the temperature effect both on the aerodynamic characteristics of the aeroplane and on the engine power. The full temperature accountability is expressed per degree of temperature in terms of a mass correction, a take-off distance correction and a change, if any, in the position of the critical point.

b) Where 2.6.2 is used to determine the take-off path, the operating correction factors for the aeroplane mass and take-off distance are at least one half of the full accountability values. Where 2.6.3 is used to determine the take-off path, the operating correction factors for the aeroplane mass and take-off distance are equal to the full accountability values. With both methods, the position of the critical point is further corrected by the average amount necessary to assure that the aeroplane can stop within the runway length at the ambient temperature, except that the speed at the critical point is not less than a minimum at which the aeroplane can be controlled with the critical power-unit inoperative.

3. Landing

3.1 General

The landing performance is determined:

a) for the following conditions:

1) sea level;

2) aeroplane mass equal to the maximum landing mass at sea level;

3) level, smooth, dry and hard landing surfaces (landplanes);

4) smooth water of declared density (seaplanes);

b) over selected ranges of the following variables:

1) atmospheric conditions, namely: altitude and also pressure-altitude and temperature;

2) aeroplane mass;

3) steady wind velocity parallel to the direction of landing;

4) uniform landing-surface slope (landplanes);

5) type of landing surface (landplanes);

6) water surface condition (seaplanes);

7) density of water (seaplanes);

8) strength of current (seaplanes).

3.2 Landing distance

3.2.1 The landing distance is the horizontal distance between that point on the landing surface at which the aeroplane is brought to a complete stop or, for seaplanes, to a speed of approximately 6 km/h (3 kt) and that point on the landing surface which the aeroplane cleared by 15.2 m (50 ft).

3.3 Landing technique

3.3.1 In determining the landing distance:

a) immediately before reaching the 15.2 m (50 ft) height, a steady approach is maintained, landing gear fully extended, with an airspeed of not less than $1.3V_{S0}$;

b) the nose of the aeroplane is not depressed in flight nor the forward thrust increased by application of engine power after reaching the 15.2 m (50 ft) height;

c) the wing flap control is set in the landing position, and remains constant during the final approach, flare out and touch down, and on the landing surface at air speeds above $0.9V_{S0}$. When the aeroplane is on the landing surface and the airspeed has fallen to less than $0.9V_{S0}$, change of the wing-flap-control setting is permitted;

d) the landing is made in a manner such that there is no excessive vertical acceleration, no excessive tendency to bounce, and no display of any uncontrollable or otherwise undesirable ground (water) handling characteristics, and such that its repetition does not require either an exceptional degree of skill on the part of the pilot, or exceptionally favourable conditions;

e) wheel brakes are not used in a manner such as to produce excessive wear of brakes or tires, and the operating pressures on the braking system are not in excess of those approved.

3.3.2 In addition to, or in lieu of, wheel brakes, other reliable braking means are permitted to be used in determining the landing distance, provided that the manner of their employment is such that consistent results can be expected under normal conditions of operation and that exceptional skill is not required to control the aeroplane.

3.3.3 The gradient of the steady approach and the details of the technique used in determining the landing distance, together with such variations in the technique as are recommended for landing with the critical power-units inoperative, and any appreciable variation in landing distance resulting therefrom, are entered in the flight manual.

Example 2

Purpose and scope

The purpose of the following example is to illustrate the level of performance intended by the provisions of Chapter 5 as applicable to the types of aeroplanes described below.

This material was contained in substance in Attachment A to the now superseded edition of Annex 6 which became effective on 1 May 1953. It is based on the type of requirements developed by the Standing Committee on Performance* with such detailed changes as are necessary to make it reflect as closely as possible a performance code that has been used nationally.

A substantial number of civil transport aeroplanes have been manufactured and are being operated in accordance with these codes. Those aeroplanes are powered with reciprocating engines, turbo-propellers and turbo-jets. They embrace twin-engined and four-engined aeroplanes over a mass range from approximately 5 500 kg to 70 000 kg over a stalling speed range, V_{S0} , from approximately 110 to 170 km/h (60 to 90 kt) and over a wing loading range from approximately 120 to 350 kg/m^2. Cruising speeds range up to 740 km/h (400 kt). Those aeroplanes have been used in a very wide range of altitude, air temperature and humidity conditions.

Although only past experience can warrant the fact that this example illustrates the level of performance intended by the Standards and Recommended Practices of Chapter 5, it is considered to be applicable, except for some variations in detail as necessary to fit particular cases, over a much wider range of aeroplane characteristics. Reservation should, however, be made concerning one point. The landing distance specification of this example, not being derived from the same method as other specifications, is valid only for the range of conditions stated for Example 1 in this Attachment.

This example is not intended for application to aeroplanes having short take-off and landing (STOL) or vertical take-off and landing (VTOL) capabilities.

No detailed study has been made of the applicability of this example to operations in all-weather conditions. The validity of this example has not therefore been established for operations which may involve low decision heights and be associated with low weather minima operating techniques and procedures.

1. Definitions

Declared distances.

a) *Take-off run available (TORA).* The length of runway declared available and suitable for the ground run of an aeroplane taking off.

b) *Take-off distance available (TODA).* The length of the take-off run available plus the length of the clearway, if provided.

* The ICAO Standing Committee on Performance, established as a result of recommendations of the Airworthiness and Operations Divisions at their Fourth Sessions, in 1951, met four times between 1951 and 1953.

c) *Accelerate-stop distance available (ASDA).* The length of the take-off run available plus the length of the stopway, if provided.

d) *Landing distance available (LDA).* The length of runway which is declared available and suitable for the ground run of an aeroplane landing.

Note.— The calculation of declared distances is described in Annex 14, Volume I, Attachment A.

Declared temperature. A temperature selected in such a way that when used for performance purposes, over a series of operations, the average level of safety is not less than would be obtained by using official forecast temperatures.

Expected. Used in relation to various aspects of performance (e.g. rate or gradient of climb), this term means the standard performance for the type, in the relevant conditions (e.g. mass, altitude and temperature).

Height. The vertical distance of a level, a point, or an object considered as a point, measured from a specified datum.

Note.— For the purposes of this example, the point referred to above is the lowest part of the aeroplane and the specified datum is the take-off or landing surface, whichever is applicable.

Landing surface. That part of the surface of an aerodrome which the aerodrome authority has declared available for the normal ground or water run of aircraft landing in a particular direction.

Net gradient. The net gradient of climb throughout these requirements is the expected gradient of climb diminished by the manoeuvre performance (i.e. that gradient of climb necessary to provide power to manoeuvre) and by the margin (i.e. that gradient of climb necessary to provide for those variations in performance which are not expected to be taken explicit account of operationally).

Reference humidity. The relationship between temperature and reference humidity is defined as follows:

— at temperatures at and below ISA, 80 per cent relative humidity,

— at temperatures at and above ISA + 28°C, 34 per cent relative humidity,

— at temperatures between ISA and ISA + 28°C, the relative humidity varies linearly between the humidity specified for those temperatures.

Take-off surface. That part of the surface of an aerodrome which the aerodrome authority has declared available for the normal ground or water run of aircraft taking off in a particular direction.

TAS (True airspeed). The speed of the aeroplane relative to undisturbed air.

Note.— See Chapter 1 and Annexes 8 and 14, Volume I, for other definitions.

2. Take-off

2.1 Mass

The mass of the aeroplane at take-off is not to exceed the maximum take-off mass specified in the flight manual for the altitude and temperature at which the take-off is to be made.

2.2 Performance

The performance of the aeroplane, as determined from the information contained in the flight manual, is such that:

a) the accelerate-stop distance required does not exceed the accelerate-stop distance available;

b) the take-off run required does not exceed the take-off run available;

c) the take-off distance required does not exceed the take-off distance available;

d) the net take-off flight path starting at a point 10.7 m (35 ft) above the ground at the end of the take-off distance required provides a vertical clearance of not less than 6 m (20 ft) plus 0.005D above all obstacles lying within 60 m plus half the wing span of the aeroplane plus 0.125D on either side of the intended track until the relevant altitude laid down in the operations manual for an en-route flight has been attained; except that obstacles lying beyond 1 500 m on either side of the flight path need not be cleared.

The distance D is the horizontal distance that the aeroplane has travelled from the end of the take-off distance available.

Note.— This need not be carried beyond the point at which the aeroplane would be able, without further gaining in height, to commence a landing procedure at the aerodrome of take-off or, alternatively, has attained the minimum safe altitude for commencing flight to another aerodrome.

However, the lateral obstacle clearance is liable to be reduced (below the values stated above) when, and to the extent that, this is warranted by special provisions or conditions which assist the pilot to avoid inadvertent lateral deviations from the intended flight path. For example, particularly in poor weather conditions, a precise radio aid may assist the pilot to maintain the intended flight path. Also, when the take-off is made in sufficiently good visibility

conditions, it may, in some cases, be possible to avoid obstacles which are clearly visible but may be within the lateral limits noted in 2.2 d).

Note.— The procedures used in determining the accelerate-stop distance required, the take-off run required, the take-off distance required and the net take-off flight path are described in the Appendix to this example.

2.3 Conditions

For the purpose of 2.1 and 2.2, the performance is that corresponding to:

a) the mass of the aeroplane at the start of take-off;

b) an altitude equal to the elevation of the aerodrome;

c) either the ambient temperature at the time of take-off, or a declared temperature giving an equivalent average level of performance;

and for the purpose of 2.2:

d) the surface slope in the direction of take-off (land-planes);

e) not more than 50 per cent of the reported wind component opposite to the direction of take-off, and not less than 150 per cent of the reported wind component in the direction of take-off. In certain cases of operation of seaplanes, it has been found necessary to take account of the reported wind component normal to the direction of take-off.

2.4 Power failure point

In applying 2.2 the power failure point chosen for establishing compliance with 2.2 a) is not nearer to the starting point than that used for establishing compliance with 2.2 b) and 2.2 c).

2.5 Turns

The net take-off flight path may include turns, provided that:

a) the radius of steady turn assumed is not less than that scheduled for this purpose in the flight manual;

b) if the planned change of direction of the take-off flight path exceeds 15 degrees, the clearance of the net take-off flight path above obstacles is at least 30 m (100 ft) during and after the turn, and the appropriate allowance, as prescribed in the flight manual, is made for the reduction in assumed gradient of climb during the turn;

c) the distance D is measured along the intended track.

3. En route

3.1 All power-units operating

At each point along the route and planned diversion therefrom, the all power-units operating performance ceiling appropriate to the aeroplane mass at that point, taking into account the amount of fuel and oil expected to be consumed, is not less than the minimum altitude (see Chapter 4, 4.2.6) or, if greater, the planned altitude which it is intended to maintain with all power-units operating, in order to ensure compliance with 3.2 and 3.3.

3.2 One power-unit inoperative

From each point along the route and planned diversions therefrom, it is possible in the event of one power-unit becoming inoperative to continue the flight to an en-route alternate aerodrome where a landing can be made in accordance with 4.2 and, on arrival at the aerodrome, the net gradient of climb is not less than zero at a height of 450 m (1 500 ft) above the elevation of the aerodrome.

3.3 Two power-units inoperative
(applicable only to aeroplanes with four power-units)

For each point along the route or planned diversions therefrom, at which the aeroplane is more than 90 minutes' flying time at all power-units operating cruising speed from an en-route alternate aerodrome, the two power-units inoperative net flight path is such that a height of at least 300 m (1 000 ft) above terrain can be maintained until arrival at such an aerodrome.

Note.— The net flight path is that attainable from the expected gradient of climb or descent diminished by 0.2 per cent.

3.4 Conditions

The ability to comply with 3.1, 3.2 and 3.3 is assessed:

a) either on the basis of forecast temperatures, or on the basis of declared temperatures giving an equivalent average level of performance;

b) on the forecast data on wind velocity versus altitude and locality assumed for the flight plan as a whole;

c) in the case of 3.2 and 3.3, on the scheduled gradient of climb or gradient of descent after power failure appropriate to the mass and altitude at each point considered;

d) on the basis that, if the aeroplane is expected to gain altitude at some point in the flight after power failure has occurred, a satisfactory positive net gradient of climb is available;

e) in the case of 3.2 on the basis that the minimum altitude (see Chapter 4, 4.2.6), appropriate to each point between the place at which power failure is assumed to occur and the aerodrome at which it is intended to alight, is exceeded;

f) in the case of 3.2, making reasonable allowance for indecision and navigational error in the event of power-unit failure at any point.

4. Landing

4.1 Mass

The calculated mass for the expected time of landing at the aerodrome of intended landing or any destination alternate aerodrome is not to exceed the maximum specified in the flight manual for the altitude and temperature at which the landing is to be made.

4.2 Landing distance required

The landing distance required at the aerodrome of the intended landing or at any alternate aerodrome, as determined from the flight manual, is not to exceed the landing distance available on:

a) the most suitable landing surface for a landing in still air; and, if more severe,

b) any other landing surface that may be required for landing because of expected wind conditions at the time of arrival.

4.3 Conditions

For the purpose of 4.2, the landing distance required is that corresponding to:

a) the calculated mass of the aeroplane for the expected time of landing;

b) an altitude equal to the elevation of the aerodrome;

c) the expected temperature at which landing is to be made or a declared temperature giving an equivalent average level of performance;

d) the surface slope in the direction of landing;

e) for the purpose of 4.2 a), still air;

f) for the purpose of 4.2 b), not more than 50 per cent of the expected wind component along the landing path and opposite to the direction of landing and not less than 150 per cent of the expected wind component in the direction of landing.

APPENDIX TO EXAMPLE 2 ON AEROPLANE PERFORMANCE OPERATING LIMITATIONS — PROCEDURES USED IN DETERMINING TAKE-OFF AND LANDING PERFORMANCE

1. General

1.1 Unless otherwise stated, reference humidity and still air conditions are applied.

1.2 The performance of the aeroplane is determined in such a manner that the approved airworthiness limitations for the aeroplane and its systems are not exceeded.

1.3 The wing flap positions for showing compliance with the performance specifications are selected.

Note.— Alternative wing flap positions are made available, if so desired, in such a manner as to be consistent with acceptably simple operating techniques.

1.4 The position of the centre of gravity is selected within the permissible range so that the performance achieved in the configuration and power indicated in the specification under consideration is a minimum.

1.5 The performance of the aeroplane is determined in such a manner that under all conditions the approved limitations for the powerplant are not exceeded.

1.6 While certain configurations of cooling gills have been specified based upon maximum anticipated temperature, the use of other positions is acceptable provided that an equivalent level of safety is maintained.

1.7 The determined performance is so scheduled that it can serve directly in showing compliance with the aeroplane performance operating limitations.

2. Take-off

2.1 General

2.1.1 The following take-off data are determined for sea level pressure and temperature in the Standard Atmosphere, and reference humidity conditions, with the aeroplane at the corresponding maximum take-off mass for a level, smooth, dry and hard take-off surface (landplanes) and for smooth water of declared density (seaplanes):

a) take-off safety speed and any other relevant speed;

b) power failure point;

c) power failure point criterion, e.g. airspeed indicator reading;

} associated with items d), e), f)

d) accelerate-stop distance required;

e) take-off run required;

f) take-off distance required;

g) net take-off flight path;

h) radius of a steady Rate 1 (180 degrees per minute) turn made at the airspeed used in establishing the net take-off flight path, and the corresponding reduction in gradient of climb in accordance with the conditions of 2.9.

2.1.2 The determination is also made over selected ranges of the following variables:

a) aeroplane mass;

b) pressure-altitude at the take-off surface;

c) outside air temperature;

d) steady wind velocity parallel to the direction of take-off;

e) steady wind velocity normal to the direction of take-off (seaplanes);

f) take-off surface slope over the take-off distance required (landplanes);

g) water surface condition (seaplanes);

h) density of water (seaplanes);

i) strength of current (seaplanes);

j) power failure point (subject to provisions of 2.4.3).

2.1.3 For seaplanes appropriate interpretations of the term landing gear, etc., are made to provide for the operation of retractable floats, if employed.

2.2 Take-off safety speed

2.2.1 The take-off safety speed is an airspeed (CAS) so selected that it is not less than:

a) $1.20V_{S1}$, for aeroplanes with two power-units;

b) $1.15V_{S1}$, for aeroplanes having more than two power-units;

c) 1.10 times the minimum control speed, V_{MC}, established as prescribed in 2.3;

d) the minimum speed prescribed in 2.9.7.6;

where V_{S1} is appropriate to the take-off configuration.

Note.— See Example 1 for definition of V_{S1}.

2.3 Minimum control speed

2.3.1 The minimum control speed is such that, when any one power-unit is made inoperative at that speed, it is possible to recover control of the aeroplane with the one power-unit still inoperative and to maintain the aeroplane in straight flight at that speed either with zero yaw or with a bank not in excess of 5 degrees.

2.3.2 From the time at which the power-unit is made inoperative to the time at which recovery is complete, exceptional skill, alertness, or strength, on the part of the pilot is not required to prevent any loss of altitude other than that implicit in the loss of performance or any change of heading in excess of 20 degrees, nor does the aeroplane assume any dangerous attitude.

2.3.3 It is demonstrated that to maintain the aeroplane in steady straight flight at this speed after recovery and before retrimming does not require a rudder control force exceeding 800 N and does not make it necessary for the flight crew to reduce the power of the remaining power-units.

2.4 Power failure point

2.4.1 The power failure point is the point at which sudden complete loss of power from the power-unit, critical from the performance aspect in the case considered, is assumed to occur. If the airspeed corresponding to this point is less than the take-off safety speed, it is demonstrated that, in the event of sudden failure of the critical power-unit at all speeds down to the lowest speed corresponding with the power failure point, the aeroplane is controllable satisfactorily and that the take-off can be continued safely, using normal piloting skill, without:

a) reducing the thrust of the remaining power-units; and

b) encountering characteristics which would result in unsatisfactory controllability on wet runways.

2.4.2 If the critical power-unit varies with the configuration, and this variation has a substantial effect on performance, either the critical power-unit is considered separately for each element concerned, or it is shown that the established performance provides for each possibility of single power-unit failure.

2.4.3 The power failure point is selected for each take-off distance required and take-off run required, and for each accelerate-stop distance required. The pilot is provided with a ready and reliable means of determining when the applicable power failure point has been reached.

2.5 Accelerate-stop distance required

2.5.1 The accelerate-stop distance required is the distance required to reach the power failure point from a standing start and, assuming the critical power-unit to fail suddenly at this point, to stop if a landplane, or to bring the aeroplane to a speed of approximately 9 km/h (5 kt) if a seaplane.

2.5.2 Use of braking means in addition to, or in lieu of, wheel brakes is permitted in determining this distance, provided that they are reliable and that the manner of their employment is such that consistent results can be expected under normal conditions of operation, and provided that exceptional skill is not required to control the aeroplane.

2.6 Take-off run required

The take-off run required is the greater of the following:

1.15 times the distance required with all power-units operating to accelerate from a standing start to take-off safety speed;

1.0 times the distance required to accelerate from a standing start to take-off safety speed assuming the critical power-unit to fail at the power failure point.

2.7 Take-off distance required

2.7.1 The take-off distance required is the distance required to reach a height of:

10.7 m (35 ft), for aeroplanes with two power-units,

15.2 m (50 ft), for aeroplanes with four power-units,

above the take-off surface, with the critical power-unit failing at the power failure point.

2.7.2 The heights mentioned above are those which can be just cleared by the aeroplane when following the relevant flight path in an unbanked attitude with the landing gear extended.

Note.— Paragraph 2.8 and the corresponding operating requirements, by defining the point at which the net take-off flight path starts as the 10.7 m (35 ft) height point, ensure that the appropriate net clearances are achieved.

2.8 Net take-off flight path

2.8.1 The net take-off flight path is the one-power-unit-inoperative flight path which starts at a height of 10.7 m (35 ft) at the end of the take-off distance required and extends to a height of at least 450 m (1 500 ft) calculated in accordance with the conditions of 2.9, the expected gradient of climb being diminished at each point by a gradient equal to:

0.5 per cent, for aeroplanes with two power-units,

0.8 per cent, for aeroplanes with four power-units.

2.8.2 The expected performance with which the aeroplane is credited in the take-off wing flap, take-off power condition, is available at the selected take-off safety speed and is substantially available at 9 km/h (5 kt) below this speed.

2.8.3 In addition the effect of significant turns is scheduled as follows:

Radius. The radius of a steady Rate 1 (180 degrees per minute) turn in still air at the various true airspeeds corresponding to the take-off safety speeds for each wing-flap setting used in establishing the net take-off flight path below the 450 m (1 500 ft) height point, is scheduled.

Performance change. The approximate reduction in performance due to the above turns is scheduled and corresponds to a change in gradient of

$\left[0.5\left(\frac{V}{185.2}\right)^2\right]$ % where V is the true airspeed in km/h; and

$\left[0.5\left(\frac{V}{100}\right)^2\right]$ % where V is the true airspeed in knots.

2.9 Conditions

2.9.1 *Air speed*

2.9.1.1 In determining the take-off distance required, the selected take-off safety speed is attained before the end of the take-off distance required is reached.

2.9.1.2 In determining the net take-off flight path below a height of 120 m (400 ft), the selected take-off safety speed is maintained, i.e. no credit is taken for acceleration before this height is reached.

2.9.1.3 In determining the net take-off flight path above a height of 120 m (400 ft), the airspeed is not less than the selected take-off safety speed. If the aeroplane is accelerated after reaching a height of 120 m (400 ft) and before reaching a height of 450 m (1 500 ft), the acceleration is assumed to take place in level flight and to have a value equal to the true acceleration available diminished by an acceleration equivalent to a climb gradient equal to that specified in 2.8.1.

2.9.1.4 The net take-off flight path includes transition to the initial en-route configuration and airspeed. During all transition stages, the above provisions regarding acceleration are complied with.

2.9.2 *Wing flaps*

The wing flaps are in the same position (take-off position) throughout, except:

a) that the flaps may be moved at heights above 120 m (400 ft), provided that the airspeed specifications of 2.9.1 are met and that the take-off safety speed applicable to subsequent elements is appropriate to the new flap position;

b) the wing flaps may be moved before the earliest power failure point is reached, if this is established as a satisfactory normal procedure.

2.9.3 *Landing gear*

2.9.3.1 In establishing the accelerate-stop distance required and the take-off run required, the landing gear are extended throughout.

2.9.3.2 In establishing the take-off distance required, retraction of the landing gear is not initiated until the selected take-off safety speed has been reached, except that, when the selected take-off safety speed exceeds the minimum value prescribed in 2.2 retraction of the landing gear may be initiated when a speed greater than the minimum value prescribed in 2.2 has been reached.

2.9.3.3 In establishing the net take-off flight path, the retraction of the landing gear is assumed to have been initiated not earlier than the point prescribed in 2.9.3.2.

2.9.4 *Cooling*

For that part of the net take-off flight path before the 120 m (400 ft) height point, plus any transition element which starts at the 120 m (400 ft) height point, the cowl flap position is such that, starting the take-off at the maximum temperatures permitted for the start of take-off, the relevant maximum temperature limitations are not exceeded in the maximum anticipated air temperature conditions. For any subsequent part of the net take-off flight path, the cowl flap position and airspeed are such that the appropriate temperature limitations would not be exceeded in steady flight in the maximum anticipated air temperatures. The cowl flaps of all power-units at the start of the take-off are as above, and the cowl flaps of the inoperative power-unit may be assumed to be closed upon reaching the end of the take-off distance required.

2.9.5 *Power unit conditions*

2.9.5.1 From the starting point to the power failure point, all power-units may operate at maximum take-off power conditions. The operative power-units do not operate at maximum take-off power limitations for a period greater than that for which the use of maximum take-off power is permitted.

2.9.5.2 After the period for which the take-off power may be used, maximum continuous power limitations are not exceeded. The period for which maximum take-off power is used is assumed to begin at the start of the take-off run.

2.9.6 *Propeller conditions*

At the starting point, all propellers are set in the condition recommended for take-off. Propeller feathering or pitch coarsening is not initiated (unless it is by automatic or auto-selective means) before the end of the take-off distance required.

2.9.7 *Technique*

2.9.7.1 In that part of the net take-off flight path prior to the 120 m (400 ft) height point, no changes of configuration or power are made which have the effect of reducing the gradient of climb.

2.9.7.2 The aeroplane is not flown or assumed to be flown in a manner which would make the gradient of any part of the net take-off flight path negative.

2.9.7.3 The technique chosen for those elements of the flight path conducted in steady flight, which are not the subject of numerical climb specifications, are such that the net gradient of climb is not less than 0.5 per cent.

2.9.7.4 All information which it may be necessary to furnish to the pilot, if the aeroplane is to be flown in a manner consistent with the scheduled performance, is obtained and recorded.

2.9.7.5 The aeroplane is held on, or close to the ground until the point at which it is permissible to initiate landing gear retraction has been reached.

2.9.7.6 No attempt is made to leave the ground until a speed has been reached which is at least:

15 per cent above the minimum possible unstick speed with all power-units operating;

7 per cent above the minimum possible unstick speed with the critical power-unit inoperative;

except that these unstick speed margins may be reduced to 10 per cent and 5 per cent, respectively, when the limitation is due to landing gear geometry and not to ground stalling characteristics.

Note.— Compliance with this specification is determined by attempting to leave the ground at progressively lower speeds (by normal use of the controls except that up-elevator is applied earlier and more coarsely than is normal) until it has been shown to be possible to leave the ground at a speed which complies with these specifications, and to complete the take-off. It is recognized that during the test manoeuvre, the usual margin of control associated with normal operating techniques and scheduled performance information will not be available.

2.10 Methods of derivation

2.10.1 *General*

The take-off field lengths required are determined from measurements of actual take-offs and ground runs. The net take-off flight path is determined by calculating each section separately on the basis of performance data obtained in steady flight.

2.10.2 *Net take-off flight path*

Credit is not taken for any change in configuration until that change is complete, unless more accurate data are available to substantiate a less conservative assumption; ground effect is ignored.

2.10.3 *Take-off distance required*

Satisfactory corrections for the vertical gradient of wind velocity are made.

3. Landing

3.1 General

The landing distance required is determined:

a) for the following conditions:

1) sea level;

2) aeroplane mass equal to the maximum landing mass at sea level;

3) level, smooth, dry and hard landing surfaces (landplanes);

4) smooth water of declared density (seaplanes);

b) over selected ranges of the following variables:

1) atmospheric conditions, namely: altitude, or pressure-altitude and temperature;

2) aeroplane mass;

3) steady wind velocity parallel to the direction of landing;

4) uniform landing surface slope (landplanes);

5) nature of landing surface (landplanes);

6) water surface condition (seaplanes);

7) density of water (seaplanes);

8) strength of current (seaplanes).

3.2 Landing distance required

The landing distance required is the measured horizontal distance between that point on the landing surface at which the aeroplane is brought to a complete stop or, for seaplanes, to a speed of approximately 9 km/h (5 kt) and that point on the landing surface which the aeroplane cleared by 15.2 m (50 ft) multiplied by a factor of 1/0.7.

Note.— Some States have found it necessary to use a factor of 1/0.6 instead of 1/0.7.

3.3 Landing technique

3.3.1 In determining the measured landing distance:

a) immediately before reaching the 15.2 m (50 ft) height, a steady approach is maintained, landing gear fully extended, with an airspeed of at least $1.3V_{S0}$;

Note.— See Example 1 for definition of V_{S0}.

b) the nose of the aeroplane is not depressed in flight nor the forward thrust increased by application of engine power after reaching the 15.2 m (50 ft) height;

c) the power is not reduced in such a way that the power used for establishing compliance with the balked landing climb requirement would not be obtained within 5 seconds if selected at any point down to touch down;

d) reverse pitch or reverse thrust are not used when establishing the landing distance using this method and field length factor. Ground fine pitch is used if the effective drag/weight ratio in the airborne part of the landing distance is not less satisfactory than that of conventional piston-engined aeroplane;

Note.— This does not mean that reverse pitch or reverse thrust, or use of ground fine pitch, are to be discouraged.

e) the wing flap control is set in the landing position, and remains constant during the final approach, flare out and touch down, and on the landing surface at airspeeds above $0.9V_{S0}$. When the aeroplane is on the landing surface and the airspeed has fallen to less than $0.9V_{S0}$, change of the wing-flap-control setting is acceptable;

f) the landing is made in a manner such that there is no excessive vertical acceleration, no excessive tendency to bounce, and no display of any other undesirable handling characteristics, and such that its repetition does not require either an exceptional degree of skill on the part of the pilot, or exceptionally favourable conditions;

g) wheel brakes are not used in a manner such as to produce excessive wear of brakes or tires, and the operating pressures on the braking system are not in excess of those approved.

3.3.2 The gradient of the steady approach and the details of the technique used in determining the landing distance, together with such variations in the technique as are recommended for landing with the critical engine inoperative, and any appreciable variation in landing distance resulting therefrom, are entered in the flight manual.

Example 3

Purpose and scope

The purpose of the following example is to illustrate the level of performance intended by the provisions of Chapter 5 as applicable to turbine-powered subsonic transport type aeroplanes over 5 700 kg maximum certificated take-off mass having two or more engines. However, where relevant, it can be applied to all turbine-powered or piston-engined subsonic aeroplanes having two, three or four engines. This example is shown to be compatible with principal national airworthiness codes in effect in 1969.

No study has been made of the applicability of this material to turbine-powered subsonic aeroplanes having characteristics other than those of the transport aeroplanes introduced into service up to 1969.

This example is not intended for application to aeroplanes having short take-off and landing (STOL) or vertical take-off and landing (VTOL) capabilities.

No detailed study has been made of the applicability of this example to operations in all-weather conditions. The validity of this example has not therefore been established for operations which may involve low decision heights and be associated with low minima operating techniques and procedures.

1. General

1.1 The provisions of 1 to 5 are to be complied with, unless deviations therefrom are specifically authorized by the State of Registry on the ground that the special circumstances of a particular case make a literal observance of these provisions unnecessary for safety.

1.2 Compliance with 1 to 5 is to be established using performance data in the flight manual and in accordance with other applicable operating requirements. In no case may the limitations in the flight manual be exceeded. However,

additional limitations may be applied when operational conditions not included in the flight manual are encountered.

1.3 The procedures scheduled in the flight manual are to be followed except where operational circumstances require the use of modified procedures in order to maintain the intended level of safety.

Note.— See the Airworthiness Manual *(Doc 9760) for the related airworthiness performance guidance material.*

2. Aeroplane take-off performance limitations

2.1 No aeroplane is taken off at a mass which exceeds the take-off mass specified in the flight manual for the altitude of the aerodrome and for the ambient temperature existing at the time of the take-off.

2.2 No aeroplane is taken off at a mass such that, allowing for normal consumption of fuel and oil in flight to the aerodrome of destination and to the destination alternate aerodromes, the mass on arrival will exceed the landing mass specified in the flight manual for the altitude of each of the aerodromes involved and for the ambient temperatures anticipated at the time of landing.

2.3 No aeroplane is taken off at a mass which exceeds the mass at which, in accordance with the minimum distances for take-off scheduled in the flight manual, compliance with 2.3.1 to 2.3.3 inclusive is shown. These distances correspond with the altitude of the aerodrome, the runway, stopway and clearway to be used, the runway slope, the stopway slope, the clearway plane slope, and the ambient temperature and wind existing at the time of take-off.

2.3.1 The take-off run required does not exceed the length of the runway.

2.3.2 The accelerate-stop distance required does not exceed the length of the runway plus the length of the stopway, where present.

2.3.3 The take-off distance required does not exceed the length of the runway, plus the length of the clearway, where present, except that the sum of the lengths of the runway and the clearway is in no case considered as being greater than 1.5 times the length of the runway.

2.4 Credit is not taken for the length of the stopway or the length of the clearway unless they comply with the relevant specifications in Annex 14, Volume I.

Note.— In determining the length of the runway available, account is taken of the loss, if any, of runway length due to alignment of the aeroplane prior to take-off.

3. Take-off obstacle clearance limitations

3.1 No aeroplane is taken off at a mass in excess of that shown in the flight manual to correspond with a net take-off flight path which clears all obstacles either by at least a height of 10.7 m (35 ft) vertically or at least 90 m plus 0.125D laterally, where D is the horizontal distance the aeroplane has travelled from the end of take-off distance available, except as provided in 3.1.1 to 3.1.3 inclusive. In determining the allowable deviation of the net take-off flight path in order to avoid obstacles by at least the distances specified, it is assumed that the aeroplane is not banked before the clearance of the net take-off flight path above obstacles is at least 15.2 m (50 ft) and that the bank thereafter does not exceed 15 degrees. The net take-off flight path considered is for the altitude of the aerodrome and for the ambient temperature and wind component existing at the time of take-off.

3.1.1 Where the intended track does not include any change of heading greater than 15 degrees,

a) for operations conducted in VMC by day, or

b) for operations conducted with navigation aids such that the pilot can maintain the aeroplane on the intended track with the same precision as for operations specified in 3.1.1 a),

obstacles at a distance greater than 300 m on either side of the intended track need not be cleared.

3.1.2 Where the intended track does not include any change of heading greater than 15 degrees for operations conducted in IMC, or in VMC by night, except as provided in 3.1.1 b); and where the intended track includes changes of heading greater than 15 degrees for operations conducted in VMC by day, obstacles at a distance greater than 600 m on either side of the intended track need not be cleared.

3.1.3 Where the intended track includes changes of heading greater than 15 degrees for operations conducted in IMC, or in VMC by night, obstacles at a distance greater than 900 m on either side of the intended track need not be cleared.

4. En-route limitations

4.1 General

At no point along the intended track, is an aeroplane having three or more engines to be more than 90 minutes at normal cruising speed away from an aerodrome at which the distance specifications for alternate aerodromes (see 5.2) are complied with and where it is expected that a safe landing can be made, unless it complies with 4.3.1.1.

Note.— For the authorization of extended range operations by aeroplanes with two turbine engines, see 4.7 of this Part.

4.2 One engine inoperative

4.2.1 No aeroplane is taken off at a mass in excess of that which, in accordance with the one-engine-inoperative en-route net flight path data shown in the flight manual, permits compliance either with 4.2.1.1 or 4.2.1.2 at all points along the route. The net flight path has a positive slope at 450 m (1 500 ft) above the aerodrome where the landing is assumed to be made after engine failure. The net flight path used is for the ambient temperatures anticipated along the route. In meteorological conditions where icing protection systems are to be operable, the effect of their use on the net flight path data is taken into account.

4.2.1.1 The slope of the net flight path is positive at an altitude of at least 300 m (1 000 ft) above all terrain and obstructions along the route within 9.3 km (5 NM) on either side of the intended track.

4.2.1.2 The net flight path is such as to permit the aeroplane to continue flight from the cruising altitude to an aerodrome where a landing can be made in accordance with 5.2, the net flight path clearing vertically, by at least 600 m (2 000 ft), all terrain and obstructions along the route within 9.3 km (5 NM) on either side of the intended track. The provisions of 4.2.1.2.1 to 4.2.1.2.5 inclusive are applied.

4.2.1.2.1 The engine is assumed to fail at the most critical point along the route, allowance being made for indecision and navigational error.

4.2.1.2.2 Account is taken of the effects of winds on the flight path.

4.2.1.2.3 Fuel jettisoning is permitted to an extent consistent with reaching the aerodrome with satisfactory fuel reserves, if a safe procedure is used.

4.2.1.2.4 The aerodrome, where the aeroplane is assumed to land after engine failure, is specified in the operational flight plan and it meets the appropriate aerodrome operating minima.

4.2.1.2.5 The consumption of fuel and oil after the engine becomes inoperative is that which is accounted for in the net flight path data shown in the flight manual.

4.3 Two engines inoperative

4.3.1 Aeroplanes which do not comply with 4.1 comply with 4.3.1.1.

4.3.1.1 No aeroplane is taken off at a mass in excess of that which according to the two-engines-inoperative en-route net flight path data shown in the flight manual, permits the aeroplane to continue flight from the point where two engines are assumed to fail simultaneously, to an aerodrome at which the landing distance specification for alternate aerodromes (see 5.2) is complied with and where it is expected that a safe landing can be made. The net flight path clears vertically, by at least 600 m (2 000 ft) all terrain and obstructions along the route within 9.3 km (5 NM) on either side of the intended track. The net flight path considered is for the ambient temperatures anticipated along the route. In altitudes and meteorological conditions where icing protection systems are to be operable, the effect of their use on the net flight path data is taken into account. The provisions of 4.3.1.1.1 to 4.3.1.1.5 inclusive apply.

4.3.1.1.1 The two engines are assumed to fail at the most critical point of that portion of the route where the aeroplane is at more than 90 minutes at normal cruising speed away from an aerodrome at which the landing distance specification for alternate aerodromes (see 5.2) is complied with and where it is expected that a safe landing can be made.

4.3.1.1.2 The net flight path has a positive slope at 450 m (1 500 ft) above the aerodrome where the landing is assumed to be made after the failure of two engines.

4.3.1.1.3 Fuel jettisoning is permitted to an extent consistent with 4.3.1.1.4, if a safe procedure is used.

4.3.1.1.4 The aeroplane mass at the point where the two engines are assumed to fail is considered to be not less than that which would include sufficient fuel to proceed to the aerodrome and to arrive there at an altitude of at least 450 m (1 500 ft) directly over the landing area and thereafter to fly for 15 minutes at cruise power and/or thrust.

4.3.1.1.5 The consumption of fuel and oil after the engines become inoperative is that which is accounted for in the net flight path data shown in the flight manual.

5. Landing limitations

5.1 Aerodrome of destination

5.1.1 No aeroplane is taken off at a mass in excess of that which, in accordance with the landing distances required as shown in the flight manual for the altitude of the aerodrome of intended destination, permits the aeroplane to be brought to rest at the aerodrome of intended destination within the effective length of the runway, this length being as declared by the aerodrome authorities with regard to the obstructions in the approach. The mass of the aeroplane is assumed to be reduced by the mass of the fuel and oil expected to be consumed in flight to the aerodrome of intended destination. Compliance is shown with 5.1.1.3 and with either 5.1.1.4 or 5.1.1.5.

5.1.1.1 The runway slope is assumed to be zero, unless the runway is usable in only one direction.

5.1.1.2 A runway condition (wet or dry) not more favourable than that expected is taken into account.

Note.— National authorities will need to develop suitable methods for dealing with accountability for wet and dry runways.

5.1.1.3 It is assumed that the aeroplane is landed on the most favourable runway and in the most favourable direction in still air.

5.1.1.4 It is assumed that the aeroplane is landed on the runway which is the most suitable for the wind conditions anticipated at the aerodrome at the time of landing, taking due account of the probable wind speed and direction, of the ground handling characteristics of the aeroplane, and of other conditions (i.e. landing aids, terrain, etc.).

5.1.1.5 If full compliance with 5.1.1.4 is not shown, the aeroplane may be taken off if a destination alternate aerodrome is designated which permits compliance with 5.2.

5.2 Destination alternate aerodrome

No aerodrome is designated as a destination alternate aerodrome unless the aeroplane, at the mass anticipated at the time of arrival at such aerodrome, can comply with 5.1, in accordance with the landing distance required as shown in the flight manual for the altitude of the alternate aerodrome and in accordance with other applicable operating requirements for the alternate aerodrome.

ATTACHMENT D. FLIGHT RECORDERS

Supplementary to Chapter 6, 6.3

Introduction

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

1. Flight data recorder (FDR)

1.1 General requirements

1.1.1 The FDR is to record continuously during flight time.

1.1.2 The FDR container is to:

a) be painted a distinctive orange or yellow colour;

b) carry reflective material to facilitate its location; and

c) have securely attached an automatically activated underwater locating device.

1.1.3 The FDR is to be installed so that:

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

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

c) there is an aural or visual means for pre-flight checking that the FDR is operating properly.

1.2 Parameters to be recorded

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

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

1.3 Additional information

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

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

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

a) manufacturer's operating instructions, equipment limitations and installation procedures;

b) parameter origin or source and equations which relate counts to units of measurement; and

c) manufacturer's test reports.

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

2. Cockpit voice recorder (CVR)

2.1 General requirements

2.1.1 The CVR is to be designed so that it will record at least the following:

a) voice communication transmitted from or received in the aeroplane by radio;

b) aural environment on the flight deck;

c) voice communication of flight crew members on the flight deck using the aeroplane's interphone system;

d) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker;

e) voice communication of flight crew members using the passenger address system, if installed; and

f) digital communications with ATS, unless recorded by the FDR.

2.1.2 The CVR container is to:

a) be painted a distinctive orange or yellow colour;

b) carry reflective material to facilitate its location; and

c) have securely attached an automatically activated underwater locating device.

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

2.1.4 The CVR is to be installed so that:

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

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

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

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

2.2 Performance requirements

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

2.2.2 The preferred track allocation is as follows:

Track 1 — co-pilot headphones and live boom microphone

Track 2 — pilot headphones and live boom microphone

Track 3 — area microphone

Track 4 — time reference plus the third and fourth crew members' headphone and live microphone, if applicable.

Note 1.— Track 1 is located closest to the base of the recording head.

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

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

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

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

2.3 Additional information

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

a) manufacturer's operating instructions, equipment limitations and installation procedures; and

b) manufacturer's test reports.

3. Inspections of FDR and CVR systems

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

3.2 Annual inspections should be carried out as follows:

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

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

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

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

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

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

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

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

3.5 Calibration of the FDR system:

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

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

Table D-1
Parameters for Flight Data Recorders

Serial number	Parameter	Measurement range	Recording interval (seconds)	Accuracy limits (sensor input compared to FDR read-out)
1	Time (UTC when available, otherwise elapsed time)	24 hours	4	±0.125% per hour
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)
3	Indicated airspeed	95 km/h (50 kt) to max V_{S_o} *(Note 1)* V_{S_o} to 1.2 V_D *(Note 2)*	1	±5% ±3%
4	Heading	360°	1	±2°
5	Normal acceleration	–3 g to +6 g	0.125	±1% of maximum range excluding datum error of ±5%
6	Pitch attitude	±75°	1	±2°
7	Roll attitude	±180°	1	±2°
8	Radio transmission keying	On-off (one discrete)	1	
9	Power on each engine *(Note 3)*	Full range	1 (per engine)	±2%
10	Trailing edge flap or cockpit control selection	Full range or each discrete position	2	±5% or as pilot's indicator
11	Leading edge flap or cockpit control selection	Full range or each discrete position	2	±5% or as pilot's indicator
12	Thrust reverser position	Stowed, in transit, and reverse	1 (per engine)	
13	Ground spoiler/speed brake selection	Full range or each discrete position	1	±2% unless higher accuracy uniquely required
14	Outside air temperature	Sensor range	2	±2°C
15	Autopilot/auto throttle/AFCS mode and engagement status	A suitable combination of discretes	1	

Note.— The preceding 15 parameters satisfy the requirements for a Type II FDR.

16	Longitudinal acceleration	±1 g	0.25	±1.5% max range excluding datum error of ±5%
17	Lateral acceleration	±1 g	0.25	±1.5% max range excluding datum error of ±5%
18	Pilot input and/or control surface position-primary controls (pitch, roll, yaw) *(Note 4)*	Full range	1	±2° unless higher accuracy uniquely required

Serial number	Parameter	Measurement range	Recording interval (seconds)	Accuracy limits (sensor input compared to FDR read-out)
19	Pitch trim position	Full range	1	±3% unless higher accuracy uniquely required
20	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)
21	Glide path deviation	Signal range	1	±3%
22	Localizer deviation	Signal range	1	±3%
23	Marker beacon passage	Discrete	1	
24	Master warning	Discrete	1	
25	NAV 1 and 2 frequency selection *(Note 5)*	Full range	4	As installed
26	DME 1 and 2 distance *(Notes 5 and 6)*	0 – 370 km	4	As installed
27	Landing gear squat switch status	Discrete	1	
28	GPWS (ground proximity warning system)	Discrete	1	
29	Angle of attack	Full range	0.5	As installed
30	Hydraulics, each system (low pressure)	Discrete	2	
31	Navigation data (latitude/longitude, ground speed and drift angle) *(Note 7)*	As installed	1	As installed
32	Landing gear or gear selector position	Discrete	4	As installed

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

Notes.—

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

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

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

   1) parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and autoflight system engagement and mode indications if not recorded from another source;

   2) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY, ETC.;

   3) warnings and alerts;

   4) the identity of displayed pages for emergency procedures and checklists;

b) retardation information including brake application for use in the investigation of landing overruns and rejected take-offs; and

c) additional engine parameters (EPR, N_1, EGT, fuel flow, etc.).

ATTACHMENT E. EXTENDED RANGE OPERATIONS BY AEROPLANES WITH TWO TURBINE POWER-UNITS

Supplementary to Chapter 4, 4.7

1. Purpose and scope

1.1 Introduction

The purpose of this Attachment is to give guidance on the value of the threshold time which is to be established in compliance with Chapter 4, 4.7.1 and also to give guidance on the means of achieving the required level of safety envisaged by Chapter 4, 4.7.2 where operations beyond the established threshold are approved.

1.2 Threshold time

It should be understood that the threshold time established in accordance with Chapter 4, 4.7.1 is not an operating limit, but is a flight time from an adequate en-route alternate aerodrome beyond which the State of the Operator must give particular consideration to the aeroplane and the operation before granting authorization. Pending the acquisition of additional data for such operations by twin-engined commercial transport aeroplanes and taking into account the level of safety intended by Chapter 4, 4.7.2, it is suggested that the threshold time be 60 minutes.

1.3 Basic concepts

In order to maintain the required level of safety on routes where an aeroplane with two power-units is permitted to operate beyond the threshold time, it is necessary that:

a) the airworthiness certification of the aeroplane type specifically permits operations beyond the threshold time, taking into account the aeroplane system design and reliability aspects;

b) the reliability of the propulsion system is such that the risk of double power-unit failure from independent causes is extremely remote;

c) any necessary special maintenance requirements are fulfilled;

d) specific flight dispatch requirements are met;

e) necessary in-flight operational procedures are established; and

f) specific operational authorization is granted by the State of the Operator.

2. Glossary of terms

Where the following terms are used in this Attachment, they have the meaning indicated:

Adequate alternate aerodrome. An adequate alternate aerodrome is one at which the landing performance requirements can be met and which is expected to be available, if required, and which has the necessary facilities and services, such as air traffic control, lighting, communications, meteorological services, navigation aids, rescue and fire-fighting services and one suitable instrument approach procedure.

Aeroplane system. An aeroplane system includes all elements of equipment necessary for the control and performance of a particular major function. It includes both the equipment specifically provided for the function in question and other basic related aeroplane equipment such as that required to supply power for the equipment operation. As used herein the power-unit is not considered to be an aeroplane system.

Extended range operation. Any flight by an aeroplane with two turbine power-units where the flight time at the one power-unit inoperative cruise speed (in ISA and still air conditions), from a point on the route to an adequate alternate aerodrome, is greater than the threshold time approved by the State of the Operator.

Power-unit. A system consisting of an engine and all ancillary parts installed on the engine prior to installation on the aeroplane to provide and control power/thrust and for the extraction of energy for aeroplane systems, but not including independent short-period thrust-producing devices.

Propulsion system. A system consisting of a power-unit and all other equipment utilized to provide those functions necessary to sustain, monitor and control the power/thrust output of any one power-unit following installation on the airframe.

Suitable alternate aerodrome. A suitable alternate aerodrome is an adequate aerodrome where, for the anticipated time of use, weather reports, or forecasts, or any combination thereof, indicate that the weather conditions will be at or above the required aerodrome operating minima, and the runway surface condition reports indicate that a safe landing will be possible.

3. Airworthiness certification requirements for extended range operations

During the airworthiness certification procedure for an aeroplane type intended for extended range operations, special attention should be paid to ensuring that the required level of safety will be maintained under conditions which may be encountered during such operations, e.g. flight for extended periods following failure of an engine and/or essential systems. Information or procedures specifically related to extended range operations should be incorporated into the aeroplane flight manual, maintenance manual or other appropriate document.

Note.— Criteria for aeroplane systems performance and reliability for extended range operations are contained in the Airworthiness Manual *(Doc 9760).*

4. Propulsion system maturity and reliability

4.1 Basic elements to be considered for the authorization of extended range operations are the maturity and reliability of the propulsion system. These should be such that the risk of complete loss of power from independent causes is extremely remote.

4.2 The only way to assess the maturity of the propulsion system and its reliability in service is to exercise engineering judgement, taking account of the worldwide experience with the power-unit.

4.3 For a propulsion system whose reliability has already been assessed, each national authority must evaluate the ability of the operator to maintain that level of reliability, taking into account the operator's record of reliability *vis-à-vis* power-units of closely related types.

5. Airworthiness modifications and maintenance programme requirements

Each operator's maintenance programme should ensure that:

a) the titles and numbers of all airworthiness modifications, additions and changes which were made to qualify aeroplane systems for extended range operations are provided to the State of Registry and, where applicable, to the State of the Operator;

b) any changes to maintenance and training procedures, practices or limitations established in the qualification for extended range operations are submitted to the State of the Operator and, where applicable, to the State of Registry before such changes are adopted;

c) a reliability reporting programme is developed and implemented prior to approval and continued after approval;

d) prompt implementation of required modifications and inspections which could affect propulsion system reliability is undertaken;

e) procedures are established which prevent an aeroplane from being dispatched for an extended range operation after power-unit shutdown or primary system failure on a previous flight until the cause of such failure has been positively identified and the necessary corrective action is completed. Confirmation that such corrective action has been effective may, in some cases, require the successful completion of a subsequent flight prior to dispatch on an extended range operation; and

f) a procedure is established to ensure that the airborne equipment will continue to be maintained at the level of performance and reliability required for extended range operations.

6. Flight dispatch requirements

In applying the general flight dispatch requirements of Chapter 4 particular attention should be paid to the conditions which might prevail during extended range operations, e.g. extended flight with one power-unit inoperative, major systems degradation, reduced flight altitude, etc. In addition to the requirement of Chapter 4, 4.7.3, at least the following aspects should be considered:

a) pre-flight system serviceability;

b) communication and navigation facilities and capabilities;

c) fuel requirements; and

d) availability of relevant performance information.

7. Operational principles

An aeroplane which is engaged in an extended range operation should normally, in the event of:

a) shutdown of a power-unit, fly to and land at the nearest (in terms of the least flying time) aerodrome suitable for landing;

b) a single or multiple primary aeroplane system failure, fly to and land at the nearest suitable aerodrome unless

it has been demonstrated, in view of the flight consequences of the failure and the probability and consequences of subsequent failures, that no substantial degradation of safety results from continuation of the planned flight; and

c) changes impacting the status of items on the minimum equipment list, the communications and navigation facilities, fuel and oil supply, en-route alternate aerodromes or aeroplane performance, make appropriate adjustments to the flight plan.

8. Operational authorization

In authorizing the operation of an aeroplane with two power-units on an extended range route in accordance with Chapter 4, 4.7.2, the State of the Operator should, in addition to the requirements previously set forth in this Attachment, ensure that:

a) the operator's past experience and compliance record is satisfactory;

b) the operator has demonstrated that the flight can continue to a safe landing under the anticipated degraded operating conditions which would arise from:

1) total loss of thrust from one power-unit; or

2) total loss of power-unit generated electric power; or

3) any other condition which the State of the Operator considers to be equivalent in airworthiness and performance risk;

c) that the operator's crew training programme is adequate for the proposed operation; and

d) that documentation accompanying the authorization covers all relevant aspects.

ATTACHMENT F. AIR OPERATOR CERTIFICATE OR EQUIVALENT DOCUMENT

Supplementary to Chapter 4, 4.2.1

1. The State of the Operator regulations and rules for the operational certification of operators and the conduct of subsequent commercial air transport operations should be in conformity with the Annexes to the *Convention on International Civil Aviation* and have sufficient detail to ensure that compliance will result in the desired level of safety.

2. The State of the Operator regulations should provide a framework of positive control and guidance but also allow the operator sufficient flexibility to develop and update instructions for the detailed guidance of personnel essential to the conduct of operations.

3. The State of the Operator regulations should require the operator to submit detailed information on the organization, method of control and supervision of flight operations, training programme and maintenance arrangements as a basis for operational certification. As required by this Part, the operator's material should be submitted in the form of an operations manual, a maintenance control manual and a maintenance programme containing at least the material specified in Appendix 2 and Chapter 11, 11.2 and 11.3 respectively and such other material as the State may require.

4. The State of the Operator, in addition to assessing the operator's ability and competence, should guide the operator in regulatory, organizational and procedural matters. The State of the Operator should be satisfied concerning the operator's eligibility for operational certification. This includes the ability and competence to conduct safe and efficient operations and proof of compliance with applicable regulations.

5. Continuing surveillance by the State of the Operator of an air operator certificate holder's operations is inherent in the system of certification and is an essential part of the State's responsibility to ensure that the required standards of operations are maintained in order to provide a safe and reliable commercial air transportation service to the public. Adequate authority for certification and continuing surveillance of an air operator certificate holder's operations should be contained in the provisions of the basic aviation law of the State.

Note 1.— Guidance on the operations manual is given in the manual Preparation of an Operations Manual *(Doc 9376).*

Note 2.— Guidance on the certification and continued surveillance of the operator is given in the Manual of Procedures for Operations Inspection, Certification and Continued Surveillance *(Doc 8335).*

ATTACHMENT G. MINIMUM EQUIPMENT LIST (MEL)

Supplementary to Chapter 6, 6.1.2

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

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

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

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

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

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

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

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

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

10. The responsibilities of the pilot-in-command in accepting an aeroplane for operation with deficiencies in accordance with a minimum equipment list are specified in Chapter 4, 4.3.1.

ATTACHMENT H. FLIGHT SAFETY DOCUMENTS SYSTEM

Supplementary to Chapter 3, 3.3

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 Chapter 3, 3.3. The guidelines are based not only upon scientific research, but also upon current best industry 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.

— END —

27/9/02

Transmittal Note

SUPPLEMENT TO

ANNEX 6 — OPERATION OF AIRCRAFT

(PART I — INTERNATIONAL COMMERCIAL AIR TRANSPORT — AEROPLANES)

(Eighth Edition)

1. The attached Supplement supersedes all previous Supplements to Annex 6, Part I, and includes differences notified by Contracting States up to 27 September 2002 with respect to all amendments up to and including Amendment 26.

2. This Supplement should be inserted at the end of Annex 6, Part I (Eighth Edition). Additional differences received from Contracting States will be issued at intervals as amendments to this Supplement.

SUPPLEMENT TO
ANNEX 6 — OPERATION OF AIRCRAFT

(Part I — International Commercial Air Transport — Aeroplanes)

(Eighth Edition)

Differences between the national regulations and practices of Contracting States and the corresponding International Standards and Recommended Practices contained in Annex 6, Part I, as notified to ICAO in accordance with Article 38 of the *Convention on International Civil Aviation* and the Council's resolution of 21 November 1950.

SEPTEMBER 2002

INTERNATIONAL CIVIL AVIATION ORGANIZATION

RECORD OF AMENDMENTS

No.	*Date*	*Entered by*

No.	*Date*	*Entered by*

AMENDMENTS TO ANNEX 6, PART I, ADOPTED OR APPROVED BY THE COUNCIL SUBSEQUENT TO THE EIGHTH EDITION ISSUED JULY 2001

No.	*Date of adoption or approval*	*Date applicable*

No.	*Date of adoption or approval*	*Date applicable*

1. Contracting States which have notified ICAO of differences

The Contracting States listed below have notified ICAO of differences which exist between their national regulations and practices and the International Standards and Recommended Practices of Annex 6, Part I (Eighth Edition), up to and including Amendment 26, or have commented on implementation.

The page numbers shown for each State and the dates of publication of those pages correspond to the actual pages in this Supplement.

State	*Date of notification*	*Pages in Supplement*	*Date of publication*
Argentina	19/10/01	1	27/9/02
Australia	16/8/02	5	27/9/02
Austria	6/9/01	1	27/9/02
Bolivia	30/7/01	2	27/9/02
Bulgaria	6/9/01	1	27/9/02
China	28/8/01	2	27/9/02
Colombia	12/2/02	1	27/9/02
Costa Rica	22/10/01	1	27/9/02
Czech Republic	31/7/01	2	27/9/02
Denmark	24/9/01	2	27/9/02
Fiji	14/6/01	1	27/9/02
Finland	28/9/01	2	27/9/02
France	22/10/01	2	27/9/02
Georgia	16/11/01	2	27/9/02
Greece	5/2/02	2	27/9/02
India	25/10/01	1	27/9/02
Lithuania	24/10/01	1	27/9/02
Maldives	28/8/01	1	27/9/02
New Zealand	4/9/01	7	27/9/02
Norway	17/10/01	1	27/9/02
Pakistan	26/9/01	1	27/9/02
Papua New Guinea	15/1/02	3	27/9/02
Qatar	8/9/01	1	27/9/02
Republic of Korea	29/11/01	1	27/9/02
Romania	15/10/01	2	27/9/02
Slovakia	26/9/01	1	27/9/02
South Africa	13/11/01	1	27/9/02
Sweden	21/9/01	2	27/9/02
Thailand	3/9/01	1	27/9/02
Turkmenistan	3/4/02	1	27/9/02
United Kingdom	30/10/01	4	27/9/02
United States	7/9/01	7	27/9/02
Uruguay	20/11/01	1	27/9/02

2. Contracting States which have notified ICAO that no differences exist

State	Date of notification	State	Date of notification
Bahrain	21/7/01	Jordan	13/6/01
Barbados	1/6/01	Netherlands	29/6/01
Burundi	13/8/01	Portugal	12/10/01
China (Hong Kong SAR)	28/9/01	Republic of Moldova	24/9/01
Egypt	6/4/01	Singapore	21/11/01
El Salvador	9/7/01	The former Yugoslav Republic of Macedonia	29/6/01
Eritrea	11/5/01	United Arab Emirates	19/8/01
Germany	17/9/01	United Republic of Tanzania	31/5/01
Ghana	30/8/01		

3. Contracting States from which no information has been received

Afghanistan
Albania
Algeria
Andorra
Angola
Antigua and Barbuda
Armenia
Azerbaijan
Bahamas
Bangladesh
Belarus
Belgium
Belize
Benin
Bhutan
Bosnia and Herzegovina
Botswana
Brazil
Brunei Darussalam
Burkina Faso
Cambodia
Cameroon
Canada
Cape Verde
Central African Republic
Chad
Chile
Comoros
Congo
Cook Islands
Côte d'Ivoire
Croatia
Cuba
Cyprus
Democratic People's Republic of Korea
Democratic Republic of the Congo
Djibouti
Dominican Republic
Ecuador
Equatorial Guinea
Estonia
Ethiopia
Gabon
Gambia
Grenada
Guatemala
Guinea
Guinea-Bissau
Guyana
Haiti
Honduras
Hungary
Iceland
Indonesia
Iran (Islamic Republic of)
Iraq
Ireland
Israel
Italy
Jamaica
Japan
Kazakhstan
Kenya
Kiribati
Kuwait
Kyrgyzstan
Lao People's Democratic Republic
Latvia
Lebanon
Lesotho
Liberia
Libyan Arab Jamahiriya
Luxembourg
Madagascar
Malawi
Malaysia
Mali
Malta
Marshall Islands
Mauritania
Mauritius
Mexico
Micronesia (Federated States of)
Monaco
Mongolia
Morocco
Mozambique
Myanmar
Namibia
Nauru
Nepal
Nicaragua
Niger
Nigeria
Oman
Palau
Panama
Paraguay
Peru
Philippines
Poland
Russian Federation

Rwanda
Saint Kitts and Nevis
Saint Lucia
Saint Vincent and the Grenadines
Samoa
San Marino
Sao Tome and Principe
Saudi Arabia
Senegal
Seychelles
Sierra Leone
Slovenia
Solomon Islands
Somalia
Spain
Sri Lanka
Sudan
Suriname
Swaziland
Switzerland
Syrian Arab Republic
Tajikistan
Togo
Tonga
Trinidad and Tobago
Tunisia
Turkey
Uganda
Ukraine
Uzbekistan
Vanuatu
Venezuela
Viet Nam
Yemen
Yugoslavia
Zambia
Zimbabwe

4. Paragraphs with respect to which differences have been notified

Paragraph	*Differences notified by*
General	United Kingdom
	United States
Chapter 1 — Definitions	Argentina
	Australia
	Austria
	China
	Denmark
	Finland
	New Zealand
	Norway
	Romania
	Slovakia
	Sweden
	United Kingdom
	United States
Chapter 2	Czech Republic
3.1.3	Bulgaria
	Papua New Guinea
3.1.5	United States
3.2	Australia
	Papua New Guinea
	United Kingdom
	United States
	Uruguay
3.2.2	France
3.2.3	France
	Sweden
3.2.4	Norway
	Sweden
4.1.2	South Africa
	United Kingdom
4.1.3	Greece
	Papua New Guinea
	Romania
	United States
	Uruguay
4.2.1.6	Maldives
4.2.2	United States
	Uruguay
4.2.2.2	Australia
	New Zealand
4.2.3.2	Denmark
	Finland
	Greece
	Norway
	Romania
	Sweden
	United States
	Uruguay
4.2.4	New Zealand
	South Africa
	United States
	Uruguay
4.2.5	Czech Republic
	Denmark
	Finland
	Greece
	Romania
	United Kingdom
4.2.6	New Zealand
4.2.6.2	Australia

Paragraph	*Differences notified by*
4.2.6.3	China
4.2.6.4	China
4.2.7	Lithuania
	New Zealand
4.2.7.1	Papua New Guinea
4.2.7.3	New Zealand
4.2.7.4	Papua New Guinea
	United Kingdom
4.2.8	Australia
	New Zealand
	United Kingdom
4.2.9	United States
4.2.9.2	Papua New Guinea
	United States
4.2.10.2	Australia
4.2.10.4	China
	Fiji
	Papua New Guinea
	Uruguay
4.3.1	New Zealand
4.3.3.1	Australia
	France
4.3.3.2	Australia
	United States
4.3.4.1.2	Australia
	United States
4.3.4.2	New Zealand
	United States
	Uruguay
4.3.5.1	Australia
4.3.5.4	Bulgaria
	Papua New Guinea
4.3.6.2	France
4.3.6.2.1	Costa Rica
	Denmark
	Finland
	Greece
	Qatar
	Sweden
	United States
4.3.6.2.2	Costa Rica
	Denmark
	Finland
	Sweden
4.3.6.3	United States
4.3.6.3.1	United States
4.3.6.3.2	United States
4.3.6.4	New Zealand
	United States
4.3.7	Georgia
4.3.7.1	Bulgaria
4.3.7.2	Australia

Paragraph	*Differences notified by*
	China
	Denmark
	Finland
	Greece
	New Zealand
	Papua New Guinea
	Romania
	Sweden
	United Kingdom
	United States
4.3.8	Georgia
	United States
4.3.8.2	Czech Republic
	Denmark
	Finland
	France
	Greece
	Romania
	Sweden
	United States
4.4.1.2	New Zealand
	South Africa
4.4.1.3	Denmark
	Finland
	Greece
	New Zealand
	Romania
4.4.2	Sweden
4.4.3	New Zealand
	Papua New Guinea
	South Africa
4.4.4.2	New Zealand
4.4.4.3	Papua New Guinea
4.4.4.4	United States
4.4.6	South Africa
4.4.7	Australia
	Denmark
	Finland
	Greece
	Papua New Guinea
	Romania
	Sweden
	United Kingdom
4.4.8.1	Greece
	Romania
4.4.9.1	Australia
	Papua New Guinea
4.4.9.2	Australia
	New Zealand
	Papua New Guinea
4.5.1	Denmark
	Finland

Paragraph	*Differences notified by*
	Greece
	New Zealand
	Romania
	Sweden
	United Kingdom
4.5.3	Greece
4.5.5	Uruguay
4.6	Fiji
	New Zealand
	South Africa
	United Kingdom
4.6.1	Denmark
	Finland
	Georgia
	Greece
	United States
4.6.2	Denmark
	Finland
	Georgia
	Greece
	Sweden
4.7	Uruguay
4.7.1	China
	New Zealand
	South Africa
	United States
4.7.2	Australia
	South Africa
	United States
4.7.3	United States
4.7.4	China
	Greece
	New Zealand
	Romania
	South Africa
5.1.1	Czech Republic
	Qatar
5.1.2	Australia
	China
	Denmark
	Finland
	New Zealand
	Norway
	Sweden
	United States
5.1.3	Greece
	Papua New Guinea
5.2.3	South Africa
5.2.5	Qatar
5.2.7	China
	Greece
	Papua New Guinea
	United States
5.2.8.1	United States
5.2.10	Turkmenistan
5.3.1	Australia
	Greece
	Romania
	United States
5.3.2	Czech Republic
	Denmark
	Finland
	France
	Greece
	Romania
	Sweden
Chapter 6 — General	United States
6.1.1	Sweden
6.1.2	France
	Georgia
	Sweden
6.1.3	Denmark
	Finland
	Greece
	New Zealand
	Romania
	United Kingdom
	United States
6.2.2	Australia
	Denmark
	Finland
	Lithuania
6.2.3	New Zealand
6.2.4	New Zealand
	Papua New Guinea
6.2.4.2	Papua New Guinea
6.3	Denmark
	New Zealand
6.3.1	Denmark
	Turkmenistan
6.3.1.1	United States
6.3.1.2	Australia
	United States
6.3.1.3	Australia
	Bolivia
	China
6.3.1.4	Australia
	China
	United Kingdom
6.3.1.4.1	Australia
	United Kingdom

Paragraph	*Differences notified by*
6.3.1.5	Australia
	Bolivia
	China
	France
	Papua New Guinea
	Sweden
	United Kingdom
6.3.1.5.1	Australia
	China
	France
	Papua New Guinea
	Sweden
	Thailand
	United Kingdom
6.3.1.5.2	Australia
	France
	Sweden
	United Kingdom
6.3.1.6	Australia
	Bolivia
	Czech Republic
	Papua New Guinea
	United Kingdom
6.3.1.7	Australia
	Bolivia
6.3.1.8	Argentina
	Australia
	France
	Sweden
	United Kingdom
6.3.1.8.1	Argentina
	Australia
	Sweden
6.3.1.8.2	Argentina
	Australia
	Sweden
6.3.1.8.3	Argentina
	Australia
	Sweden
6.3.1.8.4	Argentina
	Australia
	Sweden
6.3.1.8.5	Argentina
	Australia
	Sweden
6.3.2	Australia
6.3.3	Finland
6.3.3.1	Australia
	Bolivia
	Finland
6.3.3.2	Australia
	Bolivia
	Finland
6.3.3.3	Australia
	Bolivia
	China
	Finland
6.3.4	Finland
6.3.4.1	Bolivia
	Finland
6.3.4.2	Australia
	Czech Republic
	Finland
	France
6.3.4.3	Australia
	Bolivia
	Finland
6.3.5	Finland
6.3.5.1	Bolivia
	United States
6.3.5.2	Australia
	Bolivia
6.3.6	Argentina
	Australia
	Denmark
	France
	Georgia
	Pakistan
	Sweden
6.3.7	Bolivia
6.3.7.1	Georgia
	Pakistan
6.3.7.2	France
	Georgia
	United Kingdom
6.3.8	Finland
6.3.8.1	Bolivia
	Pakistan
6.3.8.2	Bolivia
	China
6.3.9.2	Australia
	Bolivia
	France
	United Kingdom
6.3.9.3	Australia
	United Kingdom
6.3.10	Finland
	Romania
6.3.11.2	Australia
	Romania
6.3.12	Australia
	Bulgaria
	Czech Republic
6.4	Lithuania

Paragraph	*Differences notified by*
6.4.1	United States
6.4.2	Australia
	Czech Republic
	Finland
	France
	Greece
	New Zealand
	Norway
	Papua New Guinea
	Sweden
6.5.1	China
	New Zealand
	United States
6.5.2.1	Costa Rica
6.5.3.1	United States
6.6	China
	Georgia
	New Zealand
	United States
6.7.1	Georgia
6.7.2	Georgia
6.7.3	Czech Republic
	South Africa
6.7.4	Czech Republic
	South Africa
6.7.5	New Zealand
6.7.6	New Zealand
6.9	Denmark
	Lithuania
6.9.1	Czech Republic
	Denmark
	Finland
	France
	Greece
	United Kingdom
6.10	Lithuania
6.11	Australia
	Lithuania
	New Zealand
6.12	China
	Finland
	New Zealand
6.13	Australia
	China
	New Zealand
	Papua New Guinea
	Uruguay
6.15	New Zealand
6.15.1	Australia
	Bolivia
	Bulgaria
	Pakistan
	United Kingdom
6.15.2	Australia
	Bolivia
	Czech Republic
	Greece
	Lithuania
	New Zealand
	Pakistan
	South Africa
	United Kingdom
	United States
6.15.3	Georgia
	Papua New Guinea
	South Africa
6.15.5	Australia
	Bolivia
	Norway
	United States
	Uruguay
6.15.6	Australia
	Bolivia
	China
	Costa Rica
	Denmark
	Finland
	France
	Lithuania
	Norway
	Republic of Korea
	United Kingdom
	United States
	Uruguay
6.15.7	Australia
	France
	Lithuania
	Norway
	Pakistan
	Papua New Guinea
	South Africa
	United States
	Uruguay
6.16.1	Bolivia
6.16.2	Australia
	Bolivia
6.16.3	New Zealand
	Romania
6.17	Denmark
	Finland
	Romania
	Uruguay
6.17.1	Australia
	Bolivia

Paragraph	*Differences notified by*
	China
	Georgia
	United States
6.17.2	Australia
	Bolivia
	China
	Georgia
	Republic of Korea
	United Kingdom
	United States
6.17.3	Australia
	Bolivia
	China
	Georgia
	Greece
	Romania
	United Kingdom
	United States
6.17.4	Bolivia
	Georgia
	United States
6.17.5	Bolivia
	Republic of Korea
	United Kingdom
	United States
6.17.6	Bolivia
	Romania
	United Kingdom
	United States
6.17.7	Greece
	Turkmenistan
	United Kingdom
	United States
6.18	New Zealand
	Papua New Guinea
	South Africa
6.18.1	Argentina
	Australia
	China
	Pakistan
	Republic of Korea
	Romania
	United States
6.18.2	Argentina
	Australia
	Bulgaria
	China
	Pakistan
	United Kingdom
	United States
6.18.3	Australia
	China
	Czech Republic
	France
	Greece
	India
	Lithuania
	United Kingdom
	United States
	Uruguay
6.18.4	China
	Romania
6.19	Australia
	Denmark
	Finland
	New Zealand
	United Kingdom
6.20	Australia
	Bulgaria
	Costa Rica
	Denmark
	Finland
	France
	New Zealand
	Norway
	Romania
	Sweden
	United Kingdom
	United States
	Uruguay
6.21.1	Argentina
	Australia
	Bolivia
	France
	Georgia
	Greece
	New Zealand
	Papua New Guinea
	Romania
	South Africa
	Sweden
	United Kingdom
6.21.2	Argentina
	Australia
	Bolivia
	France
	Georgia
	Greece
	New Zealand
	Papua New Guinea
	Romania
	South Africa
	United Kingdom

Paragraph	*Differences notified by*
7.1.2	Australia
7.2.1	United States
7.2.2	Papua New Guinea
	United States
7.2.3	China
	Uruguay
7.2.4	Australia
	Papua New Guinea
7.3	Papua New Guinea
8.1.2	Papua New Guinea
8.1.3	Papua New Guinea
8.1.4	Georgia
8.2	Georgia
8.2.3	Czech Republic
8.3	United States
8.3.1	Georgia
	Romania
	United Kingdom
	United States
8.3.2	Czech Republic
8.4.1	Romania
8.4.2	Argentina
	Australia
	Georgia
	Romania
	United States
8.4.3	Papua New Guinea
	South Africa
8.5.1	Australia
	South Africa
8.5.2	Australia
	Papua New Guinea
8.7	United States
8.7.2	New Zealand
8.7.2.1	Georgia
	Maldives
8.7.3.2	Maldives
8.7.5.1	Georgia
	Papua New Guinea
8.7.5.3	Papua New Guinea
	Romania
8.7.5.4	Australia
	China
	France
	South Africa
	United Kingdom
	United States
8.7.6.2	Argentina
	Georgia
	Romania
	United States

Paragraph	*Differences notified by*
9.1.2	China
	United States
9.1.4	Bolivia
	New Zealand
	Papua New Guinea
9.3	New Zealand
9.3.1	Australia
9.4	Denmark
9.4.1	Australia
	China
	Costa Rica
	Czech Republic
	Finland
	France
	Greece
	New Zealand
	Qatar
	Romania
	United States
9.4.2	Australia
	Czech Republic
	Finland
	New Zealand
9.4.3.2	New Zealand
	South Africa
	United States
9.4.3.3	New Zealand
	South Africa
	United States
9.4.3.5	New Zealand
	United States
9.4.4	China
	Colombia
	Denmark
	Finland
	Sweden
	United States
9.5	Czech Republic
	Georgia
	United States
9.6	Sweden
Chapter 10	Fiji
	New Zealand
	South Africa
10.1	Georgia
	Sweden
	United Kingdom
	United States
10.2	Australia
	Georgia
	Greece

Paragraph	*Differences notified by*
	United Kingdom
	United States
10.3	United Kingdom
	United States
10.4	Australia
	Czech Republic
	France
	Greece
	United Kingdom
	United States
11.2	Georgia
	Maldives
	Romania
11.3	Maldives
11.3.1	China
	Georgia
11.4.1	Turkmenistan
11.4.2	Australia
	China
11.4.3	China
	Czech Republic
11.5	China
	Uruguay
11.6	Uruguay
12.4	Australia
	France
12.5	Australia
	New Zealand
13.1	Australia
	Georgia
	Papua New Guinea
13.2	United States
13.3.1	Georgia
13.5.1	Australia
	Czech Republic
	France
	Georgia
	Greece
	New Zealand
	Papua New Guinea
	Romania
	United Kingdom
13.5.2	China
	Czech Republic
	New Zealand
Appendix 1	
3.	Slovakia
Appendix 2	Bulgaria
	New Zealand
	United States
2.	United Kingdom
5.12	Greece
5.14	Greece
5.19	Greece
5.23	Greece
5.25	China
	Georgia

CHAPTER 1

Definitions *Aerodrome operating minima*. Argentine regulations do not include subparagraph c).

Approach and landing operations using instrument approach procedures. Argentine regulations retain the former definition.

Decision altitude (DA) or decision height (DH). Argentine regulations do not include "or approach with vertical guidance".

Flight time — aeroplanes. Argentine regulations differ.

CHAPTER 6

6.3.1.8 The installation of a Type IA recorder is not required.

6.3.1.8.1 Only the recording of the following parameters is required: pressure altitude, speed, heading, normal acceleration, longitudinal acceleration and time.

6.3.1.8.2 Only the recording of the following parameters is required: pitch attitude and roll attitude.

6.3.1.8.3 Only the recording of engine thrust is required.

6.3.1.8.4 Only the recording of pitch trim surface position is required.

6.3.1.8.5 This requirement is not applied.

6.3.6 Only the recording of 11 parameters is required.

6.18.1 This regulation is mandatory as of 1 July 1999.

6.18.2 As of 1 July 2002, it will be mandatory for aeroplanes with a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers to be equipped with an airborne collision avoidance system (ACAS II).

6.21.1* 6.21.2* It is mandatory for all turbo-jet aeroplanes authorized to carry more than 30 passengers or with a maximum cargo payload capacity of more than 3 400 kg to be equipped with a forward-looking wind shear warning system.

CHAPTER 8

8.4.2 The maintenance records listed in 8.4.1 must be kept by the aircraft operator and transferred with the aircraft when the latter is sold.

8.7.6.2 The maintenance records of maintenance organizations must be kept until the work is repeated or replaced by other work or until one year after the work was done. For aeroplanes used in non-scheduled air transport operations, maintenance records, except for work related to an overhaul, must be kept for at least five years after completion of the work.

*Recommended Practice

CHAPTER 1

Definitions — *Approach and landing operations using instrument approach procedures. Approach and landing operations with vertical guidance.* Not defined in Australian legislation.

Flight data analysis. Not defined in Australian legislation.

CHAPTER 3

3.2 — Analysis of FDR data as part of an operator's accident prevention and flight safety programme is not mandated.

CHAPTER 4

4.2.2.2 — There is no specific approval of the information produced in the operations manual which relates to the Standards in 4.2.7 and 12.4.

4.2.6.2 — Australian legislation mandates the method by which minimum flight altitude must be determined but does not require the method to be incorporated in the operations manual.

4.2.8 — There is no legislative requirement for operators to specify procedures relating to their own operations.

4.2.10.2 — Flight time, flight duty time limitations and rest periods are mandated by Australia. Several standing exemptions are issued. These limitations do not apply to cabin crew.

4.3.3.1
4.3.3.2 — Australia does not mandate preparation of an operational flight plan for every flight and does not specify the content of the plan.

4.3.4.1.2 — No distance based on time requirement is specified in the regulations. It is linked with performance requirements.

4.3.5.1 — Australia places the decision-making responsibility on the pilot-in-command for commencement and continuation of a flight.

4.3.7.2 — There is no requirement to maintain two-way communications between the aeroplane and the ground crew while refuelling with passengers on board.

4.4.7 — The pilot-in-command is responsible for liaison with ATC directly with respect to any changes to the ATS flight plan.

4.4.9.1*
4.4.9.2* — Operators are not required to specify noise abatement procedures. Such procedures are mandated by the State.

4.7.2 — ETOPS training is not mandated by regulation. However, no approval for ETOPS operations is granted unless the operator demonstrates that satisfactory training has been or will be undertaken.

*Recommended Practice

CHAPTER 5

5.1.2 Single-engine aeroplanes operating under the VFR by day are not restricted to routes that permit a safe forced landing. Single-engine aeroplanes may operate under the IFR and at night with specific approval.

5.3.1 Provision is mandated only for major international aerodromes.

CHAPTER 6

6.2.2 Regulations empower the authority to direct that medical supplies be provided but no direction is published.

6.3.1.2 Australian legislation does not refer to FDRs by type but specifies the parameters to be recorded.

6.3.1.3 Metal foil FDRs are still permitted.

6.3.1.4* Current legislation specifies that analogue recorders will not be approved for fitment to aircraft which receive their initial use Certificate of Airworthiness after 1 January 1984.

6.3.1.4.1 Photographic film FDRs are not approved.

6.3.1.5
6.3.1.5.1
6.3.1.5.2 Currently there are no legislative requirements to give effect to these Standards.

6.3.1.6* Australian legislation does not refer to combination recorders.

6.3.1.7* Australian legislation does not require aeroplanes below 5 700 kg to be equipped with an FDR. However, an aeroplane which has a MCTM equal to or less than 5 700 kg which is:

a) pressurized;

b) turbine powered;

c) of a type certificated in its country of manufacture for operation with more than eleven places; and

d) issued with its initial Australian Certificate of Airworthiness after 1 January 1988,

shall not be flown unless it is equipped with an approved CVR system.

6.3.1.8 to
6.3.1.8.5 Australian legislation does not refer to FDRs by type. Parameters currently required to be recorded are less comprehensive than the Annex Standards.

6.3.2 Australia does not refer to type. Legislation requires data to be retained for the last 25 hours of recording, rather than of operation.

6.3.3.1
6.3.3.2
6.3.3.3* Australian legislation does not refer to FDRs by type and does not require fitment of FDRs in aeroplanes below 5 700 kg MCTM.

*Recommended Practice

6.3.4.2*	Australia does not specify parameters which will allow determination of pitch attitude, roll attitude and power on each engine.
6.3.4.3 6.3.5.2*	Australian legislation does not refer to type and establishes the weight break at 29 000 kg MCTM.
6.3.6	Australian legislation does not refer to FDRs by type. Parameters currently required to be recorded are less comprehensive than the Annex Standards.
6.3.9.2*	Australian turbine-powered aeroplanes first certificated after 1 July 1965, above 5 700 kg MCTM, must have a CVR capable of retaining the last 30 minutes of recording.
6.3.9.3	There is no requirement for the cockpit voice recorder to be capable of retaining information recorded during the last two hours of its operation.
6.3.11.2	There is no requirement for operators to establish a procedure to that effect.
6.3.12	Australia does not legislate for continued serviceability checks.
6.4.2	Australian legislation does not base the requirement to be equipped in accordance with 6.9 on whether the flight is a controlled flight.
6.11*	In Australia, the requirement to carry weather radar applies only to pressurized aeroplanes required to be operated by two or more flight crew members and operating under the IFR.
6.13	There is no requirement for the carriage of a noise certificate in an aeroplane.
6.15.1	Australia requires fitment of GPWS to turbine-powered aeroplanes of greater than 15 000 kg MCTM or carrying 10 or more passengers in passenger transport operations under the IFR.
6.15.2*	Australia does not require fitment of GPWS to any piston-engined aeroplanes.
6.15.5 6.15.6 6.15.7*	Australia will apply this requirement to all turbine-powered aeroplanes greater than 15 000 kg MCTM or carrying 10 or more passengers in passenger transport operations under the IFR from 1 July 2005.
6.16.2*	Australian legislation allows a lap sash belt instead of the safety harness if it was installed before 6 March 1980.
6.17.1 6.17.2 6.17.3	Australian legislation allows a single ELT(S) if only one life raft is carried and at least two ELT(S) if more than one life raft is carried.
6.18.1	Australian turbine-powered commercial aeroplanes having a MCTM of more than 15 000 kg, or having a passenger seating capacity in excess of 30 seats, are required to be fitted with TCAS II. This requirement took effect on 1 January 2000.
6.18.2 6.18.3*	Australia does not require fitment of ACAS equipment to turbine-powered aeroplanes with an MCTM of 15 000 kg or less, or having a passenger capacity of 30 seats or less.

*Recommended Practice

6.19 This requirement is applicable only within Class C airspace where there is radar coverage.

6.20 Australia's requirement is not based on transition altitude.

6.21.1* Most Australian aeroplanes operating internationally are equipped with a predictive wind shear warning
6.21.2* system.

CHAPTER 7

7.1.2 The requirement for 121.5 MHz is not specifically mandated.

7.2.4 Australia requires specific equipment to be installed relative to the route being operated.

CHAPTER 8 Not all the requirements contained in Chapter 8 regarding the operator's maintenance responsibilities, operator's maintenance control manual, maintenance programme, maintenance records, continuing airworthiness information, modifications and repairs and approved maintenance organizations are referred to in the Australian Civil Aviation Regulations.

8.4.2 Australian regulations do not require records to be maintained after the end of the operating life of the unit.

8.5.1 Reporting of defects to the Australian regulatory organization is required, but there is no legislative requirement for these to be reported to the organization responsible for the type design.

8.5.2 Currently there is no legislative requirement for the assessment of continuing airworthiness information. However, the system of maintenance must provide for the continued airworthiness of the aircraft, including consideration of manufacturer's information.

8.7.5.4 There is no comparable requirement in Australian regulations for training in knowledge and skills related to human performance.

CHAPTER 9

9.3.1 A training syllabus is required, but the content is at the discretion of the operator and approving office. Human Factors training is not mandated for flight crew.

9.4.1 The requirement on same type is for one take-off and one landing in 35 days.

9.4.2 The requirement on same type is for one take-off and one landing in 70 days.

CHAPTER 10

10.2* Australian legislation does not specify training or recency requirements in detail for flight dispatch
10.4* personnel.

CHAPTER 11

11.4.2* There is no requirement to ensure that entries in journey log books are made in ink or indelible pencil.

*Recommended Practice

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CHAPTER 12

12.4 Training for cabin crew in Human Factors is not mandated.

12.5 Flight time, duty and rest periods for cabin crew are not mandated.

CHAPTER 13

13.1 There is no requirement for the flight crew compartment door to be lockable.

13.5.1* There is no requirement for the provision of specialized means of blast attenuation for use at the least-risk bomb location.

*Recommended Practice

CHAPTER 1

Definitions *Maintenance organization's procedures manual*. The term "maintenance organization exposition" is used.

Operator's maintenance control manual. The term "maintenance management exposition" is used.

CHAPTER 6

6.3.1.3 The aviation regulations of Bolivia do not contemplate a date for discontinuing the use of metal foil flight data recorders.

6.3.1.5 The aviation regulations of Bolivia do not contemplate a date by which all aeroplanes must be equipped to utilize digital communications.

6.3.1.6* The aviation regulations of Bolivia establish that no holder of an AOC may operate a large multi-engined turbine-powered aeroplane authorized to carry more than 10 passengers unless an approved cockpit voice recording system has been installed.

6.3.1.7* The aviation regulations of Bolivia stipulate that no person may operate a large commercial air transport aeroplane that is turbine-powered or certificated for flight above an altitude of 25 000 ft unless the aircraft has been equipped with one or more approved flight data recording systems.

6.3.3.1 The aviation regulations of Bolivia do not consider mass for aircraft required to carry flight data recorders; the aviation regulations of Bolivia use as a criterion aeroplanes that are equipped with flight data recorders and certificated to fly above 25 000 ft.

6.3.3.2 The aviation regulations of Bolivia use as a criterion aeroplanes that are equipped with flight data recorders and certificated to fly above 25 000 ft.

6.3.3.3* Aircraft mass and the date of the certificate of airworthiness are not indicated.

6.3.4.1 The aircraft mass and the date are not taken into account as stipulated in 6.3.4.

6.3.4.3 The aircraft mass and the date of certification of the prototype are not taken into account.

6.3.5.1 The aircraft mass and the date are not taken into account.
6.3.5.2*

6.3.7.1 Neither the aircraft mass nor the date is specified.
6.3.7.2*
6.3.8.1
6.3.8.2*

6.3.9.2* The regulations do not specify the aircraft mass, the date or the time with respect to the requirement to retain the information recorded for at least the last two hours of operation.

6.15.1 No reference is made to the aeroplane mass and number of passengers.

6.15.2* The aeroplane mass, number of passengers and piston-engined aeroplanes are not mentioned.

6.15.5 No reference is made to the aeroplane mass, number of passengers and date.
6.15.6

6.16.1 The date and the orientation of the seats are not specified.
6.16.2*

*Recommended Practice

6.17.1	The date is not specified and the installation of two ELTs is not required.
6.17.2	
6.17.3	The date is not specified.
6.17.4	
6.17.5	
6.17.6	
6.21.1*	Not stipulated in the aviation regulations of Bolivia.
6.21.2*	

CHAPTER 9

9.1.4	Not stipulated in the aviation regulations of Bolivia.

*Recommended Practice

CHAPTER 3

3.1.3 There is no requirement in the national legislation for the operator or a designated representative to have responsibility for operational control.

CHAPTER 4

4.3.5.4 There is no requirement in the national legislation for the operator to establish procedures to ensure that the aircraft is inspected for icing prior to take-off and to include them in the operations manual.

4.3.7.1 There is no requirement in the national legislation for the operator to establish operational procedures for refuelling when passengers are embarking, on board and disembarking.

CHAPTER 6

6.3.12 There is no requirement in the national legislation for the operator to establish operational checks and evaluations of recordings from the flight data and cockpit voice recorder systems to ensure their continued serviceability.

6.15.1 There is no requirement in the national legislation for all turbo-engined aeroplanes in excess of MCTM 5 700 kg or authorized to carry more than nine passengers to be equipped with GPWS.

6.18.2 There is no requirement in the national legislation for all turbo-engined aeroplanes in excess of MCTM 5 700 kg or authorized to carry more than nineteen passengers to be equipped with ACAS II from 1 January 2005.

6.20 There is no requirement in the national legislation for the operator to establish procedures to ensure that all flight crew members required to be on flight deck duty should communicate through boom or throat microphone below the transition level/altitude.

Appendix 2 The latest requirements on the contents of the operations manual incorporated in the Seventh Edition (applicable 5 November 1998) are still not formally recognized in the current national legislation.

CHAPTER 1

Definitions	*Flight manual*. The CAAC does not approve aircraft flight manuals for individual aircraft.

CHAPTER 4

4.2.6.3* 4.2.6.4*	Not implemented.
4.2.10.4	Not implemented. China has no flights above 15 000 m.
4.3.7.2	Not implemented.
4.7.1	Additional requirements for ETOPS apply only for scheduled flights.
4.7.4*	Does not apply in China.

CHAPTER 5

5.1.2	Single-engine aeroplanes cannot be operated in international commercial air transport.
5.2.7 d)	Not implemented.

CHAPTER 6

6.3.1.3 6.3.1.4* 6.3.1.5 6.3.1.5.1 6.3.3.3* 6.3.8.2* 6.5.1 6.6	Not implemented.
6.12	Provision not implemented. China has no flights above 15 000 m.
6.13	The CAAC Aircraft Airworthiness Department does not issue “noise” certificates.
6.15.6 6.17.1 6.17.2 6.17.3 6.18.1 6.18.2 6.18.3* 6.18.4	Not implemented.

*Recommended Practice

CHAPTER 7

7.2.3 Not implemented.

CHAPTER 8

8.7.5.4 There are no requirements relating to Human Factors in the CAAC regulations.

CHAPTER 9

9.1.2 No radio operator requirements. Skill and knowledge requirements on radio procedures have been developed as part of all pilot licences.

9.4.1 Recent experience for pilot-in-command within the preceding 90 days may be carried out in flight simulators.

9.4.4 Pilots other than pilot-in-command are required to have a proficiency check every 12 months.

CHAPTER 11

11.3.1 c) There are no procedures for the escalation of maintenance programmes.

11.4.2* Not implemented.
11.4.3*

11.5 There are no provisions for records of emergency and survival equipment carried.

CHAPTER 13

13.5.2* Not implemented.

Appendix 2

5.25 Not implemented. China has no flights above 15 000 m.

*Recommended Practice

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CHAPTER 9

9.4.4 All scheduled and non-scheduled commercial transport pilots and co-pilots (airline pilots or commercial pilots with a type rating) must go through the ground course and flight or simulator training again, twice a year at intervals of not less than five months and not more than seven months, with an instructor qualified on the equipment and an annual proficiency check with a check pilot from the Unidad Administrativa Especial de Aeronáutica Civil or an agent thereof.

CHAPTER 4

4.3.6.2.1 When a destination alternate aerodrome is required, the flight is to be conducted under instrument flight rules:

a) fuel to the destination airport;

b) fuel to the alternate airport; and

c) fuel for 45-minute flight at normal cruise speed.

4.3.6.2.2 When a destination alternate aerodrome is not required, the flight is to be conducted under visual flight rules:

a) fuel to the destination airport;

b) fuel for an additional 30-minute flight from the destination during daylight; and

c) fuel for an additional 45-minute flight from the destination at night.

CHAPTER 6

6.5.2.1 Landplanes shall carry one life jacket or equivalent individual flotation device for each person on board.

The operator shall not operate a landplane that does not have life jackets equipped with locator lights for each person on board. Life jackets for infants may be replaced with other appropriate flotation devices equipped with locator lights.

6.15.6 All aeroplanes with a maximum certificated take-off mass in excess of 15 000 kg or authorized to carry more than 30 passengers shall be equipped with a ground proximity warning system which has a predictive terrain hazard warning function.

All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg and all turbojet aeroplanes shall be equipped with a ground proximity warning system (based on Recommended Practice 6.15.7).

6.20 Flight crew members on the flight deck shall communicate through boom or throat microphones below transition altitude.

The operator shall not operate a multi-crew aeroplane unless it is equipped with an intercommunication system consisting of earphones and microphones that are not hand-held.

CHAPTER 9

9.4.1 The operator shall not assign a pilot to act as pilot-in-command unless, on the same type of aeroplane within the preceding 90 days, that pilot has executed three take-offs and three landings.

The operator shall guarantee that no pilot will serve as pilot-in-command without having, during the preceding 90 days, executed at least three take-offs and three landings in an aeroplane of the same type or in a flight simulator of the same aircraft type with a simulation fidelity corresponding to Category D and rated and approved for the purpose.

CHAPTER 2 The national requirements are that the Standards and Recommended Practices contained in Annex 6, Part I, shall be applicable to the operation of aeroplanes by operators authorized to conduct commercial air transport operations and also to usable parts in the operation of aeroplanes by operators authorized to conduct aerial work.

CHAPTER 4

4.2.5 The national requirements of the Czech Republic do not include regulatory requirements that the checklists shall observe Human Factors principles. An operator must ensure that the contents of the operations manual are presented in a form in which they can be used without difficulty.

4.3.8.2 An operator shall not operate a pressurized aeroplane at pressure altitudes unless a sufficient quantity of stored breathing oxygen is available for: 100 per cent pax above 15 000 ft; 30 per cent pax between 14 000 and 15 000 ft; 10 per cent pax between 10 000 and 14 000 ft. In the case of pressurized aeroplanes, with regard to the oxygen supply, provision is not made for all passengers below 15 000 ft to receive oxygen.

CHAPTER 5

5.1.1 The national requirements of the Czech Republic generally use "State of the Operator".

5.3.2 It is not required that the operator shall take account of charting accuracy when assessing compliance with 5.2.8.

CHAPTER 6

6.3.1.6* Not implemented.

6.3.4.2* Not implemented.

6.3.12 Separate guidance for flight recorders maintenance not required. Maintenance serviceability of recorders is an integral part of the aeroplane maintenance programme.

6.4.2 VFR night flights shall be equipped in accordance with IFR.

6.7.3 Not implemented.

6.7.4* Not implemented.

6.9.1 Equipped with two sensitive pressure altimeters calibrated in feet with subscale setting, calibrated in hectopascals/millibars adjustable for any barometric pressure likely to be set during the flight.

6.15.2* Required for turbine-powered aeroplanes only.

6.18.3* Not implemented.

*Recommended Practice

CHAPTER 8

8.2.3 No specific requirement.
8.3.2

CHAPTER 9

9.4.1 A pilot does not operate an aeroplane as commander or co-pilot unless he has carried out at least three take-offs and three landings as pilot flying in an aeroplane of the same type or a flight simulator, qualified and approved for the purpose in accordance with JAR-STD 1A of the aeroplane type to be used, in the preceding 90 days.

9.4.2 A co-pilot does not serve at the flight controls during take-off and landing unless he has served as a pilot at the controls during take-off and landing in an aeroplane of the same type or flight simulator, qualified and approved for the purpose in accordance with JAR-STD 1A of the aeroplane type to be used, in the preceding 90 days.

9.5 If a visual requirement is met only with the use of correcting lenses, the glasses or contact lenses must provide optimal visual function purposes. A spare set of similar correcting lenses shall be readily available when exercising the privileges of the licence.

CHAPTER 10

10.4* No specific requirement.

CHAPTER 11

11.4.3* An operator shall preserve documentation for a period of three months.

CHAPTER 13

13.5.1* Requirement is included in the National Security Programme.

13.5.2* An operator shall ensure that weapons of war and ammunition of war are:

a) stowed in the aeroplane in a place which is inaccessible to passengers during flight; and

b) in the case of firearms, unloaded, unless before the commencement of the flight, approval has been granted by all States that such weapons of war and munitions of war may be carried in circumstances that differ in part or in total from those indicated in this subparagraph.

*Recommended Practice

CHAPTER 1

Definitions	*Approach and landing operations using instrument approach procedures. Category II (Cat II) operation.* A Category II operation is defined with a runway visual range of not less than 300 m.

CHAPTER 4

4.2.3.2	No formal qualification requirements established.
4.2.5	No explicit requirement for Human Factors principles established.
4.3.6.2.1 4.3.6.2.2	All aeroplanes with turbine-powered engines can use 30-minute holding fuel.
4.3.7.2	No formal requirements for two-way communication established.
4.3.8.2	For flights with a cabin pressure altitude between 10 000 ft and 15 000 ft, only a partial quantity of stored breathing oxygen is supplied for passengers.
4.4.1.3	Only partially compliant.
4.4.7	No formal requirements for coordination of in-flight instructions established.
4.5.1	Pilot-in-command responsibilities not fully reflected in JAR-OPS 1.085.
4.6.1 4.6.2	Not explicitly addressed in JAR-OPS 1.201.

CHAPTER 5

5.1.2	Single-engined turbo-propeller powered aeroplanes may be used for cargo operations only during night and/or IMC.
5.3.2	Not explicitly addressed in JAR-OPS 1.

CHAPTER 6

6.1.3	Human Factors principles design not explicitly required in JAR-OPS 1.1045.
6.2.2 c) 1) and 2)	Not applicable for transportation of parachutists to be dropped from an aeroplane.
6.3	JAR-OPS 1.715/720/725 not fully concordant with Annex 6 text.
6.3.1 6.3.6	Will not be implemented in time due to lack of standards and an obligation to provide ample warning for workshops and operators/owners.
6.9	IFR equipment only required for VFR night operations.

6.9.1 c) Counter drum-pointer not required in JAR-OPS 1.652 c).

6.15.6 JAA implementation date 1 January 2005.

6.17 Only one ELT required. From 1 January 2002, new aeroplanes to be equipped with one automatic ELT.

6.19 Pressure-altitude reporting transponder only required for VFR operation if applicable to route being flown.

6.20 JAR-OPS 1.652 s) has no formal requirement for use of boom or throat microphone below transition level/altitude.

CHAPTER 9

9.4 Recency may also be maintained by flying a flight simulator, qualified and approved for the purpose, of the aeroplane type to be used.

Recency may be extended up to a maximum of 120 days by line flying under supervision of a Class/Type Rating Instructor or a Class/Type Rating Examiner. For periods beyond 120 days, the recency requirement is satisfied by a training flight or use of an approved flight simulator.

9.4.4 Check valid if issued within the final three calendar months of the previous validity period.

CHAPTER 4

4.2.10.4 Legislation does not cover cosmic radiation dose recordings for flight crew as there are no aircraft registered in Fiji capable of operating at or above FL490.

4.6 Flight operations officers/flight dispatchers are not required as a condition on an AOC and are not licensed.

CHAPTER 10 Flight operations officers/flight dispatchers are not required as a condition on an AOC and are not licensed.

CHAPTER 1

Definitions	*Approach and landing operations using instrument approach procedures*. *Category II (Cat II) operation*. A Category II operation is defined with a runway visual range of not less than 300 m.

CHAPTER 4

4.2.3.2	No formal ground crew qualification requirements for aircraft taxi are established in JAR-OPS 1. Requirements are given in the Finnish national aviation regulations PEL M1-4 and PEL M2-90.
4.2.5	No explicit Human Factors principles requirements established in JAR-OPS 1.210 and 1.1040.
4.3.6.2.1 4.3.6.2.2	All aeroplanes with turbine-powered engines (including turbo-props) can use 30-minute holding fuel instead of 45 minutes.
4.3.7.2	No formal requirements for two-way communication established in JAR-OPS 1.
4.3.8.2	For flights with a cabin pressure altitude between 10 000 ft and 15 000 ft, only a partial quantity of stored breathing oxygen is supplied for passengers.
4.4.1.3	Only partially compliant.
4.4.7	No formal requirements for coordination of in-flight instructions with ATS established in JAR-OPS 1.
4.5.1	Pilot-in-command responsibilities not fully reflected in JAR-OPS 1.085.
4.6.1 4.6.2	Not explicitly addressed in JAR-OPS 1.205.

CHAPTER 5

5.1.2	Single-engined, turbo-propeller powered aeroplanes may be used for domestic cargo only operations during night and/or IMC.
5.3.2	Not explicitly addressed in JAR-OPS 1.475.

CHAPTER 6

6.1.3	Human Factors principles design not explicitly required in JAR-OPS 1.1040 or JAR-OPS 1.1045.
6.2.2 c) 1) and 2)	Not applicable for transportation of parachutists to be dropped from an aeroplane with a maximum of 10 passenger seats.
6.3.3 to 6.3.3.2	JAR-OPS 1.715/1.720/1.725 are not fully concordant with Annex 6 text.
6.3.3.3*	JAR-OPS 1.715/1.720/1.725 are not fully concordant with Annex 6 text.

*Recommended Practice

6.3.4 6.3.4.1	JAR-OPS 1.715/1.720/1.725 are not fully concordant with Annex 6 text.
6.3.4.2*	JAR-OPS 1.715/1.720/1.725 are not fully concordant with Annex 6 text.
6.3.4.3 6.3.5	JAR-OPS 1.715/1.720/1.725 are not fully concordant with Annex 6 text.
6.3.8 6.3.10	Flight records — operation: a CVR may be switched off during the flight time following an accident or incident, if the pilot-in-command believes that the recorded data to be preserved for accident or incident investigation would otherwise be erased automatically.
6.4.2	IFR equipment required only for VFR night operations.
6.9.1 c)	Counter drum-pointer not required in JAR-OPS 1.652 c).
6.12	Alternate means of compliance to be introduced as no measuring equipment is available.
6.15.6	JAA implementation date is 1 January 2005.
6.17	Only one ELT required in JAR-OPS 1.820. From 1 January 2002, new aeroplanes shall be equipped with one automatic ELT.
6.19	Pressure-altitude reporting transponder in JAR-OPS 1.865 only required for VFR operation, if the requirement is applicable to the area and route flown.
6.20	JAR-OPS 1.650/652 has no formal requirement for use of boom or throat microphone below transition level/altitude.

CHAPTER 9

9.4.1	Recency may also be maintained by flying a flight simulator, qualified and approved for the purpose, of the aeroplane type to be used. Recency may be extended up to a maximum of 120 days by line flying under supervision of a Class/Type Rating Instructor or a Class/Type Rating Examiner. For periods beyond 120 days, the recency requirement is satisfied by a training flight or use of an approved flight simulator.
9.4.2	Recency may be extended up to a maximum of 120 days by line flying under supervision of a Class/Type Rating Instructor or a Class/Type Rating Examiner. For periods beyond 120 days, the recency requirement is satisfied by a training flight or use of an approved flight simulator.
9.4.4	The period of validity of an operator proficiency check is six calendar months in addition to the remainder of the month of issue. If issued within the final three calender months of validity of a previous proficiency check, the period of validity shall extend from the date of issue until six calendar months from the expiry date of that previous operator proficiency check.

*Recommended Practice

CHAPTER 3

3.2.2* 3.2.3 A flight data analysis programme for turbine-engined aeroplanes of a maximum certificated take-off mass of 10 000 kg or more, or a maximum passenger seating configuration of 20 or more, is required.

CHAPTER 4

4.3.3.1 The French regulations do not have a detailed requirement about signing the operational flight plan.

4.3.6.2 The rules for the carriage of fuel for aeroplanes equipped with turboprop engines are the same as those for aeroplanes equipped with turbo-jet engines, defined in paragraph 4.3.6.3.

4.3.8.2 The French regulations only require an oxygen supply for some of the passengers for the whole part of the flight below 15 000 ft.

CHAPTER 5

5.3.2 France has no regulatory requirement to take account of the charting.

CHAPTER 6

6.1.2 France has no specific requirement for the operator to ensure that the MEL does not affect the aeroplane's compliance with the airworthiness requirements applicable in the State of Registry.

6.3.1.5 6.3.1.5.1 6.3.1.5.2 The French regulations have not yet incorporated the requirements for the recording of communications by data link.

6.3.1.8 The list of parameters required by the French regulations is not totally in compliance with the requirements of Annex 6.

6.3.4.2* Aeroplanes between 5 700 kg and 27 000 kg are not subject to this requirement.

6.3.6 Since the list of parameters of the Type IA FDR has not yet been incorporated into the French regulations, the scope concerning these recorders has consequently not yet been defined.

6.3.7.2* France only applies this recommendation to aeroplanes of more than nine passengers.

6.3.9.2* France only applies this recommendation to aeroplanes for which the individual certificate of airworthiness was issued on or after 1 April 1998.

6.4.2 France has no particular requirements for controlled VFR flights, other than compliance with the requirements of the air traffic services.

6.9.1 c) The French regulations do not specify the altimeter display mode.

*Recommended Practice

6.15.6 The French regulations have not yet incorporated provisions on equipping the aeroplanes in service with a ground proximity warning system with a predictive terrain hazard warning function.

6.15.7* The French regulations only concern aeroplanes of more than 15 tons or more than 30 passengers.

6.18.3* France has no particular requirements for airborne collision avoidance systems, other than compliance with the requirements of the air traffic services.

6.20 France has no particular requirement on the use of boom or throat microphones below the transition level/altitude.

6.21.1*
6.21.2* France has no requirements for the forward-looking wind shear warning system.

CHAPTER 8

8.7.5.4 France has no particular requirement for the theoretical and practical training of maintenance personnel in human performance.

CHAPTER 9

9.4.1 France authorizes recent experience on a simulator.

CHAPTER 10

10.4* France has no particular requirement for the recent experience of flight operations officers/flight dispatchers.

CHAPTER 12

12.4 f) France has no particular requirements for the training of cabin crew personnel in human performance.

CHAPTER 13

13.5.1* France has no requirements for the carriage of specialized means to attenuate and direct the blast.

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*Recommended Practice

CHAPTER 4

4.3.7 4.3.8	Not implemented.
4.6.1 4.6.2	Not implemented. The system currently in use does not utilize the services of flight dispatchers.

CHAPTER 6

6.1.2 6.3.6 6.3.7.1 6.3.7.2*	Not implemented.
6.6	Not implemented. The State has not designated any land areas in which search and rescue would be especially difficult.
6.7.1 6.7.2 6.15.3 6.17.1 6.17.2 6.17.3 6.17.4 6.21.1* 6.21.2*	Not implemented.

CHAPTER 8

8.1.4	Although the operator is responsible to ensure the aircraft is maintained in an airworthy condition, there is no requirement for the operator to establish a maintenance control manual.
8.2	Although the operator is responsible to ensure the aircraft is maintained in an airworthy condition, there is no requirement for the operator to establish a maintenance control manual.
8.3.1	The State of Georgia uses the term maintenance specification in lieu of maintenance programme. Not all the information specified in 11.3 is required to be identified in the maintenance specification.
8.4.2	The records in 8.4.1 a) to e) are required to be kept until the unit they refer to is completely withdrawn from service. The records in 8.4.1 f) are required to be kept for a minimum of five years.
8.7.2.1	Although a maintenance procedures manual is required, not all the requirements specified in 8.7.2.1 need to be identified.
8.7.5.1	Not implemented.
8.7.6.2	All records are kept for five years or until such time as the aircraft or unit has been withdrawn from service.

*Recommended Practice

CHAPTER 9

9.5 Not implemented.

CHAPTER 10

10.1 Not implemented. The system currently in use does not utilize the services of flight dispatchers.
10.2*

CHAPTER 11

11.2 Not implemented.
11.3.1 d)

CHAPTER 13

13.1 Not implemented.
13.3.1
13.5.1*

Appendix 2

5.25 Not implemented. Georgia presently has no aircraft that operate above 15 000 m.

*Recommended Practice

CHAPTER 4

4.1.3	Not implemented. Non-relative reference.
4.2.3.2	Not implemented. JAR-OPS does not reflect for aircraft taxi a ground crew qualification process.
4.2.5	Not implemented. Checklists: Human Factors principles are not explicitly mentioned in JAR-OPS 1.
4.3.6.2.1	Turboprop fuel reserves rationale different in JAR-OPS.
4.3.7.2	Not implemented. Two-way communication or/by other suitable means flight deck/ground when refuelling with passengers on board not addressed in JAR-OPS.
4.3.8.2	Partially implemented. Oxygen requirements: below 15 000 ft, only part of the passengers are provided with oxygen.
4.4.1.3	Partially implemented. The first part of the Standard not addressed in JAR-OPS.
4.4.7	Not implemented. In flight operational instruction coordination with ATS before transmission is not addressed in JAR-OPS.
4.4.8.1	Not applicable. Refers to the State aerodrome.
4.5.1	Duties of pilot-in-command are not considered in JAR-OPS.
4.5.3	Reporting in case of accident. JAR-OPS more accurate.
4.6.1 4.6.2	Not implemented. Duties of flight operations officer/flight dispatcher are not explicitly addressed in JAR-OPS.
4.7.4*	Grandfather rights. ETOPS threshold not addressed in leaflet 20. JAR-OPS is more stringent.

CHAPTER 5

5.1.3*	Not implemented. Annex 6 performance para. 5.2 applicable in case Annex 8, Part III, is waived by use of Article 41 of the Convention.
5.2.7 d)	Annex 16 take-off/landing mass limited in all cases by noise requirements.
5.3.1 5.3.2	Not implemented. Obstacle data to be provided to enable the operator adequate obstacle avoidance accountability in the procedures, taking into account charting accuracy.

CHAPTER 6

6.1.3	Not implemented. Human Factors accountability when developing the AOM.
6.4.2	VFR controlled flight equipment. IFR only requested at night.

*Recommended Practice

6.9.1 c)	Partially implemented.
6.15.2*	Not implemented.
6.17.3	
6.17.7*	
6.18.3*	
6.21.1*	
6.21.2*	

CHAPTER 9

9.4.1	Recent experience in JAR OPS recency may be achieved in a simulator. Other means of compliance for time period.

CHAPTER 10

10.2*	Not implemented. Flight operations officer/flight dispatcher recent experience is not addressed.
10.4*	

CHAPTER 13

13.5.1*	Not implemented. Bomb blast attenuation is not addressed.

Appendix 2

5.12	Not implemented.
5.14	
5.19	
5.23	

*Recommended Practice

CHAPTER 6

6.18.3* Indian regulations require all aeroplanes with a take-off mass of less than 5 700 kg and authorized to carry 10 to 19 passengers to be equipped with ACAS-I by 1 January 2005. It is not considered feasible to require all aeroplanes to be equipped with ACAS II.

*Recommended Practice

CHAPTER 4

4.2.7 Requirements are in accordance with JAR-OPS 1, Subpart E.

CHAPTER 6

6.2.2 Not implemented.

6.4 Requirements are in accordance with JAR-OPS 1, 1.650.

6.9 Requirements are in accordance with JAR-OPS 1, 1.652.
6.10

6.11* Requirements are in accordance with JAR-OPS Part 1, 1.670. Implemented 1 April 1999.

6.15.2* Not implemented.

6.15.6 Requirements are in accordance with JAR-OPS 1, 1.665.

6.15.7* Requirements are in accordance with JAR-OPS 1, 1.665.

6.18.3* Not implemented.

*Recommended Practice

CHAPTER 4

4.2.1.6 Requirements for ongoing supervision and oversight of air operators not implemented.

CHAPTER 8

8.2.1 Content of the maintenance control manual and its revisions not implemented.

8.7.3.2 Requirement for authority's inspection of the approved maintenance organization not implemented.

CHAPTER 11

11.2 Content of the maintenance control manual and its revisions not implemented.

11.3 Maintenance reliability programmes and their requirements not implemented.

CHAPTER 1

Definitions *Crew member.* A person carried by an aircraft who is:

a) employed, engaged or contracted by the operator of the aircraft; or

b) carried for the sole purpose of undergoing or giving instruction in the control and navigation of the aircraft; or

c) a person exercising a function which that person is duly authorized in writing by the Director under the Act or rules made under the Act to exercise; or

d) a flight examiner.

Flight crew member. A crew member assigned by an operator for duty in an aircraft during flight time as a pilot or flight engineer.

Flight time. The total time from the moment the aircraft first moves under its own power for the purpose of taking off until the moment it comes to rest at the end of the flight.

Pilot-in-command. In relation to any aircraft means the pilot responsible for the operation and safety of the aircraft.

CHAPTER 4

4.2.2.2 The requirements for the contents of the operations manual do not include all of the elements indicated in Appendix 2.

Remark: Minimum flight altitudes are mandated by the CAA. There is no requirement for the operator to address these minimums in the operations manual.

4.2.4 Applicable in Part 121 operations only.

4.2.6 Minimum flight altitudes are established by the State.

Remark: There is no requirement for the operator to address these minimums in the operations manual.

4.2.7 The State prescribes aerodrome operating minima.

4.2.7.3 CAR 91.415 d). Unless otherwise authorized by the director, a pilot performing a Category II or III precision approach procedure that provides and requires use of a DH shall not continue the approach below the authorized DH unless the following conditions are met:

2) At least one of the following visual references for the intended runway is distinctly visible and identifiable:

i) the runway threshold; or

ii) the runway threshold markings; or

iii) the runway threshold lights; or

iv) the runway touchdown zone or touchdown zone markings; or

v) the runway touchdown zone lights.

CAR 91.417 a). No person shall perform a Category II or III precision approach procedure in a New Zealand registered aircraft unless:

1) there is available in the aircraft:

i) for Category II precision approach procedures, a current Category II precision approach procedure manual approved in accordance with 91.419 for that aircraft; or

ii) for Category III precision approach procedures, a current Category III precision approach procedure manual approved in accordance with 91.419 for that aircraft; and

2) the Category II or III precision approach procedure is performed in accordance with the procedures, instructions and limitations in the approved manual; and

3) the instruments and equipment listed in the approved manual that are required for a particular Category II or III precision approach procedure have been inspected and maintained in accordance with the maintenance programme in that manual.

CAR 91.419 c). Each Category II or III precision approach procedure manual shall contain the procedures and instructions related to:

i) the recognition of decision height; and

ii) the use of runway visual range information.

4.2.8 The threshold crossing height is 50 ft.

4.3.1 The Standards are met, however, certifying is not a requirement.

4.3.4.2
4.3.6.4 c) Not implemented.

4.3.7.2 Live intercom, ground/aircraft, not a requirement pursuant to Civil Aviation Rules.

4.4.1.2
4.4.1.3 CAR 91.413 c). *Operation below DA, DH or MDA*. Where a DA, DH or MDA is applicable, no pilot-in-command shall operate an aircraft at any aerodrome below the MDA or continue an instrument approach procedure below the DA or DH prescribed in paragraph b) unless:

1) the aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent using normal manoeuvres that will allow touchdown to occur within the touchdown zone of the runway of intended landing;

2) the flight visibility is not less than the visibility prescribed under Part 97 for the instrument approach procedure being used; and

3) except for a Category II or Category III precision approach procedure prescribed under Part 97 for that aerodrome that includes any necessary visual reference requirements, at least one of the following visual references for the intended runway is distinctly visible and identifiable to the pilot:

i) the approach lighting system; or

ii) the threshold markings; or

iii) the threshold lights; or

iv) the runway-end identification lights; or

v) the visual approach slope indicator; or

vi) the touchdown zone or touchdown zone markings; or

vii) the touchdown zone lights; or

viii) the runway or runway markings; or

ix) the runway lights.

d) *Landing*. A pilot-in-command shall not land an aircraft when the flight visibility is less than the visibility prescribed under Part 97 for the instrument procedure used.

e) *Missed approach procedures*. Each pilot-in-command shall immediately execute the missed approach procedure prescribed under Part 97 if:

1) the requirements of paragraph c) are not met at either of the following times:

i) when the aircraft is being operated below MDA; or

ii) upon arrival at the missed approach point, including a DA or DH were a DA or DH is specified and its use is required, and any time after that until touchdown; or

2) an identifiable part of the aerodrome is not distinctly visible to the pilot during a circling manoeuvre at or above MDA, unless the inability to see an identifiable part of the aerodrome results only from normal manoeuvring of the aircraft during approach.

4.4.3 Not implemented.

4.4.4.2 Not a requirement pursuant to Civil Aviation Rules.

4.4.9.2* Noise abatement procedures are applied independent of aircraft type.

4.5.1 The pilot-in-command of an aircraft shall:

a) be responsible for the safe operation of the aircraft in flight, the safety and well-being of all passengers and crew and the safety of cargo carried;

b) have final authority to control the aircraft while in command and for the maintenance of discipline by all persons on board; and

*Recommended Practice

c) subject to Section 13A of the Civil Aviation Act (duties of pilot-in-command and operator during emergencies), be responsible for compliance with all relevant requirements of this Act and regulations and rules made under this Act.

4.6 There are no provisions addressing or requiring flight operations officers/dispatchers.

4.7.1 Threshold time for Part 121 operations is 60 minutes while 90 minutes is established for Part 125 and 135 operations.

4.7.4* Not implemented. No ETOPS threshold prior to the commencement of Civil Aviation Rules.

CHAPTER 5

5.1.2 Single-engined aeroplane operations not prohibited, however, the Civil Aviation Rules provide standards to mitigate the risk associated with that type of operation.

CHAPTER 6

6.1.3 There is no requirement for the operator to provide an aircraft operating manual as such.

Remark: The Civil Aviation Rules use the term "aircraft flight manual" the carriage of which is mandatory.

6.2.3 Partially implemented in that the requirement concerning the operations manual is incomplete.

6.2.4 Marking of break-in points not prescribed in Civil Aviation Rules.

6.3 *Flight Data Recorders*. Each holder of an airline air operator certificate (air transport operation or commercial transport operation) shall ensure that each of its:

a) aeroplanes with a seating configuration of more than 30 passenger seats or a payload capacity of more than 3 410 kg; or

b) multi-engine turbine-powered aeroplanes with a seating configuration of 10 to 30 passenger seats or a payload capacity of 3 410 kg or less and a maximum certified take-off weight of greater than 5 700 kg, except for de Havilland DHC 6 aeroplanes and aeroplanes registered on or before 31 March 1997, with a maximum certified take-off weight of less than 5 700 kg,

are equipped with a flight data recorder.

Each flight crew member shall ensure that the flight data recorder is operated continuously from the instant the aircraft begins the take-off until it has completed the landing, and that all recorded data is kept until the aircraft has been operated for at least 25 hours, or 10 hours with respect to helicopters, after each operating cycle, and that no more than one hour of recorded data is erased for the purpose of testing the flight recorder or the flight recorder system, and that any such erasure is of the oldest recorded data accumulated at the time of testing and recorded in the maintenance documentation.

Cockpit Voice Recorders. Each holder of an airline air operator certificate (air transport operation or commercial transport operation) shall ensure that each of its aeroplanes:

*Recommended Practice

a) with a seating configuration of more than 30 passenger seats or a payload capacity of more than 3 410 kg; or

b) with a seating configuration of 10 to 30 passenger seats or a payload capacity of 3 410 kg or less and a maximum certified take-off weight of greater than 5 700 kg, for which the aeroplane's flight manual requires two or more flight crew,

is equipped with a cockpit voice recorder.

Each flight crew member shall ensure that the cockpit voice recorder is operated continuously from the start of the checklist commenced before the engine start until the completion of the final checklist at the termination of flight, and if the aircraft is equipped to record the uninterrupted audio signals received from a boom or mask microphone, boom microphones are used below 10 000 ft altitude, and if an erasure feature is used in the cockpit voice recorder only information recorded more than 30 minutes earlier than the last record is erased or otherwise obliterated.

6.4.2 New Zealand does not distinguish between controlled or uncontrolled VFR flights. Additional equipment is required for night operations.

6.5.1 b) No sound signal requirement is prescribed.

6.6 There is no requirement for means of sustaining life.

6.7.5
6.7.6* Applicable only for flights above 30 000 ft.

6.11* There is no requirement for the equipment to be operative. Weather radar shall meet the requirements of TSO-C63 series.

Remark:

CAR 121.377: Each holder of an air operator certificate shall ensure that each of its turbine-powered aeroplanes operating under IFR is equipped with a weather radar.

CAR 125.373: Each holder of an air operator certificate shall ensure each of the turbine-powered aeroplanes in excess of 5 700 kg maximum certificated take-off weight operating under IFR is equipped with a weather radar.

6.12 Not implemented.

6.13 *Remark:* Notice of Proposed Rule Making, incorporating by reference the provisions of Annex 16, issued.

6.15 Each holder of an airline air operator certificate (air transport operation or commercial transport operation) shall ensure that each of its turbine-powered aeroplanes with a certificated seating capacity of more than 30 passenger seats or greater than 15 000 kg maximum certificated take-off weight is equipped with a ground proximity warning system meeting the requirements of the TSO-C92 series.

*Recommended Practice

Each holder of an airline air operator certificate (air transport operation or commercial transport operation) shall ensure that each of its turbine-powered aeroplanes with a certificated seating capacity of more than 30 passenger seats or a payload capacity of greater than 3 410 kg, or greater than 5 700 kg maximum certificated take-off weight, operating under IFR, is equipped with a global proximity warning system meeting the requirements of the TSO-C92 series.

6.15.2* GPWS requirements not applied to other than turbine-engined aeroplanes.

6.16.3 Applicable to Part 121 operations only and location is not specified.

6.18 Civil Aviation Rules do not at present require the carriage and operation of ACAS II.

6.19 Unless otherwise authorized or instructed by ATC aircraft operating in transponder, mandatory airspace shall be equipped with an SSR transponder.

6.20 Use below transition level not mandatory. Effectively applicable only for aircraft having a certified seating capacity of 10 seats or more, excluding any pilot seat.

6.21.1*
6.21.2* Forward-looking wind shear warning system — turbo-jet aeroplanes — not required pursuant to Civil Aviation Rules.

CHAPTER 8

8.7.2 Partially implemented. Not all the requirements contained in Chapter 8 concerning the operator's maintenance organization's procedures manual, operators maintenance control manual, maintenance programme, maintenance records and continuing airworthiness information are referred to in the Civil Aviation Rules.

CHAPTER 9

9.1.4 New Zealand does not issue flight navigator licences nor require a flight navigator as a flight crew member.

9.3 The requirement does not include all the elements mentioned in Annex 6, Part I.

9.4.1 Partially implemented in that the currency may be renewed in a zero flight time simulator.

9.4.2 CAR 61.37: Recent flight experience applicable only to pilot-in-command.

9.4.3.2 Partially implemented in that the flight crews are required to meet aerodrome and route qualification requirements which are not specified.

9.4.3.3 Partially implemented in that the annual route check is deemed to satisfy the requirement.

9.4.3.5 Partially implemented in that the annual route check is deemed to satisfy the requirement.

CHAPTER 10 New Zealand does not license flight operations officers or flight dispatchers.

*Recommended Practice

CHAPTER 12

12.5 Flight time, flight duty periods and rest periods for cabin crew are limited and determined by industrial agreement.

CHAPTER 13

13.5.1* Not implemented.

13.5.2* Partially implemented, requirement applicable to Part 121 operations only.

Appendix 2 The detailed requirements do no include all the elements listed in the Appendix.

*Recommended Practice

CHAPTER 1

Definitions	*Approach and landing operations using instrument approach procedures*. *Category II (Cat II) operation*. A Category II operation is defined with a runway visual range of not less than 300 m.

CHAPTER 3

3.2.4	Norway's present legislation is not in conformity with "a flight data analysis programme shall be non-punitive".

CHAPTER 4

4.2.3.2 a) and d)	Operations instructions general. Norwegian regulations or JAR-OPS 1 contain no formal requirements.

CHAPTER 5

5.1.2	Single-engined aircraft may be used in cargo operations under IMC and/or night.

CHAPTER 6

6.4.2	Equipment for controlled VFR flights. Only one pressure altimeter is required for VFR by day.
6.15.5 to 6.15.7*	GPWS. The installation of the predictive function not yet required.
6.20	Microphones. Boom microphones only required for IFR operations.

*Recommended Practice

CHAPTER 6

6.3.7.1 6.3.8.1	Compliance deferred until 1 January 2005 due to constraints on the part of operators.
6.15.1 6.15.2* 6.15.7*	Non-compliance.
6.18.1	Compliance date is to be extended to 1 January 2005 due to constraints on the part of operators.
6.18.2	Non-compliance.

*Recommended Practice

CHAPTER 3

3.1.3 CAR 93 vests this power with ATC rather than with the operator.

3.2 Papua New Guinea legislation does not call up such a requirement.

CHAPTER 4

4.1.3 Papua New Guinea legislation does not call up such a requirement.

4.2.7.1 Papua New Guinea legislation does not permit an operator to establish aerodrome minima which may differ from those established by CAA pursuant to CAR 260.

4.2.7.4* Papua New Guinea legislation does not call up such a requirement.

4.2.9.2 No period of retention is specified.

4.2.10.4 While CAO 20.18 requires aircraft to be fitted with equipment to measure cosmic radiation, it does not require operators to maintain records.

4.3.5.4 Papua New Guinea legislation does not call up such a requirement (may be pertinent for some international flights).

4.3.7.2 Such a requirement is not called up in CAO 20.9.

4.4.3 Papua New Guinea legislation does not call up such a requirement.

4.4.4.3 CAR 254 only requires one pilot to have seat belt fastened.

4.4.7 Papua New Guinea legislation does not call up such a requirement.

4.4.9.1* While the Papua New Guinea AIP does contain some noise abatement procedures at major aerodromes, it could not be established whether such procedures are compliant with Doc 8168.

4.4.9.2* There are no operator specified noise abatement procedures in Papua New Guinea, nor does the legislation address this issue.

CHAPTER 5

5.1.3* Performance requirements for aeroplanes above and below 5 700 kg MTOW (MTOM) engaged in various classes of operation are contained in CAO 20.7. These orders do not recommend operating in a higher performance category than is required by weight or class of operation category.

5.2.7 d) Papua New Guinea does not issue aeroplane noise certificates, hence this Standard is not pertinent for domestic operations.

*Recommended Practice

CHAPTER 6

6.2.4 6.2.4.2	Papua New Guinea legislation does not call up such a requirement.
6.3.1.5 6.3.1.5.1	Papua New Guinea legislation does not call up such a requirement.
6.3.1.6*	Papua New Guinea legislation does not address this alternative.
6.4.2	Papua New Guinea legislation does not address this category of operation and hence does not require VFR aircraft to be fitted with IFR equipment.
6.13	Aeroplane noise certification not issued in Papua New Guinea.
6.15.3 6.15.7*	The current GPWS requirement is limited to aeroplanes over 15 000 kg or authorized to carry more than 30 passengers.
6.18	Papua New Guinea legislation does not presently address ACAS — as with the GPWS requirement for smaller aircraft.
6.21.1* 6.21.2*	Papua New Guinea legislation does not call up such a requirement.

CHAPTER 7

7.2.2	Appropriate standards are presently being developed but are not yet addressed in Papua New Guinea legislation.
7.2.4 7.3	Papua New Guinea legislation does not call up such a requirement, although CAO 20.8 addresses this issue to some extent.

CHAPTER 8

8.1.2	Any licensed aircraft maintenance engineer licensed on type may release an aircraft to service without necessarily belonging to an approved organization.
8.1.3	An authorized person may sign a maintenance release irrespective of whether he is part of an approved organization or equivalent system.
8.4.3	Papua New Guinea legislation does not call up such a requirement.
8.5.2	This occurs in practice but is not specifically addressed in legislation.
8.7.5.1	Papua New Guinea legislation does not presently call up such a requirement.
8.7.5.3	No specific requirement in Papua New Guinea legislation in respect to assessing the competence of maintenance personnel. See 8.1.3 in respect to who may sign a maintenance release.

*Recommended Practice

CHAPTER 9

9.1.4 CAO 41.4 prescribes the requirements for a flight navigator's licence, but Papua New Guinea legislation does not specifically call up this Standard.

CHAPTER 13

13.1 Papua New Guinea legislation does not call up such a requirement.

13.5.1* Papua New Guinea legislation does not call up such a requirement.

*Recommended Practice

CHAPTER 4

4.3.6.2.1 Fuel and oil supply: aeroplanes are classified to two, either with reciprocating engines or with turbine engines.

CHAPTER 5

5.1.1 It is the responsibility of the operator to establish the aeroplane performance operating limitations.

5.2.5 The information related to performance is provided in the operating manual.

CHAPTER 9

9.4.1 Use of approved simulator to fulfil the recency requirements.

CHAPTER 6

6.15.6 From 1 January 2005, the Standard will be implemented.

6.17.2 From 1 January 2003, the Standard will be implemented.
6.17.5

6.18.1 From 24 September 2001, the Standard was implemented.

CHAPTER 1

Definitions	*Approach and landing operations using instrument approach procedures*. *Category II (Cat II) operation*. A Category II operation is defined with a decision height of 100 ft and a runway visual range of not less than 300 m.

CHAPTER 4

4.1.3	The national regulation does not contain a provision to keep facilities continuously available.
4.2.3.2	The national regulation does not include a ground qualification process.
4.2.5	Human Factors principles are not explicitly mentioned in the national regulation.
4.3.7.2	When refuelling with passengers on board, two-way communication by other suitable means between flight deck and ground crew is not addressed in national regulations.
4.3.8.2	Below 15 000 ft, only some of the passengers are provided with oxygen.
4.4.1.3	First part of the Standard not addressed in national regulations.
4.4.7	Coordination with ATS before transmission to the aeroplane.
4.4.8.1	The provisions refer to State aerodromes.
4.5.1	Duties of the pilot-in-command not considered.
4.7.4*	National regulations more stringent with established thresholds.

CHAPTER 5

5.3.1 5.3.2	No national requirement for obstacle data to be provided to enable the operator adequate obstacle avoidance accountability in the procedures, taking into account charting accuracy.

CHAPTER 6

6.1.3	No national requirement concerning Human Factors accountability when developing AOM.
6.3.10	No national requirement concerning where the flight records are to be located.
6.3.11.2	No requirement for the operator to preserve flight records following an accident or incident.
6.16.3	No requirement for the attendants' seats to be located near floor level or emergency exits.
6.17	The need for carrying two ELTs during a flight conducted over large sea areas began 1 January 2002.

*Recommended Practice

6.17.3 6.17.6	No requirement in the national regulations for automatic ELT.
6.18.1	From 1 January 2003, any aircraft with a certificated take-off mass in excess of 15 000 kg must be equipped with ACAS II.
6.18.4	No obligation for the ACAS II to comply with Annex 10, Volume IV.
6.20	No obligation for crew members while on flight deck duty to communicate through boom or throat microphones below the transition level/altitude.
6.21.1* 6.21.2*	No requirement for carrying a wind shear warning system.

CHAPTER 8

8.3.1	There are no specific requirements regarding the involvement of Human Factors in designing the maintenance programmes.
8.4.1 a), b) and c)	Twelve months instead of 90 days.
d)	Until next overhaul instead of 90 days.
e)	Until next maintenance check.
f)	Two years instead of one year.
8.4.2	As for 8.4.1.
8.7.5.3	The person signing the maintenance release is qualified according to JAR 66 and/or RACR-LPTA.
8.7.6.2	Two years instead of one year.

CHAPTER 9

9.4.1	Recent experience for pilot-in-command may be achieved in a simulator.

CHAPTER 11

11.2 a) 1)	JAR-OPS Subpart M asks for a procedure in the operator's manual to report to the certification authority and manufacturer. PINAC 13 asks for an occurrence report made by an operator after major defects but not for a procedure to be in the operator's manual.

CHAPTER 13

13.5.1*	Bomb blast attenuation is under study at the European level.

*Recommended Practice

27/9/02

CHAPTER 1

Definitions *Night*. The hours between sunset and sunrise.

Appendix 1

3. The Slovak regulation does not require lights to be displayed on the water.

CHAPTER 4

4.1.2 Not implemented.

4.2.4 The Civil Aviation Regulation Article 97.07.26 requires the operator to ensure that, when passengers are being carried, no emergency or abnormal situation shall be simulated. The requirement for cargo is not implemented.

4.4.1.2 Not implemented.
4.4.3
4.4.6*
4.6
4.7.1
4.7.2
4.7.4*

CHAPTER 5

5.2.3 Not implemented.

CHAPTER 6

6.7.3 Not implemented.
6.7.4*
6.15.2*
6.15.3
6.15.7*
6.18
6.21.1*
6.21.2*

CHAPTER 8

8.4.3 In the event of a temporary change of operator, the CAA has no means to mandate a transfer of records to the new operator.

8.5.1 Although the continuing airworthiness information is available at the operator's facility, the CAA does not mandate that continuing airworthiness information be transmitted to the CAA.

8.7.5.4 The CAA does not specify the type of initial and recurrent training programme necessary for maintenance personnel including training regarding human performance and coordination with other maintenance personnel and flight crew.

CHAPTER 9

9.4.3.2 Not implemented.
9.4.3.3

CHAPTER 10 Not implemented.

*Recommended Practice

CHAPTER 1

Definitions

Approach and landing operations using instrument approach procedures. Approach and landing with vertical guidance. Sweden has no definition.

Category II (CAT II) operations. Sweden uses a runway visual range of not less than 300 m.

Crew member. National definition differs.

Flight data analysis. No such definition.

Pilot-in-command. National definition differs.

CHAPTER 3

3.2.3
3.2.4 National definition differs.

CHAPTER 4

4.2.3.2 No such requirements.

4.3.6.2.1
4.3.6.2.2 Forty-five minutes for piston engine and 30 minutes for turbine engine.

4.3.7.2 No formal requirement for two-way communication established.

4.3.8.2 Sweden does not comply.

4.4.2 Sweden does not comply, but advisory material is published in AIP.

4.4.7 No formal requirements exists.

4.5.1 Responsibility differs.

4.6.2 Sweden has no such requirements.

CHAPTER 5

5.1.2
5.3.2 National requirements do not cover this.

CHAPTER 6

6.1.1
6.1.2
6.3.1.5
6.3.1.5.1
6.3.1.5.2 No such requirement.

6.3.1.8 No such requirement.
6.3.1.8.1
6.3.1.8.2
6.3.1.8.3
6.3.1.8.4
6.3.1.8.5
6.3.6

6.4.2 Sweden does not apply controlled VFR concept.

6.20 Sweden has no such requirements for VFR day operations.

6.21.1* Sweden has no such requirement.

CHAPTER 9

9.4.4 Check valid if issued within final three calendar months of previous validity period.

9.6 Sweden only regulates flight duty time/periods.

CHAPTER 10

10.1 Sweden has no such requirements.

*Recommended Practice

CHAPTER 6

6.3.1.5.1 Compliance will be effected on 1 January 2009.

CHAPTER 5

5.2.10 The Aviation Regulations of Turkmenistan require a positive net climb gradient at the level flight altitude recommended in the operations manual following failure of two power-units on aircraft with three or more power-units.

CHAPTER 6

6.3.1 The Aviation Regulations of Turkmenistan do not distinguish clearly between Type I and Type II (IIA) flight recorders.

6.17.7* The Aviation Regulations of Turkmenistan do not include requirements for mandatory carriage of an automatic ELT.

CHAPTER 11

11.4.1* The journey log book does not contain the names of all crew members (only the pilot-in-command and co-pilot), the duty assignments of crew members or the nature of the flight. This information is contained in the orders issued for each flight.

*Recommended Practice

General

With regard to references to "State of the Operator" (except paragraphs 4.2.6.1 and 4.2.6.2 — Minimum flight altitudes), the responsibility for aeroplanes registered in the United Kingdom remains with the United Kingdom unless an agreement is reached with another State under the terms of Chapter 3.

The United Kingdom will continue to use the term "weight" unless the aeroplane is operated in accordance with JAR-OPS, when "mass" will be used.

The Overseas Territories of the United Kingdom cannot necessarily accept responsibility for aeroplanes not on their register.

CHAPTER 1

Definitions

Approach and landing operations using instrument approach procedures. Subpart E of JAR-OPS 1 (Aeroplanes), now the sole United Kingdom code for aerodrome operating minima policy, specifies a minimum RVR that is 50 m less than the 350 m specified in the ICAO Category II definition.

Cabin crew member. The United Kingdom continues to use the term "cabin attendant" in place of "cabin crew".

Crew member. The United Kingdom definition is based upon the functions that crew members undertake. Although different, the United Kingdom definition is more precise than that of ICAO.

Flight crew member. The United Kingdom definition is based upon the functions that flight crew members undertake. Although different, it is more precise than the ICAO definition.

Pilot-in-command. In United Kingdom legislation, "pilot-in-command" in relation to an aircraft means a person who for the time being is in charge of the piloting of the aircraft without being under the direction of any other pilot in the aircraft.

CHAPTER 3

3.2 The United Kingdom does not explicitly require operators to establish an accident prevention and flight safety programme, including a flight data analysis programme.

CHAPTER 4

4.1.2 The United Kingdom does not explicitly require operators to specify in their operations manuals this instruction on reporting without delay any inadequacy of facilities that may be observed.

4.2.5 The United Kingdom does not explicitly require operators to ensure that the design and utilization of checklists shall observe Human Factors principles.

4.2.7.4* The United Kingdom allows meteorology visibility to be converted to RVR. No limiting visibility is prescribed; if a reported RVR is not available, then an approach may be made if the conversion results in an RVR-equivalent value that is not less than the relevant aerodrome operating minima.

4.2.8 The United Kingdom does not explicitly require operators to establish operational procedures designed to ensure that an aeroplane being used to conduct precision approaches crosses the threshold by a safe margin.

*Recommended Practice

4.3.7.2 The United Kingdom does not require operators to specify in their operations manuals this instruction on establishing two-way communication by means of the aeroplane's intercommunication system or other suitable means between ground crew supervising the refuelling and the qualified personnel on board the aeroplane.

4.4.7 The United Kingdom does not explicitly require operators to specify in their operations manuals these instructions on the duties and training associated with the employment of flight operations officers/flight dispatchers.

4.5.1 The United Kingdom prescribes duties for the pilot designated by the operator as commander of the aircraft, covering essentially the same requirements as in the ICAO text, but described in a different and more precise manner.

4.6 The United Kingdom does not explicitly require operators to specify in their operations manuals these instructions on the duties and training associated with the employment of flight operations officers/flight dispatchers.

CHAPTER 6

6.1.3 The United Kingdom does not require operators to observe Human Factors principles in the design of the aircraft operating manual.

6.3.1.4* The United Kingdom does not accept the use of analogue flight data recorders using FM on aircraft new or second-hand first brought onto the U.K. register after 1 July 1981.

6.3.1.4.1 The United Kingdom does not prohibit this type of flight data recorder.

6.3.1.5
6.3.1.5.1
6.3.1.5.2 The United Kingdom has not promulgated any requirements for compliance with these Standards (which apply from 1 January 2005) on recording digital communications.

6.3.1.6* This type of recording is only allowed up to 5 700 kg.

6.3.1.8 Not all of the parameters listed are required by the U.K. CAA.

6.3.7.2* The United Kingdom has the same requirement but only for aircraft with C of A issued after 31 May 1990.

6.3.9.2*
6.3.9.3 The United Kingdom requires at least the last 30 minutes preceding removal of electrical power from the equipment.

6.9.1 i) The United Kingdom does not require public transport aeroplanes of maximum total weight not exceeding 5 700 kg to provide a means of indicating outside air temperature.

6.15.1 The United Kingdom prescribes a ground proximity warning system implementation date of 1 October 2001 for all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers.

6.15.2* The United Kingdom does not require compliance with this Recommendation.

*Recommended Practice

6.15.6 The United Kingdom prescribes an implementation date of 1 January 2005 for all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15 000 kg or authorized to carry more than 30 passengers that the Standard states shall be equipped by 1 January 2003 with a ground proximity warning system which has a predictive terrain warning function.

6.17.2
6.17.3
6.17.5
6.17.6 The United Kingdom does not require carriage of automatically activated emergency locator transmitters in public transport aeroplanes (over specified surfaces/locations).

6.17.7* The United Kingdom does not require carriage of automatically activated emergency locator transmitters in all public transport aeroplanes (over all surfaces/locations).

6.18.2 The United Kingdom does not require compliance with this Standard that will require from 1 January 2005 all turbine-engined aeroplanes with a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than 19 passengers to be equipped with an airborne collision avoidance system II.

6.18.3* The United Kingdom does not require carriage of an airborne collision avoidance system II in all public transport aeroplanes.

6.19 The United Kingdom does not require all public transport aeroplanes to be equipped with a pressure-altitude reporting transponder.

6.20 The United Kingdom proscribes the use of hand-held microphones below flight level 150 in controlled airspace.

6.21.1*
6.21.2* The United Kingdom does not prescribe these Recommendations for carriage of a forward-looking wind shear warning system.

CHAPTER 8

8.3.1 The United Kingdom does not require operators to observe Human Factors principles in the design and application of the maintenance programme.

8.7.5.4 The United Kingdom does not require maintenance organizations to ensure maintenance personnel receive training in knowledge and skills related to human performance.

CHAPTER 10

10.1 The United Kingdom does not explicitly require operators to specify in their operations manuals these instructions on the duties and training associated with the employment of flight operations officers/flight dispatchers.

10.2*
10.3*
10.4* The United Kingdom does not explicitly require operators to specify in their operations manuals these instructions on the duties and training associated with the employment of flight operations officers/flight dispatchers.

*Recommended Practice

CHAPTER 13

13.5.1* The United Kingdom does not currently prescribe that specialized means of attenuating and directing the blast should be provided for use in the least-risk bomb location.

Appendix 2

2. The United Kingdom does not explicitly require operators to establish an accident prevention and flight safety programme, including a flight data analysis programme.

*Recommended Practice

General The United States does not accept any provision of Annexes 2, 6, 10 or 11 or any other Annex as a Standard or Recommended Practice as applicable to State aircraft. In accordance with Article 3 *a*) of the *Convention on International Civil Aviation*, the Convention and its Annexes are not applicable to State aircraft. In so far as any provisions of Annexes 2, 6, 10 or 11 address the operation or control of State aircraft, the United States considers such provisions to be in the nature of a special recommendation of the Council, advisory only, and not requiring the filing of differences under Article 38 of the Convention.

CHAPTER 1

Definitions *Note.— The United States expresses distances in terms of feet and miles rather than metres. A significant number of North American operators and aircraft are not equipped with metric unit display.*

Aerodrome operating minima. The United States uses the term "landing minimums".

Approach and landing operations using instrument approach procedures:

Category I (CAT I) operation. For a Category I operation, the United States requires a decision height (DH) of not less than 200 ft and either visibility of not less than one-half mile or a runway visual range of 2 400 ft (RVR 1 800 ft with operative touchdown zone and runway centre line lights).

Category II (CAT II) operation. The United States requires that Category II provide approaches to minima of less than 200 ft decision height/2 400 ft runway visual range to as low as 100 ft decision height/1 200 ft runway visual range.

Category IIIB (CAT IIIB) operation. The United States criteria are the same as those adopted in Annex 6, Part I. However, the runway visual range is expressed in feet and less than 700 ft (200 m) but not less than 150 ft (50 m).

Cruising level. The United States air traffic control phraseology uses the term "cruising altitude".

Maintenance. The definition of maintenance in the United States regulations does not include modification or preventive maintenance and does include preservation.

Maximum mass. The United States Federal Regulations use the term "weight" and express "weight" in pounds.

CHAPTER 3

3.1.5 The pilot-in-command is not required to have available on board the aeroplane information concerning search and rescue services in the area over which the aircraft will be flown.

3.2 An operator is not required to establish and maintain an accident prevention and flight safety programme, though regulations pertaining to air carrier and commercial operator certification require that a sufficient number of personnel be available to ensure the highest degree of safety in its operations. This includes a Director of Safety position.

CHAPTER 4

4.1.3 The United States has no provisions requiring aerodromes to be continuously available during their published hours of operation.

4.2.2 The elements specifically required to be included in the operations manual of a United States air carrier are fewer in number than those specified in Appendix 2. Some commuter and on-demand operations do not require an operations manual.

4.2.3.2 The United States has no requirement that persons taxiing aircraft on the movement area of an aerodrome be qualified to use the radio.

4.2.4 For commuter and on-demand operations, there is no requirement that prohibits simulating emergency or abnormal situations when passengers or cargo are being carried.

4.2.9 For commuter and on-demand operations, operators are not required to maintain fuel and oil records showing compliance with the fuel and oil supply requirements of 4.3.6 of Annex 6, Part I.

4.2.9.2 For commuter and on-demand operations, there is no requirement that fuel and oil records be kept for three months. There is, however, a requirement that load manifests, which include fuel and oil records, be retained for 30 days.

4.3.3.2 The United States does not require that the operations manual describe the contents and use of the operational flight plan but does require establishing procedures for locating each flight.

4.3.4.1.2 When determining the distance to a take-off alternate, the United States does not require commuter and on-demand operations to calculate engine inoperative configurations, but does require that the alternate must be within one-hour flying time (at normal cruising speed, in still air) of the aerodrome of departure.

4.3.4.2 For commuter and on-demand operations, the United States does not require the designation in a flight plan of an en-route alternate aerodrome for extended range operations by aeroplanes with two turbine power-units.

4.3.6.2.1 The United States specifies different requirements when determining destination alternates depending on the type of operation (e.g. flag, supplemental, on demand). The United States criteria for designating an alternate aerodrome include weather conditions as well as flight time from the destination airport.

4.3.6.3 Commuter and on-demand operations using aeroplanes equipped with turbo-jet engines are not required to meet the Standards contained in 4.3.6.3 when a destination alternate aerodrome is required.

4.3.6.3.1 a) and b) The fuel reserve requirements for commuter and on-demand operations are expressed in terms of flight time and do not include a specific altitude requirement.

4.3.6.3.2 The fuel reserve requirements for commuter and on-demand operations are expressed in terms of flight time and do not include a specific altitude requirement.

4.3.6.4 d) and e) When computing fuel and oil requirements, the United States does not require commuter and on-demand operators to include in the operations manual required procedures in the case of loss of pressurization and other contingencies that may delay the landing of the aeroplane or increase fuel and/or oil consumption.

4.3.7.2 When refuelling with passengers embarking, on board, or disembarking an aeroplane, the United States does not require two-way communication between the ground crew supervising the refuelling and the qualified personnel on board the aeroplane. Refuelling safety procedures in the United States are contained in each operator's approved operating manual.

4.3.8 The United States does not require oxygen at all times for passengers experiencing cabin pressure altitudes above 13 000 ft (620 hPa). Oxygen for all passengers is not required until 15 000 ft.

4.3.8.2 The United States requires descent within four minutes to 14 000 ft, not 13 000 ft, in the event of loss of pressurization. For commuter and on-demand operations, the descent altitude is 15 000 ft.

4.4.4.4 The United States does not require all flight crew members occupying seats equipped with combined safety belts and shoulder harnesses to be properly secured during take-off and landing and still be able to properly perform their assigned duties.

4.6.1 A flight dispatcher is not required for commuter and on-demand operations.

4.7.1 to 4.7.3 The United States has not established regulations for commuter and on-demand operations specifying a threshold time to meet ETOPS requirements. However, flight operations up to 180 minutes away from an adequate alternate aerodrome are carried out by means of a special administrative authorization. ETOPS operations for air carriers are conducted via operations specifications and advisory material C2PPOC.

CHAPTER 5

5.1.2 Commuter and on-demand operators are permitted to carry passengers in single-engined aircraft in IFR conditions provided certain equipment requirements are met. There is no requirement that single-engined aeroplanes be operated in conditions of weather and light and over routes that would permit a safe forced landing to be executed in the event of engine failure. The United States prohibits air carriers from operating single-engined aircraft.

5.2.7 d) The United States employs a runway use programme to provide for noise sensitive areas.

5.2.8.1 The United States has no provision requiring that the loss, if any, of runway length due to alignment of the aeroplane prior to take-off be accounted for when determining the length of the runway available.

5.3.1 Aeroplanes certified under Part 23 (Commuter category aeroplanes) are not type certificated to meet the performance requirements of 5.3.1.

CHAPTER 6

General In addition to the aeroplane instruments and equipment Standards prescribed in Annex 6, Part I, Chapter 6, the United States requires that all United States-registered turbojet-powered aeroplanes, wherever operated, be equipped with an altitude-alerting system or device. The United States also requires that all transport category aeroplanes used in air commerce in the United States and all United States-registered transport category aeroplanes used in air commerce outside the United States must use an aural speed warning device.

6.1.3 The United States does not require the design of the aircraft operating manual to observe Human Factors principles. United States aircraft operating manual design requirements are covered by policy and guidance material.

6.3.1.1 Engine power, configuration and operation are not recorded on flight data recorders installed in large aeroplanes having a United States original type certificate issued on or before 30 September 1969, which are certificated for operations above 25 000 ft altitude or are turbine-engine powered. Engine operation is not recorded on flight data recorders installed on large aeroplanes having a United States original type certificate issued before 30 September 1969, which are certificated for operations above 25 000 ft altitude or are turbine-powered.

6.3.1.2 Neither engine power nor configuration of lift and drag devices are recorded on flight data recorders installed in large aeroplanes having a United States original type certificate issued on or before 30 September 1969, which are certificated for operations above 25 000 ft altitude or are turbine-engine powered.

6.3.5.1 The United States does not require flight data recorders that record the referenced parameters for all aircraft meeting this weight criterion. When operated by commuter and on-demand operators, multi-engine, turbine-powered aeroplanes that meet this weight criterion and were registered in the United States 11 October 1991 must be equipped with a flight data recorder that records time, altitude, airspeed, normal acceleration and heading, as well as other parameters.

6.4.1 The United States does not require aeroplanes on VFR flights, when operated as controlled flights, to be equipped in accordance with the requirements for aeroplanes operated under instrument flight rules.

6.5.1 b) Seaplanes are not required to have equipment for making the sound signals prescribed in the International Regulations for Preventing Collisions at Sea.

c) Seaplanes are not required to be equipped with one sea anchor (drogue).

6.5.3.1 The United States defines extended over water operations for aircraft other than helicopters as an operation over water at a horizontal distance of more than 50 nautical miles from the nearest shoreline.

6.6 Aeroplanes operated over land areas designated as areas in which search and rescue would be especially difficult are not required to be equipped with signalling devices or life-saving equipment. The United States does not designate areas in which search and rescue would be especially difficult and therefore does not require such additional equipment.

6.15.2* A ground proximity warning system is not required on piston-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or those authorized to carry more than nine passengers.

6.15.5 The United States has not required ground proximity warning systems having a predictive terrain hazard warning function to be installed on all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15 000 kg or authorized to carry more than 30 passengers, for which the individual certificate of airworthiness is first issued on or after 1 January 2001. All United States-registered turbine-powered aeroplanes configured with six or more passenger seats produced after 29 March 2002, must be equipped with a terrain awareness and warning system.

6.15.6 The United States has not required ground proximity warning systems having a predictive terrain hazard warning function to be installed on all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15 000 kg or authorized to carry more than 30 passengers from 1 January 2003. All United States-registered turbine-powered aeroplanes configured with six or more passenger seats produced after 29 March 2002, must be equipped with a terrain awareness and warning system by 29 March 2005.

6.15.7* A ground proximity warning system that has a predictive terrain hazard warning function is not required on all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers. All United States-registered turbine-powered aeroplanes configured with six or more passenger seats produced after 29 March 2002, must be equipped with a terrain awareness and warning system.

6.17.1 to 6.17.7* Emergency locator transmitters are not required for turbo-jet powered aircraft; aircraft engaged in scheduled flights by scheduled air carriers; or aircraft being used to show compliance with regulations or crew training.

*Recommended Practice

6.18.1 The United States does not require an aeroplane engaged in cargo operations only to be equipped with an airborne collision avoidance system (ACAS II). Only passenger-carrying operations are affected.

In addition to the Standards prescribed in Annex 6, Part I, 6.18.1 through 6.18.3, for United States-registered turbine-powered aeroplanes and United States operators of such aircraft, the United States requires all foreign air carriers operating a turbine-powered aeroplane having more than 10 passenger seats (excluding pilot seats) to be equipped with an airborne collision and avoidance system for flights within the United States. For aeroplanes with 30 or more passenger seats (excluding pilot seats), an ACAS II unit meeting TSO-C119 specifications is required. The ICAO Standard does not require compliance until January 2003 for aeroplanes with 30 or more passenger seats and January 2005 for aeroplanes with 19 or more passenger seats.

6.18.2 6.18.3* In addition to the Standards prescribed in Annex 6, Part I, 6.18.1 through 6.18.3, for United States-registered turbine-powered aeroplanes and United States operators of such aircraft, the United States requires all foreign air carriers operating a turbine-powered aeroplane having more than 10 passenger seats (excluding pilot seats) to be equipped with an airborne collision and avoidance system for flights within the United States. For aeroplanes with 30 or more passenger seats (excluding pilot seats), an ACAS II unit meeting TSO-C119 specifications is required. The ICAO Standard does not require compliance until January 2003 for aeroplanes with 30 or more passenger seats and January 2005 for aeroplanes with 19 or more passenger seats.

6.20 The United States does not require crew members on flight deck duty to communicate through boom or throat microphones below the transition level/altitude.

CHAPTER 7

7.2.1 The United States does not require an aeroplane to be provided with navigation equipment in accordance with RNP types for navigation within the United States. However, the United States does provide information and operations specifications for IFR operating requirements when United States operators and aircraft conduct operations in the European Airspace Designated for Basic Area Navigation (RNP-5 and 10).

7.2.2 a) The United States does not require an aeroplane operating in MNPS airspace to be equipped with equipment which continuously provides indications to the flight crew of adherence to or departure from a specific track. The United States does not allow a United States-registered civil aircraft to operate in MNPS-designated airspace unless that aircraft has approved navigational performance capability that complies with a 14 CFR 91 Appendix C and is authorized by the FAA Administrator to perform such operations.

CHAPTER 8

8.3 The United States does not require commuter and on-demand operators to have a maintenance programme for aeroplanes with nine or fewer seats.

8.3.1 The United States does not require that an operator's maintenance programme to observe Human Factors principles.

*Recommended Practice

8.4.2 The United States requires that records of work be retained until the work is repeated, superseded by other work or for one year after the work is performed, but does not require the records be retained after the unit has been permanently withdrawn from service.

8.7 The United States permits commuter and on-demand operators to have maintenance work performed either by an approved maintenance organization or by a certified mechanic or persons under the supervision of a certified mechanic.

8.7.5.4 The United States does not require maintenance personnel to be trained in knowledge and skills related to human performance, or maintenance training programmes to include human performance training.

8.7.6.2 The United States requires that records of work must be retained until the work is repeated, superseded by other work, or for one year after the work is performed.

CHAPTER 9

9.1.2 The United States does not require flight crew members to have a separate licence to operate the radio.

9.4.1 The United States allows for the pilot-in-command to gain recency of experience in a flight simulator.

9.4.3.2 Pilots engaged in commuter and on-demand operations are not required to demonstrate an adequate knowledge in the areas listed in 9.4.3.2.

a) 4) Pilots engaged in air carrier operations are not required to demonstrate an adequate knowledge of search and rescue procedures.

9.4.3.3 The pilot-in-command of commuter and on-demand operations is not required to have made an actual approach into each aerodrome of landing on the route, accompanied by a pilot who is qualified for the aerodrome.

9.4.3.5 Commuter and on-demand operators are not restricted from using a pilot as a pilot-in-command on a route where the pilot has not, within the preceding 12 months, made at least one trip between the terminal points of that route as a pilot member of the flight crew, or as a check pilot, or as an observer on the flight deck.

9.4.4 The second-in-command is not required to demonstrate proficiency twice during a one-year period to either a check pilot of the operator or to a representative of the State of the Operator. However, air carrier pilots other than the pilot-in-command are required to demonstrate proficiency once a year. Under the FAA's Advanced Qualification Programme (AQP), air carrier pilots are not required to demonstrate proficiency twice during a period of one year to either a check pilot of the operator or to a representative of the State of the Operator.

9.5 The United States practice is to require a spare set of correcting lenses only when a flight crew member's defective visual acuity necessitates a limitation on the pilot's medical certificate.

CHAPTER 10

10.1
10.2*
10.3*
10.4*

Flight dispatchers are not required for commuter and on-demand operations. Due to the limited size and scope of commuter and on-demand operators, only flight locating procedures are employed with non-licensed individuals.

*Recommended Practice

CHAPTER 13

13.2 A checklist containing procedures to be followed in searching for a suspected bomb is not required to be aboard the aircraft. The United States requires that crew members be trained in dealing with explosives that may be on board an aircraft, but this does not necessarily include training on how to search for an explosive.

Appendix 2 Many of the content areas for the operations manual described in Annex 6, Part I, Appendix 2, are not required in United States operations manuals (i.e. accident prevention and safety programme; search and rescue; Human Factors).

CHAPTER 3

3.2	The flight data analysis programme is not included.

CHAPTER 4

4.1.3 4.2.2 4.2.3.2 4.2.4 4.2.10.4	Not envisaged. Under study.
4.3.4.2	Not envisaged. No ETOPS operations are being conducted using aeroplanes of Uruguayan registry.
4.5.5	Not envisaged. Under study.
4.7	Not envisaged. No ETOPS operations are being conducted using aeroplanes of Uruguayan registry.

CHAPTER 6

6.13 6.15.5 6.15.6 6.15.7*	Not envisaged. Under study.
6.17	Only one ELT is required. Under study.
6.18.3* 6.20	Not envisaged. Under study.

CHAPTER 7

7.2.3	Not envisaged. An agreement must be reached at the regional level in order to implement vertical separation minimum (VSM).

CHAPTER 11

11.5 11.6	Not envisaged. Under study.

*Recommended Practice

INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

OPERATION OF AIRCRAFT

ANNEX 6

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

PART II
INTERNATIONAL GENERAL AVIATION — AEROPLANES

SIXTH EDITION OF PART II — JULY 1998

This edition incorporates all amendments adopted by the Council prior to 21 March 1998 and supersedes, on 5 November 1998, all previous editions of Part II of Annex 6.

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

INTERNATIONAL CIVIL AVIATION ORGANIZATION

AMENDMENTS

The issue of amendments is announced regularly in the *ICAO Journal* and in the monthly *Supplement to the Catalogue of ICAO Publications and Audio-visual Training Aids*, which holders of this publication should consult. The space below is provided to keep a record of such amendments.

RECORD OF AMENDMENTS AND CORRIGENDA

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No.	Date applicable	Date entered	Entered by
1-18	Incorporated in this Edition		
19	4/11/99	—	ICAO
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Introduction 31
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ABBREVIATIONS AND SYMBOLS

(used in this Annex)

Abbreviations

ADREP	Accident/incident reporting
AFCS	Automatic flight control system
AGA	Aerodromes, air routes and ground aids
AIG	Accident investigation and prevention
ASIA/PAC	Asia/Pacific
ATC	Air traffic control
ATS	Air traffic services
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
CVR	Cockpit voice recorder
DA	Decision altitude
DA/H	Decision altitude/height
DH	Decision height
DME	Distance measuring equipment
ECAM	Electronic centralized aircraft monitor
EFIS	Electronic flight instrument system
EGT	Exhaust gas temperature
EICAS	Engine indication and crew alerting system
ELT	Emergency locator transmitter
ELT(AF)	Automatic fixed ELT
ELT(AP)	Automatic portable ELT
ELT(AD)	Automatically deployable ELT
ELT(S)	Survival ELT
EPR	Engine pressure ratio
EUROCAE	European Organization for Civil Aviation Equipment
FDAU	Flight data acquisition unit
FDR	Flight data recorder
FL	Flight level
FM	Frequency modulation
ft	Foot
g	Normal acceleration

Abbreviations

GPWS	Ground proximity warning system
hPa	Hectopascal
IFR	Instrument flight rules
IMC	Instrument meteorological conditions
INS	Inertial navigation systems
kg	Kilogram
km	Kilometre
km/h	Kilometres per hour
kt	Knot
m	Metre
MDA	Minimum descent altitude
MDA/H	Minimum descent altitude/height
MDH	Minimum descent height
MHz	Megahertz
MNPS	Minimum navigation performance specifications
NAV	Navigation
NM	Nautical mile
N1	High pressure turbine speed
OCA	Obstacle clearance altitude
OCA/H	Obstacle clearance altitude/height
OCH	Obstacle clearance height
RNP	Required navigation performance
RVR	Runway visual range
SI	International System of Units
SICASP	Secondary Surveillance Radar Improvements and Collision Avoidance Systems Panel
UTC	Coordinated universal time
V_D	Design diving speed
VFR	Visual flight rules
VMC	Visual meteorological conditions
VSM	Vertical separation minima
V_{S_0}	Stalling speed or the minimum steady flight speed in the landing configuration
WXR	Weather

Symbols

°C	Degrees Celsius
%	Per cent

PUBLICATIONS

(referred to in this Annex)

Convention on International Civil Aviation (Doc 7300)

International Regulations for Preventing Collisions at Sea

European Organization for Civil Aviation Equipment (EUROCAE) Documents ED55 and ED56A

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

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 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 III — *International Operations — Helicopters*

Annex 8 — Airworthiness of Aircraft

Annex 10 — Aeronautical Telecommunications
Volume III (Part I — *Digital Data Communication Systems,* Part II — *Voice Communication Systems*)
Volume IV *(Surveillance Radar 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*

Annex 15 — Aeronautical Information Services

Annex 16 — Environmental Protection
Volume I — *Aircraft Noise*

Annex 18 — The Safe Transport of Dangerous Goods by Air

Procedures for Air Navigation Services

OPS — Aircraft Operations (Doc 8168)
Volume I — *Flight Procedures*
Volume II — *Construction of Visual and Instrument Flight Procedures*

ATM — Air Traffic Management (Doc 4444)

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

Regional Supplementary Procedures (Doc 7030)

Manuals

Accident/Incident Reporting Manual (ADREP Manual) (Doc 9156)

Airport Services Manual (Doc 9137)
Part 1 — *Rescue and Fire Fighting*
Part 8 — *Airport Operational Services*

Airworthiness Manual (Doc 9760)

Manual of Civil Aviation Medicine (Doc 8984)

Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (Doc 9574)

Manual on Required Navigation Performance (RNP) (Doc 9613)

ANNEX 6 — PART II
INTERNATIONAL GENERAL AVIATION — AEROPLANES

FOREWORD

Historical background

Standards and Recommended Practices for the Operation of Aircraft — International General Aviation were first adopted by the Council on 2 December 1968 pursuant to the provisions of Article 37 of the Convention on International Civil Aviation (Chicago, 1944) and designated as Annex 6, Part II, to the Convention. They became effective on 2 April 1969 and applicable on 18 September 1969.

Annex 6, Part II, was developed in the following manner: the Fifteenth Session of the Assembly, Montreal, June-July 1965, adopted Resolution A15-15: "Consideration of the needs of international general aviation in relation to the scope of ICAO technical activities". Subsequently, the Fourth Air Navigation Conference (Montreal, November-December 1965) recommended a series of factors which it considered should be taken into account in extending the scope of Annex 6 to meet the needs of general aviation in accordance with the directives of Assembly Resolution A15-15.

The Fourth Air Navigation Conference recommended that the International Standards and Recommended Practices to be developed for International General Aviation Operations exclude for the present aerial work operations. It was however clearly the view of the conference that the Annex should be framed in such a manner as to facilitate its extension to cover aerial work operations at a later date, should such extension prove desirable.

Based on the above considerations, draft International Standards and Recommended Practices for the Operation of International General Aviation Aircraft were developed by the Air Navigation Commission and, after amendment following the usual consultation with the Member States of the Organization, were adopted by the Council so as to become, together with the Foreword approved by the Council, the text of this Annex. In developing this material the Air Navigation Commission was guided by the following philosophies:

Presentation and conformity with Annex 6, Part I. The Annex should be, as nearly as practicable, equivalent in scope and conform as closely as possible to Annex 6 (now Annex 6, Part I).

Applicability. Although the definition of general aviation originally used in this Annex encompassed aerial work operations, these were specifically excluded from the provisions of this Annex by Chapter 2 — Applicability.

Level of safety. The Annex should ensure an acceptable level of safety to third parties (third parties meaning persons on the ground and persons in the air in other aircraft). Also, as some international general aviation operations will be performed:

a) by crews less experienced and less skilled;

b) by less reliable equipment;

c) to less rigorous standards; and

d) with greater freedom of action than in commercial air transport operations;

it has to be accepted that the passenger in international general aviation aircraft will not necessarily enjoy the same level of safety as the fare-paying passenger in commercial air transport. However, it was recognized that in ensuring an acceptable degree of safety for third parties, an acceptable level of safety for flight crews and passengers would be achieved.

Freedom of Action. The maximum freedom of action consistent with maintaining an acceptable level of safety should be granted to international general aviation.

Responsibility. The responsibility that devolves upon the operator in Annex 6, Part I, should, in Part II of the Annex, fall upon the pilot-in-command. Precedent for this course of action exists in Annex 2.

Consequent to the adoption of Annex 6, Part III, *International Operations — Helicopters*, an amendment to the title was introduced to indicate that Annex 6, Part II was applicable only to aeroplanes.

In 1986 the Air Navigation Commission commenced a review of Annex 6, Part II and concluded that the definition of general aviation should be revised to exclude aerial work thus recognizing that aerial work was a distinct aspect of civil aviation and recognizing the exclusion of aerial work from the applicability of Annex 6, Part II. As with the Fourth Air Navigation Conference in 1965, the Air Navigation

Commission was not aware of any degree of international aerial work operations which would necessitate the development of International Standards and Recommended Practices. The revised definitions for general aviation and aerial work and the revised applicability chapter were submitted to States in the usual manner and approved by the Council in March 1990.

Table A shows the origin of 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 of Annex 6, Part II are applicable to international general aviation operations with aeroplanes.

The Standards and Recommended Practices represent minimum provisions and, together with those of Annex 6 — Operation of Aircraft: Part I — International Commercial Air Transport — Aeroplanes, now cover the operation of all aeroplanes in international civil aviation, except in aerial work operations.

It will be noted that the Standards and Recommended Practices contained in Annex 6, Part II, when applied to the operation of large aeroplanes, are less stringent than those in Annex 6, Part I, applicable to the same or similar aeroplanes when used in commercial air transport operations. Nevertheless, it is considered that, in conjunction with existing provisions in Annexes 1 and 8, Annex 6, Part II, ensures an adequate level of safety for the operations envisaged for the large aeroplanes in question. In this connexion attention is drawn to the point that the entire performance standards of Annex 8 are applicable to all aeroplanes of over 5 700 kg mass intended for the carriage of passengers or cargo or mail for international air navigation, of which the prototype was submitted for certification on or after 13 December 1964. Moreover, by virtue of Annex 1 the holder of a private pilot licence, piloting an aircraft in excess of 5 700 kg unless as the sole occupant thereof is required to have a type rating entered on his licence. Since the certificates of airworthiness of the types of aeroplanes in question would preclude solo flight in all normal circumstances, it may be accepted that the private pilot of these aeroplanes must have a type rating entered on his licence.

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.

The 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 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 incorporate, by reference, other specifications having the status of Recommended Practices. In such cases, 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.

Table A. Amendments to Annex 6, Part II

Amendment	*Source(s)*	*Subject(s)*	*Adopted* *Effective* *Applicable*
1st Edition	Fifteenth Session of the Assembly (Resolution A15-15) and Fourth Air Navigation Conference		2 December 1968 2 April 1969 18 September 1969
1	Sixth Air Navigation Conference	a) The requirement for additional instruments in aeroplanes operated as controlled VFR flights in the en-route phase; and b) the permitting of aeroplanes, when unable to navigate by visual references to landmarks, to be navigated by equipment other than radio navigation equipment, e.g. solely by self-contained navigation means, provided that certain equipment capabilities are met, thus eliminating any requirement for the carriage of radio navigation equipment.	1 June 1970 1 October 1970 4 February 1971
2 (2nd Edition)	Special Meeting on Aircraft Noise in the Vicinity of Aerodromes	The inclusion of a specification for aeroplanes to be operated within the weight limitations imposed by the applicable Noise Certification Standards, except in prescribed circumstances, and to carry a document attesting noise certification.	2 April 1971 2 August 1971 6 January 1972
3	Seventh Air Navigation Conference	The inclusion of a Recommended Practice covering the design, carriage and installation of Emergency Location Beacons — Aircraft, in such aeroplanes and on such flights as may be determined by the appropriate authority.	29 May 1973 1 October 1973 23 May 1974
4	Revision of Annex 12, the Air Navigation Commission's Study concerning interception of civil aircraft and the Council action in pursuance of Assembly Resolution A18-16	a) Provisions for the marking of break-in points on aircraft; b) provisions for reducing the risk for intercepted aircraft; c) the revision of the Introductory Note to Chapter 3 of the Annex. The revision points to a practical method for States to discharge their functions in the cases of lease, charter and interchange of aircraft in international operations.	4 February 1975 4 June 1975 9 October 1975
5	Studies by the Air Navigation Commission, Amendment 60 to Annex 3 and Amendment 30 to Annex 14	Requirements for the provision and use of flight crew safety harnesses; amplification of specifications for the type of timepiece required for operations in accordance with Instrument Flight Rules and controlled VFR flights; and revision of the definitions of Aerodrome and Meteorological information.	7 April 1976 7 August 1976 30 December 1976
6	ASIA/PAC Regional Air Navigation Meeting	The requirement for the carriage of survival radio equipment over those areas in which search and rescue would be especially difficult to be determined by States rather than regional air navigation agreement.	16 June 1976 16 October 1976 6 October 1977
7	Air Navigation Commission Study	Recommendation for the fitting of ground proximity warning systems to certain aeroplanes.	15 December 1977 15 April 1978 10 August 1978

Amendment	*Source(s)*	*Subject(s)*	*Adopted* *Effective* *Applicable*
8	Air Navigation Commission Study	Introduction of requirements for navigation equipment to meet minimum navigational performance specifications (MNPS).	2 April 1980 2 August 1980 27 November 1980
9	Air Navigation Commission Study	Revision of the provisions relating to exterior lights to align with new provisions in Annexes 2 and 8.	22 March 1982 22 July 1982 25 November 1982
10 (3rd Edition)	Seventh meeting of the Obstacle Clearance Panel, AGA Divisional Meeting (1981), amendments consequential to adoption of Annexes 5 and 18	Introduced provisions related to development and use of instrument approach procedures, authority and competence to taxi aeroplanes. Changes to the requirements for the carriage of dangerous goods as a result of adoption by the Council of Annex 18. Units of measurement were brought in line with the provisions of Annex 5 and the *Note* in Chapter 3 concerning lease, charter and interchange was updated. The term "aerodrome operating minima" was introduced in lieu of "aerodrome meteorological minima", and definitions of "decision altitude/height" and "minimum descent altitude/height" entered in Chapter 1.	20 May 1983 20 September 1983 24 November 1983
11	Accident Prevention and Investigation Divisional Meeting, AIG (1979)	Introduction of provisions relating to flight recorders. Introduction of related guidance material in an attachment.	8 March 1985 29 July 1985 21 November 1985
12	Air Navigation Commission	Carriage of information on board aircraft; communication equipment on 121.5 MHz.	14 March 1986 27 July 1986 20 November 1986
13	Seventh meeting of the Obstacle Clearance Panel, Air Navigation Commission studies	Supply and use of oxygen and pressurization failure warning; refuelling with passengers on board; provision of climb performance data with all engines operating.	14 March 1986 27 July 1986 20 November 1986
14 (4th Edition)	Air Navigation Commission review of the Annex, Stage I, Third meeting of the Visual Flight Rules Operations Panel, Air Navigation Commission Study	a) Revision of the definitions of aerial work and general aviation. Revision of the definition of alternate aerodrome to introduce take-off, en-route and destination alternate aerodromes. Introduction of a new definition for a commercial air transport operation and the definitions for flight plan and flight recorder; b) deletion of the reference to aerial work from the applicability; c) alignment with Annex 6, Part I, particularly with respect to flight recorder records subsequent to accidents or incidents and the requirement for a Mach number indicator; d) elimination of the term "controlled VFR flight"; e) introduction of guidance material concerning flight data recording of important operational information in aeroplanes with electronic displays.	19 March 1990 30 July 1990 15 November 1990

Amendment	*Source(s)*	*Subject(s)*	*Adopted Effective Applicable*
15	Fifth meeting of the Operations Panel, Seventh and Eighth meetings of the Review of the General Concept of Separation Panel, Accident Investigation Divisional Meeting (AIG/1992), Air Navigation Commission studies	a) Revision of definitions of aerodrome operating minima, decision altitude/height, minimum descent altitude/height and introduction of definition of obstacle clearance altitude/height; b) introduction of new definitions for emergency locator transmitters (ELTs) required navigation performance (RNP) and RNP type; c) introduction of the definition for the classification of instrument approach and landing operations; d) revision of the requirements concerning the use of engraving metal foil flight data recorders; e) introduction of carriage requirements for emergency locator transmitters (ELTs) to replace provisions regarding survival radio equipment and emergency location beacon; f) 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 area(s) and provisions to permit the uniform implementation of 300 m (1 000 ft) VSM above FL 290.	21 March 1994 25 July 1994 10 November 1994
16 (5th Edition)	Air Navigation Commission studies, Fourteenth meeting of the Dangerous Goods Panel, editorial amendment, text alignment with Annex 6, Part I and/or Part III, consequential amendment	a) Introduction of revised definitions; b) inclusion of references to Article 35 of the Convention; c) revision of the provisions concerning operating facilities, briefing, aeroplane airworthiness and safety precautions, destination alternate aerodromes, limitations imposed by weather conditions, use of oxygen and safety harness; d) new provisions concerning all aeroplanes on all flights, all aeroplanes operated as VFR flights and ground proximity warning systems (GPWS); e) revision of the provisions concerning aeroplanes operated in accordance with instrument flight rules (IFR); f) revision of the provisions concerning the composition of the flight crew; and g) revision of the provisions concerning the carriage and use of oxygen.	10 March 1995 24 July 1995 9 November 1995
17	Fourth meeting of the Secondary Surveillance Radar Improvements and Collision Avoidance Systems Panel (SICASP/4)	Requirement for aeroplanes to be equipped with pressure-altitude reporting transponders.	19 February 1996 15 July 1996 7 November 1996

Amendment	*Source(s)*	*Subject(s)*	*Adopted* *Effective* *Applicable*
18 (6th 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	a) Introduction of new and revised definitions for psychoactive substances and required navigation performance; b) revision of the notes concerning lease and interchange; c) introduction of a note concerning use of psychoactive substances; and d) new and revised provisions concerning ground proximity warning systems, pressure-altitude reporting transponders and flight recorders.	20 March 1998 20 July 1998 5 November 1998
19	Second meeting of the Flight Recorder Panel, Air Navigation Commission studies	a) Revised definitions; and b) new provisions concerning the mandatory carriage of ELTs operating on 406 MHz and 121.5 MHz, the addition of a predictive terrain hazard warning function to the ground proximity warning system (GPWS), 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
20	Air Navigation Commission studies	a) Revised definitions; and b) revision of the duties of the pilot-in-command and the introduction of criteria for instrument approach operations.	15 March 2000 17 July 2000 2 November 2000
21	Second meeting of the Flight Recorder Panel, Third meeting of the Global Navigation Satellite System Panel, Fifth meeting of the Continuing Airworthiness Panel	a) Update of the provisions pertaining to 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; and d) new definitions and update of provisions pertaining to maintenance-related requirements.	9 March 2001 16 July 2001 1 November 2001
22	Air Navigation Commission studies	Revised requirements for the ground proximity warning system (GPWS) and forward looking terrain avoidance function.	15 March 2002 15 July 2002 28 November 2002
23	Separation and Airspace Safety Panel	Authorization by the State of Registry for operations in RNP airspace.	13 March 2003 14 July 2003 27 November 2003

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

CHAPTER 1. DEFINITIONS

When the following terms are used in the Standards, Recommended Practices and Definitions for the operation of aeroplanes in international general aviation, 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.

Aerodrome operating minima. The limits of usability of an aerodrome for:

a) take-off, expressed in terms of runway visual range and/or visibility and, if necessary, cloud conditions;

b) landing in precision approach and landing operations, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H) as appropriate to the category of the operation;

c) landing in approach and landing operations with vertical guidance, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H); and

d) landing in non-precision approach and landing operations, expressed in terms of visibility and/or runway visual range, minimum descent altitude/height (MDA/H) and, if necessary, cloud conditions.

Aeroplane. A power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight.

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.

Alternate aerodrome. An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing. Alternate aerodromes include the following:

Take-off alternate. An alternate aerodrome at which an aircraft can land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure.

En-route alternate. An aerodrome at which an aircraft would be able to land after experiencing an abnormal or emergency condition while en route.

Destination alternate. An alternate aerodrome to which an aircraft may proceed should it become either impossible or inadvisable to land at the aerodrome of intended landing.

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

Approach and landing operations using instrument approach procedures. Instrument approach and landing operations are classified as follows:

Non-precision approach and landing operations. An instrument approach and landing which utilizes lateral guidance but does not utilize vertical guidance.

Approach and landing operations with vertical guidance. An instrument approach and landing which utilizes lateral and vertical guidance but does not meet the requirements established for precision approach and landing operations.

Precision approach and landing operations. An instrument approach and landing using precision lateral and vertical guidance with minima as determined by the category of operation.

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

a) a ground-based navigation aid; or

b) computer generated navigation data.

Categories of precision approach and landing operations:

Category I (CAT I) operation. A precision instrument approach and landing with 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.

Category II (CAT II) operation. A precision instrument approach and landing with 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 350 m.

Category IIIA (CAT IIIA) operation. A precision instrument approach and landing with:

a) a decision height lower than 30 m (100 ft) or no decision height; and

b) a runway visual range not less than 200 m.

Category IIIB (CAT IIIB) operation. A precision instrument approach and landing with:

a) a decision height lower than 15 m (50 ft) or no decision height; and

b) a runway visual range less than 200 m but not less than 50 m.

Category IIIC (CAT IIIC) operation. A precision instrument approach and landing with no decision height and no runway visual range limitations.

Note.— Where decision height (DH) and runway visual range (RVR) fall into different categories of operation, the instrument approach and landing 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).

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

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 the precision approach or approach with vertical guidance 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".

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.

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

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 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 time — aeroplanes. The total time from the moment an aeroplane first moves for the purpose of taking off until the moment it finally comes to rest at the end of the flight.

Note.— Flight time as here defined is synonymous with the term "block to block" time or "chock to chock" time in

general usage which is measured from the time an aeroplane first moves for the purpose of taking off until it finally stops at the end of the flight.

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

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.

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 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.

Meteorological information. Meteorological report, analysis, forecast, and any other statement relating to existing or expected meteorological conditions.

Minimum descent altitude (MDA) or ***minimum descent height (MDH).*** A specified altitude or height in a non-precision approach or circling approach 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".

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.

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 approaches 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 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".

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 navigation performance (RNP). A statement of the navigation performance necessary for operation within a defined airspace.

Note.— Navigation performance and requirements are defined for a particular RNP type and/or application.

*As defined in Annex 2.

RNP type. A containment value expressed as a distance in nautical miles from the intended position within which flights would be for at least 95 per cent of the total flying time.

Example.— RNP 4 represents a navigation accuracy of plus or minus 7.4 km (4 NM) on a 95 per cent containment basis.

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.

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).*

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.

* As defined in Annex 2.

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CHAPTER 2. APPLICABILITY

The Standards and Recommended Practices contained in Annex 6, Part II shall be applicable to international general aviation operations with aeroplanes.

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 commercial air transport operations or international general aviation operations with helicopters are to be found in Annex 6, Part III.

CHAPTER 3. 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 aeroplanes not all of which are registered in the same Contracting State, nothing in this Part 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.

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

Note 1.— Compliance with more restrictive measures, not in contravention of the provisions of 3.1, may be required by the State of Registry.

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

3.2 The pilot-in-command shall be responsible for the safety of all crew members, passengers and cargo on board when the doors are closed. The pilot-in-command shall also be responsible for the operation and safety of the aeroplane from the moment the aeroplane is ready to move for the purpose of taking off until the moment it finally comes to rest at the end of the flight and the engine(s) used as primary propulsion units are shut down.

3.3 If an emergency situation which endangers the safety of the aeroplane 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.

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

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

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

3.6 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.

3.7 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 4. FLIGHT PREPARATION AND IN-FLIGHT PROCEDURES

4.1 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 areas and facilities available and directly required for such flight and for the safe operation of the aeroplane 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.

4.2 Aerodrome operating minima

The pilot-in-command shall not operate to or from an aerodrome using operating minima lower than those which may be established for that aerodrome by the State in which it is located, except with the specific approval of that State.

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

4.3 Briefing

4.3.1 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; 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.

4.3.2 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.

4.4 Aeroplane airworthiness and safety precautions

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

a) the aeroplane is airworthy, duly registered and that appropriate certificates with respect thereto are aboard the aeroplane;

b) the instruments and equipment installed in the aeroplane are appropriate, taking into account the expected flight conditions;

c) any necessary maintenance has been performed in accordance with Chapter 8;

d) the mass of the aeroplane and centre of gravity location are such that the flight can be conducted safely, taking into account the flight conditions expected;

e) any load carried is properly distributed and safely secured; and

f) the aeroplane operating limitations, contained in the flight manual, or its equivalent, will not be exceeded.

4.4.2 **Recommendation.—** *The pilot-in-command should have sufficient information on climb performance with all engines operating to enable determination of the climb gradient that can be achieved during the departure phase for the existing take-off conditions and intended take-off technique.*

4.5 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 the instrument flight rules, 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 — Rules of the Air *and* Procedures for Air Navigation Services — Rules of the Air and Air Traffic Services *(PANS-RAC, Doc 4444).*

4.6 Limitations imposed by weather conditions

4.6.1 Flight in accordance with the visual flight rules

A flight, except one of purely local character in visual meteorological conditions, to be conducted in accordance with the visual flight rules 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 the visual flight rules, will, at the appropriate time, be such as to render compliance with these rules possible.

4.6.2 Flight in accordance with the instrument flight rules

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

4.6.2.2 *When no destination alternate aerodrome is required.* A flight to be conducted in accordance with the instrument flight rules to an aerodrome when no alternate aerodrome is required shall not be commenced unless:

a) a standard instrument approach procedure is prescribed for the aerodrome of intended landing; and

b) 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:

1) a cloud base of at least 300 m (1 000 ft) above the minimum associated with the instrument approach procedure; and

2) visibility of at least 5.5 km or of 4 km more than the minimum associated with the procedure.

4.6.3 Aerodrome operating minima

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

4.6.3.2 An instrument approach shall not be continued beyond the outer marker fix in case of precision approach, or below 300 m (1 000 ft) above the aerodrome in case of non-precision approach, unless the reported visibility or controlling RVR is above the specified minimum.

4.6.3.3 If, after passing the outer marker fix in case of precision approach, or after descending below 300 m (1 000 ft) above the aerodrome in case of non-precision approach, 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, an aeroplane shall not continue its approach-to-land beyond a point at which the limits of the aerodrome operating minima would be infringed.

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

4.6.4 Flight in icing conditions

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

4.7 Destination alternate aerodromes

For a flight to be conducted in accordance with the instrument flight rules, at least one destination alternate aerodrome shall be selected and specified in 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 aerodrome of intended landing, and for a reasonable period before and after such time, the approach and landing may be made under visual meteorological conditions; or

b) the aerodrome of intended landing is isolated and there is no suitable destination alternate aerodrome.

4.8 Fuel and oil supply

4.8.1 A flight shall not be commenced unless, taking into account both the meteorological conditions and any delays that are expected in flight, the aeroplane carries sufficient fuel and oil to ensure that it can safely complete the flight, and, as applicable, the following special provisions are complied with:

4.8.1.1 *Flight in accordance with the instrument flight rules.* At least sufficient fuel and oil shall be carried to allow the aeroplane:

a) *when, in accordance with the exception contained in 4.6.2.2, a destination alternate aerodrome is not required,* to fly to the aerodrome to which the flight is planned and thereafter for a period of 45 minutes; or

b) *when a destination alternate aerodrome is required,* to fly to the aerodrome to which the flight is planned, thence to an alternate aerodrome, and thereafter for a period of 45 minutes.

Note.— Nothing in 4.8 precludes amendment of a flight plan in flight in order to re-plan the flight to another aerodrome, provided that the requirements of 4.8 can be complied with from the point where the flight is re-planned.

4.9 Oxygen supply

The pilot-in-command shall ensure that breathing oxygen is available to crew members and passengers in sufficient quantities for all flights at such altitudes where a lack of oxygen might result in impairment of the faculties of crew members or harmfully affect passengers.

Note.— Guidance on the carriage and use of oxygen is given in Attachment B.

4.10 Use of oxygen

All flight crew members, when engaged in performing duties essential to the safe operation of an aeroplane in flight, shall use breathing oxygen continuously whenever the circumstances prevail for which its supply has been required in 4.9.

4.11 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.

4.12 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.*

4.13 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.*

4.14 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 aerodrome when flight crew members' capacity to perform functions is significantly reduced by impairment of faculties from causes such as fatigue, sickness, lack of oxygen.

4.15 Flight crew members at duty stations

4.15.1 Take-off and landing

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

4.15.2 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 aeroplane, or for physiological needs.

4.15.3 Seat belts

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

4.15.4 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 harnesses 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.

4.16 Instrument flight procedures

4.16.1 One or more instrument approach procedures designed in accordance with the classification of instrument

approach and landing operations shall be approved and promulgated by the State in which the aerodrome is located to serve each instrument runway or aerodrome utilized for instrument flight operations.

4.16.2 All aeroplanes operated in accordance with instrument flight rules shall comply with the instrument flight procedures approved by the State in which the aerodrome is located.

Note 1.— Definitions for the classification of instrument approach and landing operations are in Chapter 1.

Note 2.— Operational procedures recommended for the guidance of operations personnel involved in instrument flight operations are described in PANS-OPS (Doc 8168), Volume I.

Note 3.— Criteria for the construction of instrument flight procedures for the guidance of procedure specialists are provided in PANS-OPS (Doc 8168), Volume II.

4.17 Instruction — general

An aeroplane shall not be taxied on the movement area of an aerodrome unless the person at the controls:

a) has been duly authorized by the owner or in the case where it is leased the lessee, or a designated agent;

b) is fully competent to taxi the aeroplane;

c) is qualified to use the radio telephone if radio communications are required; and

d) has received instruction from a competent person in respect of aerodrome layout, and where appropriate, information on routes, signs, marking, lights, ATC signals and instructions, phraseology and procedures, and is able to conform to the operational standards required for safe aeroplane movement at the aerodrome.

4.18 Refuelling with passengers on board

4.18.1 **Recommendation.—** *An aeroplane should not be refuelled when passengers are embarking, on board or disembarking unless it is attended by the pilot-in-command or other qualified personnel ready to initiate and direct an evacuation of the aeroplane by the most practical and expeditious means available.*

4.18.2 **Recommendation.—** *When refuelling with passengers embarking, on board or disembarking, two-way communications should be maintained by aeroplane intercommunications system or other suitable means between the ground crew supervising the refuelling and the pilot-in-command or other qualified personnel required by 4.18.1.*

Note 1.— The provisions of 4.18.1 do not necessarily require the deployment of integral aeroplane stairs or the opening of emergency exits as a prerequisite to refuelling.

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

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

CHAPTER 5. AEROPLANE PERFORMANCE OPERATING LIMITATIONS

5.1 An aeroplane 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 aerodrome or a runway where there is no noise disturbance problem, by the competent authority of the State in which the aerodrome is situated.

5.2 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 aeroplane.

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

CHAPTER 6. AEROPLANE INSTRUMENTS AND EQUIPMENT

Note.— Specifications for the provision of aeroplane communication and navigation equipment are contained in Chapter 7.

6.1 All aeroplanes on all flights

6.1.1 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 aeroplanes according to the aeroplane 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.

6.1.2 Instruments

An aeroplane shall be equipped with instruments which will enable the flight crew to control the flight path of the aeroplane, carry out any required procedural manoeuvre, and observe the operating limitations of the aeroplane in the expected operating conditions.

6.1.3 Equipment

6.1.3.1 All aeroplanes on all flights.

6.1.3.1.1 All aeroplanes on all flights 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 aeroplane. 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 not readily accessible to the pilot or co-pilot;

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 aeroplane by the certificating authority of the State of Registry, required for the application of Chapter 5;

   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) visual signals for use by intercepting and intercepted aircraft, as contained in Annex 2;

e) spare electrical fuses of appropriate ratings for replacement of those accessible in flight.

6.1.3.1.2 **Recommendation.—** *All aeroplanes on all flights should be equipped with the ground-air signal codes for search and rescue purposes.*

6.1.3.1.3 **Recommendation.—** *All aeroplanes 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.

6.1.4 Marking of break-in points

6.1.4.1 If areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on an aeroplane, 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.

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

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

6.2 All aeroplanes operated as VFR flights

6.2.1 All aeroplanes when operated as VFR flights 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.

6.2.2 **Recommendation.—** *VFR flights which are operated as controlled flights should be equipped in accordance with 6.6.*

6.3 All aeroplanes on flights over water

6.3.1 Seaplanes

All seaplanes for all flights shall be equipped with:

a) one life jacket, or equivalent individual floatation device, for each person on board, stowed in a position readily accessible from the seat or berth;

b) equipment for making the sound signals prescribed in the International Regulations for Preventing Collisions at Sea, where applicable;

c) one anchor;

d) one sea anchor (drogue), when necessary to assist in manoeuvring.

Note.— "Seaplanes" includes amphibians operated as seaplanes.

6.3.2 Landplanes

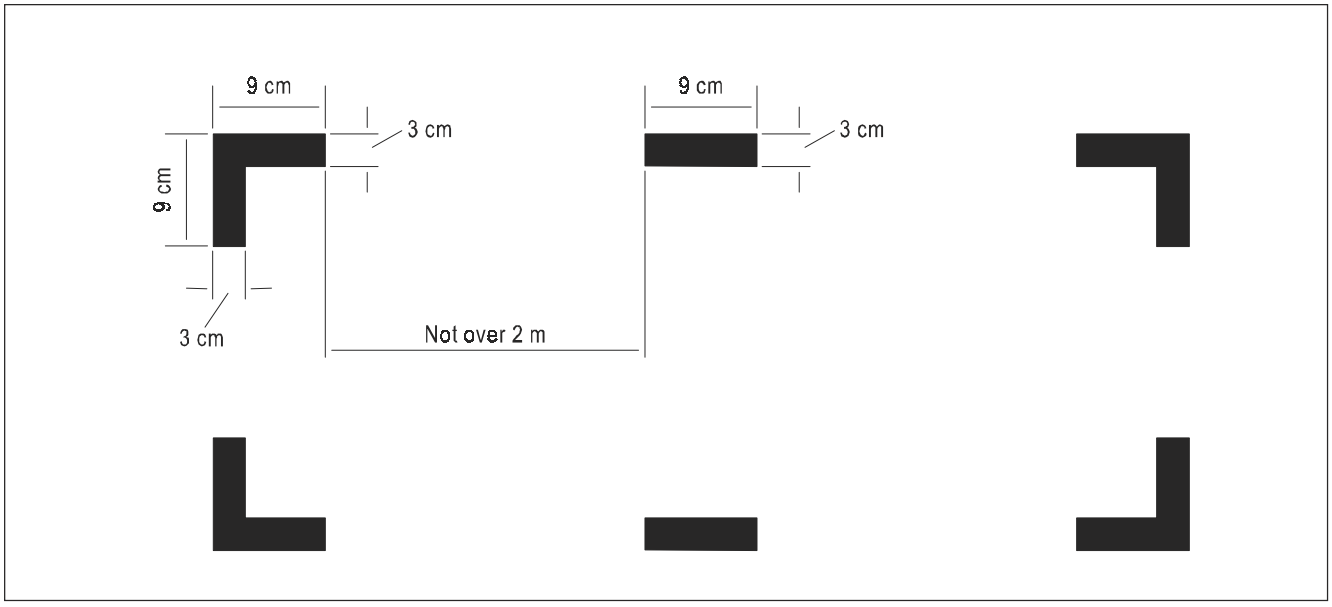
6.3.2.1 Single-engined aeroplanes.

Recommendation.— *All single-engined landplanes when flying en route over water beyond gliding distance from the shore should carry one life jacket or equivalent individual floatation 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.— "Landplanes" includes amphibians operated as landplanes.

6.3.3 All aeroplanes on extended flights over water

All aeroplanes when operated on extended flights over water shall be equipped with:



MARKING OF BREAK-IN POINTS (see 6.1.4)

a) when the aeroplane may be over water at a distance of more than 93 km (50 NM) away from land suitable for making an emergency landing:

— one life jacket or equivalent individual floatation 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;

b) when over water away from land suitable for making an emergency landing at a distance of more than 185 km (100 NM), in the case of single-engined aeroplanes, and more than 370 km (200 NM), in the case of multi-engined aeroplanes capable of continuing flight with one engine inoperative:

1) 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

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

6.4 All aeroplanes on flights over designated land areas

Aeroplanes 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.

6.5 All aeroplanes on high altitude flights

6.5.1 All aeroplanes intended to be operated at high altitudes shall be equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in 4.9.

6.5.2 Aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 1990

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

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

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

6.6 All aeroplanes operated in accordance with the instrument flight rules

All aeroplanes when operated in accordance with the instrument flight rules or when the aeroplane cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be equipped with:

a) a magnetic compass;

b) an accurate timepiece indicating the time in hours, minutes and seconds;

c) a sensitive pressure altimeter;

Note.— Due to the long history of misreadings, the use of drum-pointer altimeters is not recommended.

d) an airspeed indicating system with a means of preventing malfunctioning due to either condensation or icing;

e) a turn and slip indicator;

f) an attitude indicator (artificial horizon);

g) a heading indicator (directional gyroscope);

Note.— The requirements of e), f) and g), may be met by combinations of instruments or by integrated flight director systems provided that the safeguards against total failure, inherent in the three separate instruments, are retained.

h) means of indicating whether the supply of power to the gyroscopic instruments is adequate;

i) a means of indicating in the flight crew compartment the outside air temperature;

j) a rate-of-climb and descent indicator; and

k) such additional instruments or equipment as may be prescribed by the appropriate authority.

6.7 All aeroplanes when operated at night

All aeroplanes, when operated at night, shall be equipped with:

a) all the equipment specified in 6.6;

b) the lights required by Annex 2 for aircraft in flight or operating on the movement area of an aerodrome;

Note.— Specifications for lights meeting the requirements of Annex 2 for navigation lights are contained in the Appendix. The general characteristics of lights are specified in Annex 8. Detailed specifications for lights meeting the requirements of Annex 2 for aircraft in flight or operating on the movement area of an aerodrome are contained in the Airworthiness Manual *(Doc 9760).*

c) a landing light;

d) illumination for all flight instruments and equipment that are essential for the safe operation of the aeroplane;

e) lights in all passenger compartments; and

f) an electric torch for each crew member station.

6.8 All aeroplanes complying with the noise certification Standards in Annex 16, Volume I

An aeroplane shall carry a document attesting noise certification.

Note.— The attestation may be contained in any document, carried on board, approved by the State of Registry.

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

6.9.1 All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers, for which the individual certificate of airworthiness is first issued on or after 1 January 2004, shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

6.9.2 From 1 January 2007, all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers, shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

6.9.3 **Recommendation.—** *All turbine-engined aeroplanes of a maximum certificated take-off mass of 5 700 kg or less and authorized to carry more than five but not more than nine passengers should be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.*

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

6.9.5 A ground proximity warning system shall provide automatically a timely and distinctive warning to the flight crew when the aeroplane is in potentially hazardous proximity to the earth's surface.

6.9.6 A ground proximity warning system shall provide, as a minimum, warnings of at least the following circumstances:

a) excessive descent rate;

b) excessive altitude loss after take-off or go-around; and

c) unsafe terrain clearance.

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

6.10 Flight recorders

Note 1.— Flight recorders comprise two systems, a flight data recorder and a cockpit voice recorder.

Note 2.— Combination recorders (FDR/CVR) can only be used to meet the flight recorder equipage requirements as specifically indicated in this Annex.

Note 3.— Detailed guidance on flight recorders is contained in Attachment A.

6.10.1 Flight data recorders — types

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

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

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

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

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

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

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

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

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

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

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

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

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

6.10.1.7.2 The following parameters satisfy the requirements for attitude:

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

6.10.1.7.3 The following parameters satisfy the requirements for engine power:

– Engine thrust/power: propulsive thrust/power on each engine, cockpit thrust/power lever position
– Thrust reverse status*
– Engine thrust command*
– Engine thrust target*
– Engine bleed valve position*
– Additional engine parameters*: EPR, N_1, indicated vibration level, N_2, EGT, TLA, fuel flow, fuel cut-off lever position, N_3

6.10.1.7.4 The following parameters satisfy the requirements for configuration:

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

6.10.1.7.5 The following parameters satisfy the requirements for operation:

– Warnings
– Primary flight control surface and primary flight control pilot input: pitch axis, roll axis, yaw axis
– Marker beacon passage

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

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

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

6.10.2 Flight data recorders — duration

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

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

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

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

6.10.4 Flight data recorders — aeroplanes for which the individual certificate of airworthiness is first issued after 1 January 2005

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

6.10.5 Cockpit voice recorders — aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 1987

Note.— Cockpit voice recorder performance requirements are as contained in the Minimum Operational Performance Specifications (MOPS) document for Flight Recorder Systems of the European Organization for Civil Aviation Equipment (EUROCAE) or equivalent documents.

6.10.5.1 All aeroplanes of a maximum certificated take-off mass of over 27 000 kg shall be equipped with a cockpit voice recorder, the objective of which is the recording of the aural environment on the flight deck during flight time.

6.10.5.2 **Recommendation.—** *All aeroplanes of a maximum certificated take-off mass of over 5 700 kg up to and including 27 000 kg should be equipped with a cockpit voice recorder, the objective of which is the recording of the aural environment on the flight deck during flight time.*

6.10.6 Cockpit voice recorders — duration

6.10.6.1 A cockpit voice recorder shall be capable of retaining the information recorded during at least the last 30 minutes of its operation.

6.10.6.2 **Recommendation.—** *A cockpit voice recorder, installed in aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1990, should be capable of retaining the information recorded during at least the last two hours of its operation.*

6.10.6.3 A cockpit voice recorder, installed in aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued after 1 January 2003, shall be capable of retaining the information recorded during at least the last two hours of its operation.

6.10.7 Flight recorders — 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.

Note.— Industry crashworthiness and fire protection specifications can be found in documents such as the European Organization for Civil Aviation Equipment (EUROCAE) documents ED55 and ED56A.

6.10.8 Flight recorders — operation

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

6.10.8.2 To preserve flight recorder records, flight recorders shall be de-activated upon completion of flight time following an accident or incident. The flight recorders shall not be re-activated before their disposition as determined in accordance with Annex 13.

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 pilot-in-command's responsibilities regarding the retention of flight recorder records are contained in 6.10.9.

6.10.9 Flight recorder records

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

6.10.10 Flight recorders — continued serviceability

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

Note.— Procedures for the inspections of the flight data and cockpit voice recorder systems are given in Attachment A.

6.11 Mach number indicator

All aeroplanes with speed limitations expressed in terms of Mach number shall be equipped with a Mach number indicator.

Note.— This does not preclude the use of the airspeed indicator to derive Mach number for ATS purposes.

6.12 Emergency locator transmitter (ELT)

6.12.1 Except as provided for in 6.12.2, until 1 January 2005 all aeroplanes operated on extended flights over water as described in 6.3.3 b) and when operated on flights over designated land areas as described in 6.4 shall be equipped with one ELT.

6.12.2 All aeroplanes for which the individual certificate of airworthiness is first issued after 1 January 2002, operated on extended flights over water as described in 6.3.3 b) and when operated on flights over designated land areas as described in 6.4 shall be equipped with one automatic ELT.

6.12.3 From 1 January 2005, all aeroplanes operated on extended flights over water as described in 6.3.3 b) and when operated on flights over designated land areas as described in 6.4 shall be equipped with one automatic ELT.

6.12.4 **Recommendation.—** *All aeroplanes should carry an automatic ELT.*

6.12.5 ELT equipment carried to satisfy the requirements of 6.12.1, 6.12.2, 6.12.3 and 6.12.4 shall operate in accordance with the relevant provisions of Annex 10, Volume III.

6.13 Aeroplanes required to be equipped with a pressure-altitude reporting transponder

6.13.1 From 1 January 2003, unless exempted by the appropriate authorities, all aeroplanes shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of Annex 10, Volume IV.

6.13.2 **Recommendation.—** *All aeroplanes 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 6.13.1 and 6.13.2 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.

6.14 Microphones

Recommendation.— *All flight crew members required to be on flight deck duty should communicate through boom or throat microphones below the transition level/altitude.*

CHAPTER 7. AEROPLANE COMMUNICATION AND NAVIGATION EQUIPMENT

7.1 Communication equipment

7.1.1 An aeroplane to be operated in accordance with the instrument flight rules 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 7.1.1 are considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.

7.1.2 When compliance with 7.1.1 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.

7.1.3 An aeroplane to be operated in accordance with the visual flight rules, 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.

7.1.4 An aeroplane to be operated on a flight to which the provisions of 6.3.3 or 6.4 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.

7.1.5 The radio communication equipment required in accordance with 7.1.1 to 7.1.4 shall provide for communication on the aeronautical emergency frequency 121.5 MHz.

7.2 Navigation equipment

7.2.1 An aeroplane shall be provided with navigation equipment which will enable it to proceed:

a) in accordance with the 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 the visual flight rules is accomplished by visual reference to landmarks at least every 110 km (60 NM).

7.2.2 For flights in defined portions of airspace or on routes where an RNP type has been prescribed, an aeroplane shall, in addition to the requirements specified in 7.2.1:

a) be provided with navigation equipment which will enable it to operate in accordance with the prescribed RNP type(s); and

b) be authorized by the State of Registry for operations in such airspace.

Note.— Information on RNP and associated procedures, and guidance concerning the approval process, are contained in the Manual on Required Navigation Performance (RNP) *(Doc 9613). This document also contains a comprehensive list of references to other documents produced by States and international bodies concerning navigation systems and RNP.*

7.2.3 For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, minimum navigation performance specifications (MNPS) are prescribed, an aeroplane shall be provided with navigation equipment which:

a) continuously provides indications to the flight crew of adherence to or departure from track to the required degree of accuracy at any point along that track; and

b) has been authorized by the State of Registry for MNPS operations concerned.

Note.— The prescribed minimum navigation performance specifications and the procedures governing their application are published in Regional Supplementary Procedures *(Doc 7030).*

7.2.4 For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, a vertical separation minimum (VSM) of 300 m (1 000 ft) is applied above FL 290, an aeroplane:

a) shall be provided with equipment which is capable of:

1) indicating to the flight crew the flight level being flown;

2) automatically maintaining a selected flight level;

3) providing an alert to the flight crew when a deviation occurs from the selected flight level. The threshold for the alert shall not exceed ± 90 m (300 ft); and

4) automatically reporting pressure-altitude; and

b) shall be authorized by the State of Registry for operation in the airspace concerned.

7.2.5 The aeroplane 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 aeroplane to navigate in accordance with 7.2.1 and where applicable 7.2.2, 7.2.3 and 7.2.4.

Note 1.— This requirement may be met by means other than the duplication of equipment.

Note 2.— Guidance material relating to aircraft equipment necessary for flight in airspace where a 300 m (1 000 ft) VSM is applied above FL 290 is contained in the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive *(Doc 9574)*.

7.2.6 On flights in which it is intended to land in instrument meteorological conditions, an aeroplane shall be provided with radio equipment capable of receiving signals providing guidance to a point from which a visual landing can be effected. This equipment shall be capable of providing such guidance for each aerodrome at which it is intended to land in instrument meteorological conditions and for any designated alternate aerodromes.

CHAPTER 8. AEROPLANE MAINTENANCE

Note 1.— For the purpose of this chapter "aeroplane" includes: powerplants, propellers, components, accessories, instruments, equipment and apparatus including emergency equipment.

Note 2.— Guidance on continuing airworthiness requirements is contained in the Airworthiness Manual *(Doc 9760).*

8.1 Responsibilities

8.1.1 The owner of an aeroplane, or in the case where it is leased, the lessee, shall ensure that:

a) the aeroplane 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 aeroplane remains valid; and

d) the maintenance of the aeroplane is performed in accordance with a maintenance programme acceptable to the State of Registry.

8.1.2 The aeroplane shall not be operated unless it is maintained and released to service under a system acceptable to the State of Registry.

8.1.3 When the maintenance release is not issued by an approved maintenance organization in accordance with Annex 6, Part I, 8.7, the person signing the maintenance release shall be licensed in accordance with Annex 1.

8.2 Maintenance records

8.2.1 The owner shall ensure that the following records are kept for the periods mentioned in 8.2.2:

a) the total time in service (hours, calendar time and cycles, as appropriate) of the aeroplane and all life limited components;

b) the current status of compliance with all mandatory continuing airworthiness information;

c) appropriate details of modifications and repairs;

d) the time in service (hours, calendar time and cycles, as appropriate) since last overhaul of the aeroplane or its components subject to a mandatory overhaul life;

e) the current status of the aeroplane's compliance with the maintenance programme; and

f) the detailed maintenance records to show that all requirements for signing a maintenance release have been met.

8.2.2 The records referred to in 8.2.1 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 8.2.1 f) for a minimum period of one year after the signing of the maintenance release.

8.2.3 The lessee of an aeroplane shall comply with the requirements of 8.2.1 and 8.2.2, as applicable, while the aeroplane is leased.

Note.— Maintenance records or related documents, other than a valid certificate of airworthiness, need not be carried in the aeroplane during international flights.

8.3 Continuing airworthiness information

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

8.4 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.

8.5 Maintenance release

8.5.1 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.

8.5.2 A maintenance release shall contain a certification including:

a) basic details of the maintenance carried out;

b) date such maintenance was completed;

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

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

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CHAPTER 9. AEROPLANE FLIGHT CREW

9.1 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.

9.2 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.

APPENDIX. LIGHTS TO BE DISPLAYED BY AEROPLANES

(Note.— See Chapter 6)

1. Terminology

When the following terms are used in this Appendix, they have the following meanings:

Angles of coverage.

a) Angle of coverage A is formed by two intersecting vertical planes making angles of 70 degrees to the right and 70 degrees to the left respectively, looking aft along the longitudinal axis to a vertical plane passing through the longitudinal axis.

b) Angle of coverage F is formed by two intersecting vertical planes making angles of 110 degrees to the right and 110 degrees to the left respectively, looking forward along the longitudinal axis to a vertical plane passing through the longitudinal axis.

c) Angle of coverage L is formed by two intersecting vertical planes, one parallel to the longitudinal axis of the aeroplane, and the other 110 degrees to the left of the first, when looking forward along the longitudinal axis.

d) Angle of coverage R is formed by two intersecting vertical planes, one parallel to the longitudinal axis of the aeroplane, and the other 110 degrees to the right of the first, when looking forward along the longitudinal axis.

Horizontal plane. The plane containing the longitudinal axis and perpendicular to the plane of symmetry of the aeroplane.

Longitudinal axis of the aeroplane. A selected axis parallel to the direction of flight at a normal cruising speed, and passing through the centre of gravity of the aeroplane.

Making way. An aeroplane on the surface of the water is ''making way'' when it is under way and has a velocity relative to the water.

Under command. An aeroplane on the surface of the water is ''under command'' when it is able to execute manoeuvres as required by the International Regulations for Preventing Collisions at Sea for the purpose of avoiding other vessels.

Under way. An aeroplane on the surface of the water is ''under way'' when it is not aground or moored to the ground or to any fixed object on the land or in the water.

Vertical planes. Planes perpendicular to the horizontal plane.

Visible. Visible on a dark night with a clear atmosphere.

2. Navigation lights to be displayed in the air

Note.— The lights specified herein are intended to meet the requirements of Annex 2 for navigation lights.

As illustrated in Figure 1, the following unobstructed navigation lights shall be displayed:

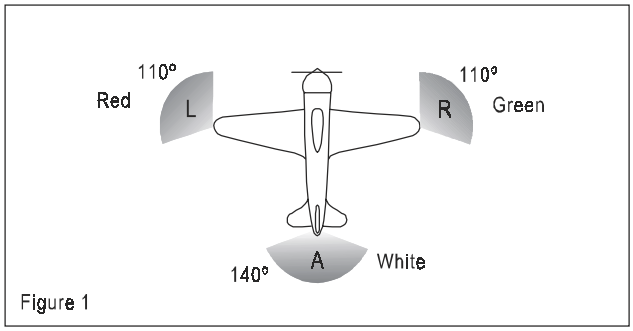


Figure 1

a) a red light projected above and below the horizontal plane through angle of coverage L;

b) a green light projected above and below the horizontal plane through angle of coverage R;

c) a white light projected above and below the horizontal plane rearward through angle of coverage A.

3. Lights to be displayed on the water

3.1 General

Note.— The lights specified herein are intended to meet the requirements of Annex 2 for lights to be displayed by aeroplanes on the water.

The International Regulations for Preventing Collisions at Sea require different lights to be displayed in each of the following circumstances:

a) when under way;

b) when towing another vessel or aeroplane;

c) when being towed;

d) when not under command and not making way;

e) when making way but not under command;

f) when at anchor;

g) when aground.

The lights required by aeroplanes in each case are described below.

3.2 When under way

As illustrated in Figure 2, the following appearing as steady unobstructed lights:

a) a red light projected above and below the horizontal through angle of coverage L;

b) a green light projected above and below the horizontal through angle of coverage R;

c) a white light projected above and below the horizontal through angle of coverage A; and

d) a white light projected through angle of coverage F.

The lights described in a), b) and c) should be visible at a distance of at least 3.7 km (2 NM). The light described in d) should be visible at a distance of 9.3 km (5 NM) when fitted to an aeroplane of 20 m or more in length or visible at a distance of 5.6 km (3 NM) when fitted to an aeroplane of less than 20 m in length.

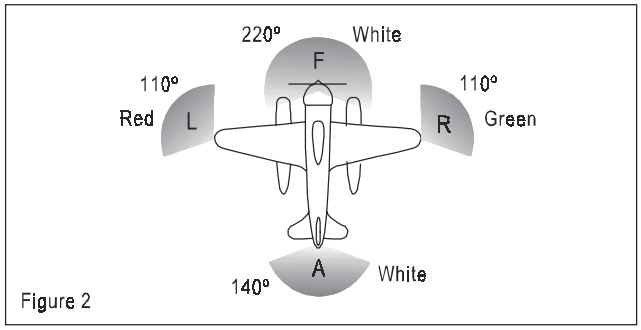


Figure 2

3.3 When towing another vessel or aeroplane

As illustrated in Figure 3, the following appearing as steady, unobstructed lights:

a) the lights described in 3.2 above;

b) a second light having the same characteristics as the light described in 3.2 d) and mounted in a vertical line at least 2 m above or below it; and

c) a yellow light having otherwise the same characteristics as the light described in 3.2 c) and mounted in a vertical line at least 2 m above it.

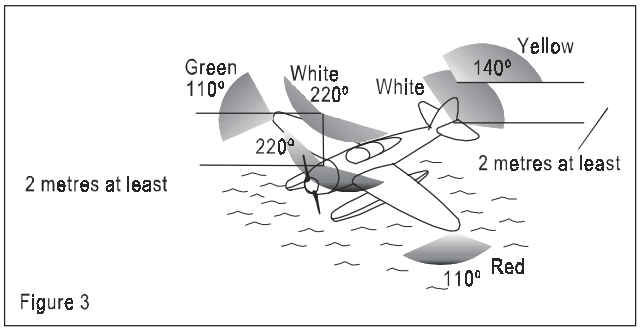


Figure 3

3.4 When being towed

The lights described in 3.2 a), b) and c) appearing as steady, unobstructed lights.

3.5 When not under command and not making way

As illustrated in Figure 4, two steady red lights placed where they can best be seen, one vertically over the other and not less than 1 m apart, and of such a character as to be visible all around the horizon at a distance of at least 3.7 km (2 NM).

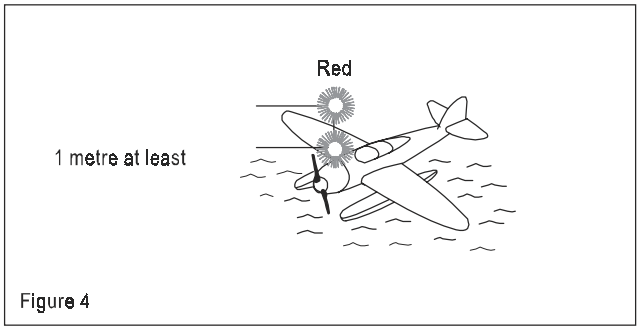


Figure 4

3.6 When making way but not under command

As illustrated in Figure 5, the lights described in 3.5 plus the lights described in 3.2 a), b) and c).

Note.— The display of lights prescribed in 3.5 and 3.6 above is to be taken by other aircraft as signals that the aeroplane showing them is not under command and cannot therefore get out of the way. They are not signals of aeroplanes in distress and requiring assistance.

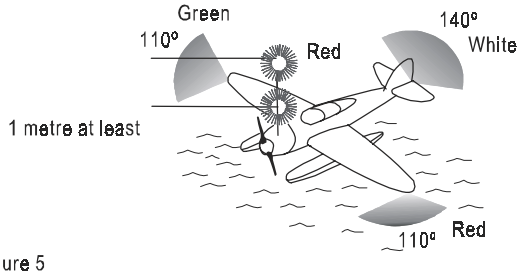


Figure 5

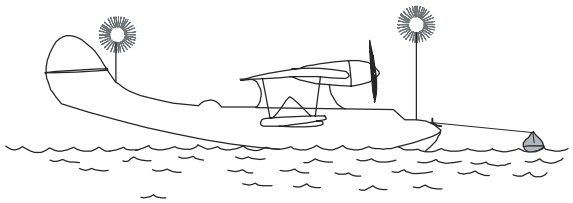


Figure 7

3.7 When at anchor

a) If less than 50 m in length, where it can best be seen, a steady white light (Figure 6), visible all around the horizon at a distance of at least 3.7 km (2 NM).

b) If 50 m or more in length, where they can best be seen, a steady white forward light and a steady white rear light (Figure 7) both visible all around the horizon at a distance of at least 5.6 km (3 NM).

c) If 50 m or more in span a steady white light on each side (Figures 8 and 9) to indicate the maximum span and visible, so far as practicable, all around the horizon at a distance of at least 1.9 km (1 NM).

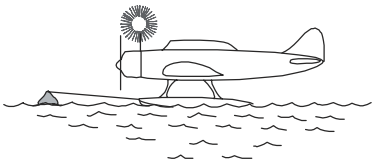
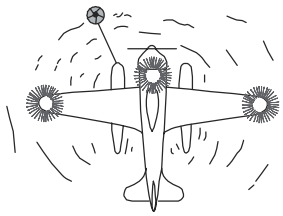
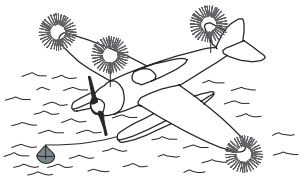


Figure 6



Less than 50 metres in length; 50 metres or more in span

Figure 8



50 metres or more in length; 50 metres or more in span

Figure 9

3.8 When aground

The lights prescribed in 3.7 and in addition two steady red lights in vertical line, at least 1 m apart so placed as to be visible all around the horizon.

ATTACHMENT A. FLIGHT RECORDERS

Supplementary to 6.10

Introduction

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

1. Flight data recorder (FDR)

1.1 General requirements

1.1.1 The recorder is to record continuously during flight time.

1.1.2 The recorder container is to:

a) be painted a distinctive orange or yellow colour;

b) carry reflective material to facilitate its location; and

c) have securely attached an automatically activated underwater locating device.

1.1.3 The recorder is to be installed so that:

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

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

c) there is an aural or visual means for pre-flight checking that the recorder is operating properly.

1.2 Parameters to be recorded

1.2.1 *Type I flight data recorder*. This recorder will be capable of recording, as appropriate to the aeroplane, at least the 32 parameters in Table A-1. However, other parameters may be substituted with due regard to the aeroplane type and the characteristics of the recording equipment.

1.2.2 *Type II flight data recorder*. This recorder will be capable of recording, as appropriate to the aeroplane, at least the first 15 parameters in Table A-1. However, other parameters may be substituted with due regard to the aeroplane type and the characteristics of the recording equipment.

1.3 Additional information

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

1.3.2 The manufacturer usually provides the national certificating authority with the following information in respect of the flight data recorder:

a) manufacturer's operating instructions, equipment limitations and installation procedures;

b) parameter origin or source and equations which relate counts to units of measurement; and

c) manufacturer's test reports.

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

2. Cockpit voice recorder (CVR)

2.1 General requirements

2.1.1 The recorder is to be designed so that it will record at least the following:

a) voice communication transmitted from or received in the aeroplane by radio;

b) aural environment on the flight deck;

c) voice communication of flight crew members on the flight deck using the aeroplane's interphone system;

d) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker;

e) voice communication of flight crew members using the passenger address system, if installed; and

f) digital communications with ATS, unless recorded by the flight data recorder.

2.1.2 The recorder container is to:

a) be painted a distinctive orange or yellow colour;

b) carry reflective material to facilitate its location; and

c) have securely attached an automatically activated underwater locating device.

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

2.1.4 The recorder is to be installed so that:

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

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

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

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

2.2 Performance requirements

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

2.2.2 The preferred track allocation is as follows:

Track 1 — co-pilot headphones and live boom microphone

Track 2 — pilot headphones and live boom microphone

Track 3 — area microphone

Track 4 — time reference plus the third and fourth crew member's headphone and live microphone, if applicable.

Note 1.— Track 1 is located closest to the base of the recording head.

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

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

2.2.4 Means will be provided for an accurate time correlation between the flight data recorder and the cockpit voice recorder.

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

2.3 Additional information

2.3.1 The manufacturer usually provides the national certificating authority with the following information in respect of the cockpit voice recorder:

a) manufacturer's operating instructions, equipment limitations and installation procedures; and

b) manufacturer's test reports.

3. Inspections of flight data and cockpit voice recorder systems

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

3.2 Annual inspections should be carried out as follows:

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

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

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

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

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

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

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

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

3.5 Calibration of the FDR system:

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

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

Table A-1
Parameters for Flight Data Recorders

Serial number	Parameter	Measurement range	Recording interval (seconds)	Accuracy limits (sensor input compared to FDR read-out)
1	Time (UTC when available, otherwise elapsed time)	24 hours	4	±0.125% per hour
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)
3	Indicated airspeed	95 km/h (50 kt) to max V_{S0} *(Note 1)* V_{S0} to 1.2 V_D *(Note 2)*	1	±5% ±3%
4	Heading	360°	1	±2°
5	Normal acceleration	–3 g to +6 g	0.125	±1% of maximum range excluding datum error of ±5%
6	Pitch attitude	±75°	1	±2°
7	Roll attitude	±180°	1	±2°
8	Radio transmission keying	On-off (one discrete)	1	
9	Power on each engine *(Note 3)*	Full range	1 (per engine)	±2%
10	Trailing edge flap or cockpit control selection	Full range or each discrete position	2	±5% or as pilot's indicator
11	Leading edge flap or cockpit control selection	Full range or each discrete position	2	±5% or as pilot's indicator
12	Thrust reverser position	Stowed, in transit, and reverse	1 (per engine)	
13	Ground spoiler/speed brake selection	Full range or each discrete position	1	±2% unless higher accuracy uniquely required
14	Outside air temperature	Sensor range	2	±2°C
15	Autopilot/auto throttle/AFCS mode and engagement status	A suitable combination of discretes	1	

Note.— The preceding 15 parameters satisfy the requirements for a Type II FDR.

16	Longitudinal acceleration	±1 g	0.25	±1.5% max range excluding datum error of ±5%
17	Lateral acceleration	±1 g	0.25	±1.5% max range excluding datum error of ±5%
18	Pilot input and/or control surface position-primary controls (pitch, roll, yaw) *(Note 4)*	Full range	1	±2° unless higher accuracy uniquely required

Serial number	Parameter	Measurement range	Recording interval (seconds)	Accuracy limits (sensor input compared to FDR read-out)
19	Pitch trim position	Full range	1	±3% unless higher accuracy uniquely required
20	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)
21	Glide path deviation	Signal range	1	±3%
22	Localizer deviation	Signal range	1	±3%
23	Marker beacon passage	Discrete	1	
24	Master warning	Discrete	1	
25	NAV 1 and 2 frequency selection *(Note 5)*	Full range	4	As installed
26	DME 1 and 2 distance *(Notes 5 and 6)*	0 – 370 km	4	As installed
27	Landing gear squat switch status	Discrete	1	
28	GPWS (ground proximity warning system)	Discrete	1	
29	Angle of attack	Full range	0.5	As installed
30	Hydraulics, each system (low pressure)	Discrete	2	
31	Navigation data (latitude/longitude, ground speed and drift angle) *(Note 7)*	As installed	1	As installed
32	Landing gear or gear selector position	Discrete	4	As installed

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

Notes.—

1. V_{S0} stalling speed or minimum steady flight speed in the landing configuration.
2. V_D design diving speed.
3. Record sufficient inputs to determine power.
4. For aeroplanes with conventional control systems “or” applies. For aeroplanes with non-mechanical control systems “and” applies. In aeroplanes with split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately.
5. If signal available in digital form.
6. Recording of latitude and longitude from INS or other navigation system is a preferred alternative.
7. If signals readily available.

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

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

   1) parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and autoflight system engagement and mode indications if not recorded from another source;

   2) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY, ETC.;

   3) warnings and alerts;

   4) the identity of displayed pages for emergency procedures and checklists;

b) retardation information including brake application for use in the investigation of landing overruns and rejected take-offs; and

c) additional engine parameters (EPR, N1, EGT, fuel flow, etc.).

ATTACHMENT B. CARRIAGE AND USE OF OXYGEN

Supplementary to 4.9

Introduction

The performance of crew members and the well-being of passengers during flights at such altitudes where a lack of oxygen might result in impairment of faculties are of major concern. Research conducted in altitude chambers or by exposure to mountain elevations indicates that human tolerance could be related to the altitude concerned and the exposure time. The subject is dealt with in detail in the *Manual of Civil Aviation Medicine* (Doc 8984). In the light of the above and to further assist the pilot-in-command in providing the oxygen supply intended by 4.9 of this Annex, the following guidelines, which take into account the requirements already established in Annex 6, Part I, are considered relevant.

1. Oxygen supply

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

a) all crew members and at least 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) all crew members and passengers for any period that the atmospheric pressure in compartments occupied by them will be less than 620 hPa.

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

2. Use of oxygen

2.1 All flight crew members, when engaged in performing duties essential to the safe operation of an aeroplane in flight, should use breathing oxygen continuously whenever the circumstances prevail for which its supply has been indicated to be necessary in 1.1 or 1.2.

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

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*

— END —

30/9/02

Transmittal Note

SUPPLEMENT TO

ANNEX 6 — OPERATION OF AIRCRAFT

PART II — INTERNATIONAL GENERAL AVIATION — AEROPLANES

(Sixth Edition)

1. The attached Supplement supersedes all previous Supplements to Annex 6, Part II, and includes differences notified by Contracting States up to 30 September 2002 with respect to all amendments up to and including Amendment 21.

2. This Supplement should be inserted at the end of Annex 6, Part II (Sixth Edition). Additional differences received from Contracting States will be issued at intervals as amendments to this Supplement.

SUPPLEMENT TO
ANNEX 6 — OPERATION OF AIRCRAFT

Part II — International General Aviation — Aeroplanes

(Sixth Edition)

Differences between the national regulations and practices of Contracting States and the corresponding International Standards and Recommended Practices contained in Annex 6, Part II, as notified to ICAO in accordance with Article 38 of the *Convention on International Civil Aviation* and the Council's resolution of 21 November 1950.

SEPTEMBER 2002

INTERNATIONAL CIVIL AVIATION ORGANIZATION

RECORD OF AMENDMENTS TO SUPPLEMENT

No.	*Date*	*Entered by*	*No.*	*Date*	*Entered by*

AMENDMENTS TO ANNEX 6, PART II, ADOPTED OR APPROVED BY THE COUNCIL SUBSEQUENT TO THE SIXTH EDITION ISSUED JULY 1998

No.	*Date of adoption or approval*	*Date applicable*	*No.*	*Date of adoption or approval*	*Date applicable*
19	19/7/99	4/11/99			
20	17/7/00	2/11/00			
21	16/7/01	1/11/01			

1. Contracting States which have notified ICAO of differences

The Contracting States listed below have notified ICAO of differences which exist between their national regulations and practices and the International Standards and Recommended Practices of Annex 6, Part II (Sixth Edition), up to and including Amendment 21, or have commented on implementation.

The page numbers shown for each State and the dates of publication of those pages correspond to the actual pages in this Supplement.

State	*Date of notification*	*Pages in Supplement*	*Date of publication*
Argentina	29/11/01	1	30/9/02
Australia	16/8/02	2	30/9/02
Czech Republic	31/7/01	1	30/9/02
Denmark	24/9/01	1	30/9/02
Finland	28/9/01	1	30/9/02
France	22/10/01	2	30/9/02
Georgia	16/11/01	2	30/9/02
Germany	17/9/01	1	30/9/02
Netherlands	29/6/01	1	30/9/02
New Zealand	4/9/01	4	30/9/02
Norway	17/10/01	2	30/9/02
Papua New Guinea	15/1/02	1	30/9/02
Romania	15/10/01	1	30/9/02
Singapore	21/11/01	1	30/9/02
Slovakia	23/11/01	1	30/9/02
Sweden	20/9/01	2	30/9/02
United Kingdom	30/10/01	2	30/9/02
United States	7/9/01	6	30/9/02

2. Contracting States which have notified ICAO that no differences exist

State	*Date of notification*
Bahrain	21/7/01
Barbados	1/6/01
Burundi	13/8/01
China (Hong Kong SAR)	28/9/01
Colombia	17/2/02
Egypt	6/4/01
El Salvador	9/7/01
Eritrea	11/5/01
Greece	26/2/02
Jordan	13/6/01
Lebanon	15/9/01
Pakistan	25/9/01
Portugal	15/10/01
Republic of Moldova	24/9/01
The former Yugoslav Republic of Macedonia	29/6/01
United Arab Emirates	19/8/01

3. Contracting States from which no information has been received

Afghanistan
Albania
Algeria
Andorra
Angola
Antigua and Barbuda
Armenia
Austria
Azerbaijan
Bahamas
Bangladesh
Belarus
Belgium
Belize
Benin
Bhutan
Bolivia
Bosnia and Herzegovina
Botswana
Brazil
Brunei Darussalam
Bulgaria
Burkina Faso
Cambodia
Cameroon
Canada
Cape Verde
Central African Republic
Chad
Chile
China
Comoros
Congo
Cook Islands
Costa Rica
Côte d'Ivoire
Croatia
Cuba
Cyprus
Democratic People's Republic of Korea
Democratic Republic of the Congo
Djibouti
Dominican Republic
Ecuador
Equatorial Guinea
Estonia
Ethiopia
Fiji
Gabon
Gambia
Ghana
Grenada
Guatemala
Guinea
Guinea-Bissau
Guyana
Haiti
Honduras
Hungary
Iceland
India
Indonesia
Iran (Islamic Republic of)
Iraq
Ireland
Israel
Italy
Jamaica
Japan
Kazakhstan
Kenya
Kiribati
Kuwait
Kyrgyzstan
Lao People's Democratic Republic
Latvia
Lesotho
Liberia
Libyan Arab Jamahiriya
Lithuania
Luxembourg
Madagascar
Malawi
Malaysia
Maldives
Mali
Malta
Marshall Islands
Mauritania
Mauritius
Mexico
Micronesia (Federated States of)
Monaco
Mongolia
Morocco
Mozambique
Myanmar
Namibia
Nauru
Nepal
Nicaragua
Niger
Nigeria
Oman
Palau
Panama
Paraguay
Peru
Philippines
Poland
Qatar
Republic of Korea
Russian Federation
Rwanda
Saint Kitts and Nevis
Saint Lucia
Saint Vincent and the Grenadines
Samoa
San Marino
Sao Tome and Principe
Saudi Arabia
Senegal
Seychelles
Sierra Leone
Slovenia
Solomon Islands
Somalia
South Africa
Spain
Sri Lanka
Sudan
Suriname
Swaziland
Switzerland
Syrian Arab Republic
Tajikistan
Thailand
Togo
Tonga
Trinidad and Tobago
Tunisia
Turkey
Turkmenistan
Uganda
Ukraine
United Republic of Tanzania
Uruguay
Uzbekistan
Vanuatu
Venezuela
Viet Nam
Yemen
Yugoslavia
Zambia
Zimbabwe

4. Paragraphs with respect to which differences have been notified

Paragraph	*Differences notified by*
General	Finland
	Netherlands
	United States
Chapter 1— Definitions	Argentina
	Australia
	Denmark
	New Zealand
	Norway
	Romania
	Slovakia
	Sweden
	United Kingdom
	United States
Chapter 3	
3.2	New Zealand
3.5	Georgia
	New Zealand
	United States
Chapter 4 — General	United States
4.3.1	Norway
	Sweden
	United States
4.3.2	United States
4.4.2	France
4.6.1	Australia
4.6.2.1	United States
4.6.2.2	Denmark
	France
	United Kingdom
	United States
4.6.3.1	France
	New Zealand
	United Kingdom
4.6.3.3	New Zealand
4.6.4	United States
4.7	Denmark
	United Kingdom
4.9	United Kingdom
4.10	Norway
	Sweden
	United Kingdom
4.11	United States
4.12	New Zealand
4.13	New Zealand
	Papua New Guinea
4.14	Norway
	Sweden
4.15.1	Denmark
4.15.2	Denmark
4.15.3	Denmark
	Papua New Guinea
4.17	Norway
	Sweden
	United States
4.18.1	Georgia
	New Zealand
	United States
4.18.2	Australia
	Georgia
	New Zealand
	Papua New Guinea
	United States
Chapter 5	
5.2	Georgia
Chapter 6 — General	United States
6.1.1	Singapore
	United Kingdom
6.1.3	United States
6.1.3.1.1	Australia
	Denmark
	France
	Georgia
	Germany
	New Zealand
	Norway
	Sweden
	United Kingdom
	United States
6.1.3.1.2	France
	New Zealand
	United States
6.1.3.1.3	France
	New Zealand
	Papua New Guinea
	United States
6.1.4	Denmark
	Norway
6.1.4.1	New Zealand
	Papua New Guinea
	Sweden
	United Kingdom

6.1.4.2	New Zealand
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	Sweden
	United Kingdom
6.2.1	Czech Republic
	France
	Norway
	Sweden
	United States
6.2.2	Australia
	France
	Papua New Guinea
	United States
6.3	Denmark
6.3.1	Australia
	Georgia
	New Zealand
	United Kingdom
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	United Kingdom
	United States
6.5	Denmark
	Germany
6.5.1	Georgia
6.5.2	Georgia
	Norway
	Sweden
6.5.3	Georgia
6.6	Georgia
	United States
6.7	Czech Republic
	France
	Georgia
	New Zealand
	United Kingdom
	United States
6.8	Australia
	Georgia
	New Zealand
	Papua New Guinea
6.9	Denmark
	New Zealand
6.9.1	Georgia
	Papua New Guinea
	Sweden
	United States
6.9.2	Australia
	France
	Georgia
	Norway
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	Norway
	United States
6.9.5	Australia
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	New Zealand
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	Georgia
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	New Zealand
	Norway
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6.10.1.5	Australia
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	New Zealand
	Norway
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	United Kingdom
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	France
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	Norway
	Papua New Guinea
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	France
	United Kingdom
6.10.1.6	Australia
	Georgia
	New Zealand
6.10.1.7	Argentina
	Australia
	Denmark
	France

	Sweden
	United Kingdom
6.10.1.7.1	Argentina
	Australia
	Sweden
6.10.1.7.2	Argentina
	Australia
	Sweden
6.10.1.7.3	Argentina
	Australia
	Sweden
6.10.1.7.4	Argentina
	Australia
	Sweden
6.10.1.7.5	Argentina
	Australia
	Sweden
6.10.2	Georgia
	New Zealand
6.10.3	New Zealand
6.10.3.1	Australia
	Georgia
	United Kingdom
	United States
6.10.3.2	Australia
	France
	Georgia
	United States
6.10.4	Argentina
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	France
	Georgia
	New Zealand
	Sweden
	United Kingdom
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	Georgia
	New Zealand
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	United Kingdom
	United States
6.10.5.2	Australia
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	United States
6.10.6	Georgia
6.10.6.1	New Zealand
6.10.6.2	Australia
	France
	New Zealand
6.10.6.3	Australia
	Sweden
	United Kingdom
6.10.7	Denmark
	Georgia
	New Zealand
6.10.8	Denmark
	Georgia
	New Zealand
	Norway
	Sweden
6.10.8.1	France
6.10.8.2	Australia
6.10.9	Australia
	Georgia
	New Zealand
	United States
6.10.10	Australia
6.11	Denmark
	France
	Georgia
	Norway
	Sweden
6.12	United States
6.12.1	Georgia
	United Kingdom
6.12.2	United Kingdom
6.12.3	Denmark
	Georgia
	United Kingdom
6.12.4	Georgia
6.13	Georgia
	Norway
6.13.1	United Kingdom
6.13.2	United Kingdom
6.14	France
	New Zealand
	United States
Chapter 7	
7.1.1	United Kingdom
	United States
7.1.2	Norway
	Papua New Guinea
	Sweden
	United States
7.1.4	United Kingdom
	United States
7.1.5	Australia
7.2.1	United States
7.2.2	Georgia
	Papua New Guinea
7.2.3	Georgia
	Norway
7.2.4	Australia
	Georgia
	Papua New Guinea

	United States
7.2.5	Georgia
Chapter 8	
8.1	Georgia
	New Zealand
8.1.1	United Kingdom
8.1.3	Argentina
	France
8.2	Georgia
	New Zealand
8.2.1	United Kingdom
8.2.2	Argentina
	New Zealand
	Sweden
	United States
8.2.3	New Zealand
	Papua New Guinea
	Sweden
8.3	Georgia
	United Kingdom
Chapter 9 — General	United States
9.1	Denmark
	Georgia
	New Zealand
9.2	Georgia
Appendix	Georgia
	Norway

CHAPTER 1

Definitions

Aerodrome operating minima. The former definition has been retained for subparagraph c).

Approach and landing operations using instrument approach procedures. The former definition has been retained.

Decision altitude (DA) or decision height (DH). The former definition has been retained.

Flight time — aeroplanes. The former definition has been retained.

CHAPTER 6

6.10.1.7 The Argentine Republic does not require the installation of a Type 1A recorder.

6.10.1.7.1 The Argentine Republic only requires recording of the following parameters: pressure altitude; speed; heading; normal acceleration; longitudinal acceleration; and time.

6.10.1.7.2 The Argentine Republic only requires recording of the following parameters: pitch attitude and roll attitude.

6.10.1.7.3 The Argentine Republic only requires recording of thrust.

6.10.1.7.4 The Argentine Republic only requires recording of the pitch trim surface position.

6.10.1.7.5 The Argentine Republic does not apply this requirement.

6.10.4 The Argentine Republic requires cockpit voice recorders to record only 11 parameters.

CHAPTER 8

8.1.3 In the Argentine Republic, only an approved maintenance organization may issue a maintenance release.

8.2.2 Maintenance records that attest to the completion of maintenance must be kept for five years after the signing of the maintenance release.

CHAPTER 1

Definitions — *Approach and landing operations using instrument approach procedures*. Australian legislation does not define approach and landing operations with vertical guidance. Australia does not yet have any instrument approach procedures that utilize GPSD data for vertical guidance.

CHAPTER 4

4.6.1 — Australia places the decision-making responsibility on the pilot-in-command for commencement and continuation of a flight.

4.18.2* — There is no requirement to maintain two-way communications between the aeroplane and the ground crew while refuelling with passengers on board.

CHAPTER 6

6.1.3.1.1 — The requirements for carriage of first-aid kits and fire extinguishers are not implemented as prescribed.

6.2.2* — Australian legislation does not base the requirement to be equipped in accordance with 6.6 on whether the flight is a controlled flight or not.

6.3.1 b) — The sound signal requirement is not implemented.

6.8 — There is no requirement for the carriage of a noise certificate in an aeroplane.

6.9.2* — Australia does not require fitment of GPWS to any piston-engined aeroplanes, whether above or below 5 700 kg MCTOM.

6.9.5* — Australia will apply this requirement to all turbine-powered aeroplanes greater than 15 000 kg MCTOM or carrying 10 or more passengers in passenger transport operations under the IFR from 1 July 2005.

6.10.1.1
6.10.1.2 — Australian legislation does not refer to FDRs by Type, but specifies the parameters to be recorded.

6.10.1.3 — Metal foil FDRs are still permitted.

6.10.1.4* — Current legislation specifies that analogue recorders will not be approved for fitment to aircraft which receive their initial use Certificate of Airworthiness afer 1 January 1984.

6.10.1.4.1 — Photographic film recorders are not approved.

6.10.1.5,
6.10.1.5.1
6.10.1.5.2 — Currently there are no legislative requirements to give effect to these standards.

6.10.1.6* — Australian legislation does not refer to combination recorders.

*Recommended Practice

6.10.1.7 6.10.1.7.1 to 6.10.1.7.5	Australian legislation does not refer to FDRs by Type. Parameters currently required to be recorded are less comprehensive than the Annex Standards.
6.10.3.1 6.10.3.2* 6.10.4	Australian legislation does not mention FDR by Type and establishes the weight break at 29 000 kg.
6.10.5.1	The weight break is established at 29 000 kg rather than 27 000 kg.
6.10.5.2*	Australia does not require non-turbine aircraft certificated before 1 July 1965 to be fitted with a CVR.
6.10.6.2* 6.10.6.3	Australian legislation requires only a thirty-minute duration.
6.10.8.2	There is no requirement for operators to establish a procedure to that effect.
6.10.9	No regulatory requirement has been established.
6.10.10	Australia does not legislate for continued serviceability checks.

CHAPTER 7

7.1.5	The requirement for 121.5 MHz is not specifically mandated.
7.2.4	Australian legislation allows carriage of a single radio navigation aid if the aeroplane is operating outside controlled airspace.

*Recommended Practice

CHAPTER 6

6.2.1 b) Not applied for aeroplanes operating above the territory of the Czech Republic for which the Certificate of Airworthiness was issued for the first time before 31 December 1997.

6.7 a) The following requirements are not applied for night flights:

a) a means of indicating in the flight crew compartment the outside air temperature; or

b) the requirements of 6.6 e), f) and g) being met by combinations of instruments or by integrated flight director systems.

CHAPTER 1

Definitions	*Approach and landing operations using instrument approach procedures. Category II (CAT II) operation*. A Category II operation is defined with a runway visual range of not less than 300 m.

CHAPTER 4

4.6.2.2	Planning an IFR flight with no destination alternate aerodrome is not part of national regulation.
4.7 a) and b)	A destination alternate is always required for IFR flights.
4.15.1 to 4.15.3	Not part of national regulation.

CHAPTER 6

6.1.3.1.1 c)	Not applicable for transportation of parachutists to be dropped from the aeroplane.
6.1.3.1.1 d) 4)	Not part of national regulation to have visual signals for use by intercepting and intercepted aircraft.
6.1.4	Not part of national regulations.
6.3	Seaplanes are not part of national regulations.
6.5	Not part of national regulations.
6.9	Discriminant is 15 000 kg or 30 passengers.
6.10.1.5 6.10.1.7 6.10.5	These paragraphs will not be implemented in time due to lack of standards and an obligation to provide ample warning for workshops and operators/owners.
6.10.5.2*	Only for aeroplanes above 5 700 kg with turbine engine(s) and for aeroplanes above 27 000 kg.
6.10.7 6.10.8 6.11	Not part of national regulations.
6.12.3	Only required over designated land areas (transiting Sonderstrom)

CHAPTER 9

9.1	Compliance with this provision is the responsibility of each individual crew member.

*Recommended Practice

Remark: As the earlier Finnish requirements concerning general aviation have been spread out in different Finnish Aviation Regulations in an OPS, PEL and TRG series, the direct equivalent for every paragraph of Annex 6, Part II cannot be found. New aviation regulations OPS M2-1 "Private aviation and aerial work with aeroplanes" will be issued and tentatively in force 1 April 2002.

The requirements in the new regulations are in most cases the direct standard text of Annex 6, and where there are more demanding or more detailed national regulations, the text of the earlier national regulation has been used. These new regulations will cancel the earlier differences, but some differences will still exist and will be notified when the regulations are finalized.

CHAPTER 4

4.4.2* France has no particular requirements concerning the climb gradient other than those contained in the flight manual.

4.6.2.2 France does not require the existence of an instrument approach procedure for isolated aerodromes with no alternate aerodrome.

4.6.3.1 France has no particular requirement concerning the continuation of the flight as being dependent upon the meteorological conditions at the destination or alternate aerodrome.

CHAPTER 6

6.1.3.1.1 France requires light aeroplanes (maximum certificated take-off mass below 5 700 kg and a maximum passenger capacity of nine) to carry first-aid kits only on flights over water or designated areas, and does not require carriage of an extinguisher. The carriage of electrical fuses is required only for night flights.

6.1.3.1.2* France requires carriage of the ground-air signal codes used for search and rescue only on flights over designated land areas.

6.1.3.1.3* France does not require a safety harness for old aeroplanes (those manufactured before 1983).

6.2.1 France does not require carriage of a timepiece on VFR flights.

6.2.2* France has no particular requirements for controlled VFR flights other than compliance with ATC requirements.

6.7 France does not require aeroplanes flying VFR at night to be equipped with a timepiece, a thermometer or pitot anti-icing. There is no requirement for passenger cabin lighting either.

6.9.2* Not implemented.

6.10.1.5 French regulations do not yet include requirements for the recording of data link communications.

6.10.1.5.1
6.10.1.5.2 Not implemented.

6.10.1.7 The list of parameters required under French regulations is not in complete compliance with the requirements of Annex 6.

6.10.3.2* France requires a Type II recorder for aeroplanes with a maximum take-off mass of 14 tonnes or over, which conducted their first flight on or after 1 January 1989. There is no requirement to record the flight path of aeroplanes with a maximum take-off mass of 14 tonnes or over, which conducted their first flight before 1 January 1989.

6.10.4 Since the list of parameters for Type IA recorders has not yet been included in French regulations, the scope of application with respect to Type IA recorders has not yet been determined.

*Recommended Practice

6.10.6.2* France requires cockpit voice recorders for aeroplanes of over 5 700 kg only if they were certificated on or after 1 April 1998.

6.10.8.1 France has no particular requirements concerning the switching off of flight recorders.

6.11 France requires a Mach number indicator only for heavy aeroplanes (maximum certificated take-off weight of over 5 700 kg or a passenger capacity of more than nine).

6.14* France has no particular requirement concerning the use of boom or throat microphones below the transition level/altitude.

CHAPTER 8

8.1.3 France permits the maintenance release to be signed by a person who is not licensed in accordance with Annex 1 for maintenance operations carried out outside an approved organization in the following cases:

a) simple maintenance; and

b) maintenance on light aircraft for which a restricted certificate that is not in accordance with Annex 8 has been issued.

In these cases, the airworthiness certificate is valid for only six months.

*Recommended Practice

CHAPTER 3

3.5*	Not implemented.

CHAPTER 4

4.18.1*	Not implemented.
4.18.2*	

CHAPTER 5

5.2	Not implemented.

CHAPTER 6

6.1.3.1.1	Not implemented.
6.3.1	
6.5.1	
6.5.2	
6.5.3*	
6.6	
6.7	
6.8	
6.9.1	
6.9.2*	
6.9.4	
6.9.5*	
6.10.1.3	
6.10.1.5	
6.10.1.5.1	
6.10.1.6*	
6.10.2	
6.10.3.1	
6.10.3.2*	
6.10.4 to 6.10.9	
6.11	
6.12.1	
6.12.3	
6.12.4*	
6.13	

CHAPTER 7

7.2.2 to 7.2.5	Not implemented.

*Recommended Practice

CHAPTER 8

8.1 Not fully implemented.

8.2 Records are only required to be kept to the end of the operating life of the unit.

8.3 Not fully implemented.

CHAPTER 9

9.1 Not implemented.
9.2

APPENDIX Not implemented.

CHAPTER 6

6.1.3.1.1 Germany does not yet have regulations concerning the carriage of the relevant documents but in practice the specific documents are already carried on board aircraft.

6.5 This paragraph has not yet been introduced into the national regulations of Germany.

6.10.1.3 Use of metal foil recorders was not discontinued on 1 January 1995.

Remark: With the introduction of JAR-OPS 2 and JAR-OPS 4, no differences will exist between the national regulations and practices of the Netherlands and Annex 6, Part II. However, at this date it is not certain when JAR-OPS 2 and JAR-OPS 4 will enter into service.

CHAPTER 1

Definitions

Flight crew member. A crew member assigned by an operator for duty in an aircraft during flight time as a pilot or flight engineer.

Flight time — aeroplanes. The total time from the moment the aircraft moves under its own power for the purpose of taking off until the moment it comes to rest at the end of the flight.

General aviation operation. In the New Zealand civil aviation system, the generic term "general aviation" can include commercial operations. In such cases the more stringent provision of Annex 6, Part II, as appropriate, are applied.

Pilot-in-command. In relation to any aircraft, this means the pilot responsible for the operation and safety of the aircraft.

CHAPTER 3

3.2 Duties of the pilot-in-command. The pilot-in-command of an aircraft shall:

a) be responsible for the safe operation of the aircraft in flight, the safety and well-being of all passengers and crew, and the safety of cargo carried; and

b) have final authority to control the aircraft while in command and for the maintenance of discipline by all persons on board; and

c) subject to Section 13A of the Civil Aviation Act ("*Duties of Pilot-in-Command and Operator During Emergencies*"), be responsible for compliance with all relevant requirements of this Act and regulations and rules made under this Act.

3.5* Not implemented.

CHAPTER 4

4.6.3.1 Not implemented.

4.6.3.3 CAR 91.413 c) — Operation below DA, DH or MDA. Where a DA, DH or MDA is applicable, no pilot-in-command shall operate an aircraft at any aerodrome below the MDA, or continue an instrument approach procedure below the DA or DH prescribed in paragraph b), unless:

a) the aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent using normal manoeuvres that will allow touchdown to occur within the touchdown zone of the runway of intended landing;

b) the flight visibility is not less than the visibility prescribed under Part 97 for the instrument approach procedure being used; and

*Recommended Practice

c) except for a Category II or Category III precision approach procedure prescribed under Part 97 for that aerodrome that includes any necessary visual reference requirements, at least one of the following visual references for the intended runway is distinctly visible and identifiable to the pilot:

1) the approach lighting system; or

2) the threshold markings; or

3) the threshold lights; or

4) the runway-end identification lights; or

5) the visual approach slope indicator; or

6) the touchdown zone or touchdown zone markings; or

7) the touchdown zone lights; or

8) the runway or runway markings; or

9) the runway lights.

d) Landing. A pilot-in-command shall not land an aircraft when the flight visibility is less than the visibility prescribed under Part 97 for the instrument approach procedure used.

e) Missed approach procedures. Each pilot-in-command shall immediately execute the missed approach procedure prescribed under Part 97 if:

1) the requirements of paragraph c) are not met at either of the following times:

i) when the aircraft is being operated below MDA; or

ii) upon arrival at the missed approach point, including a DA or DH where a DA or DH is specified and its use is required, and any time after that until touchdown; or

2) an identifiable part of the aerodrome is not distinctly visible to the pilot during a circling manoeuvre at or above MDA, unless the inability to see an identifiable part of the aerodrome results only from normal manoeuvring of the aircraft during approach.

4.12* Not implemented.
4.13*
4.18.1*
4.18.2*

CHAPTER 6

6.1.3.1.1 d) 3), 4) and e) Not implemented.

*Recommended Practice

6.1.3.1.2*	Not implemented.
6.1.3.1.3*	For aircraft with 10 passenger seats or more and for aircraft when low flying.
6.1.4.1	Not implemented.
6.1.4.2	
6.3.1	Applicable except for b) equipment for making sound signals and c) an anchor.
6.3.1 c)	Each aircraft in excess of 5 700 kg shall be equipped with one sea anchor.
6.4	There is no requirement for means of sustaining life.
6.7	Applicable except for c) a landing light and e) lights in all passenger compartments.
6.8	Not implemented.
6.9	
6.10	
6.10.1.1	
6.10.1.2	
6.10.1.3	
6.10.1.4*	
6.10.1.5	
6.10.1.6*	
6.10.2	
6.10.3	
6.10.4	
6.10.5	
6.10.6.1	
6.10.6.2*	
6.10.7	
6.10.8	
6.10.9	
6.14*	

CHAPTER 8

8.1	In the context of the New Zealand Civil Aviation Rules, the "owner" is the "operator." NZCAR define "operator" in relation to an aircraft, as the person flying or using the aircraft, or causing or permitting the aircraft to be flown, be used, or be in any place, whether or not the person is present with the aircraft.
8.2	The issue of Aviation Documents (Airworthiness Certificate) is a statutory function of the Director of Civil Aviation.
8.2.2	CAR 91.631 — Retention of records — provides for a period of 2 years or 6 months.
8.2.3	In the context of the New Zealand Civil Aviation Rules, the "lessee", like the "owner", is the operator.

*Recommended Practice

CHAPTER 9

9.1 Not implemented.

CHAPTER 1

Definitions	*Emergency locator transmitter (ELT)*. Norwegian regulations do not contain the new definition of ELT.
	Psychoactive substances. Norwegian regulations contains no definitions of psychoactive substances.

CHAPTER 4

4.3.1	Briefing card is not included among the mandatory items in the passenger briefing. Briefing cards are not generally used in general aviation.
4.10	Norwegian regulations only demand carrying oxygen and breathing equipment, not that it must be used.
4.14	The pilot-in-command is not explicitly responsible for the fitness of the flight crew members.
4.17	Not included in Norwegian regulations.

CHAPTER 6

6.1.3.1.1 d) 3) and 4)	Not included in Norwegian regulations.
6.1.4	Not included in Norwegian regulations.
6.2.1 b) and c)	The altimeter is not required to be of a sensitive type and no timepiece is required for VFR operations.
6.5.2	Not included in Norwegian regulations.
6.9.2*	The Norwegian regulations require GPWS on aircraft with TOM exceeding 15 000 kg or more than 30 passenger seats.
6.9.4	Not included in Norwegian regulations.
6.10.1.3	Metal foil FDR recorders are still allowed.
6.10.1.5	Not included in Norwegian regulations.
6.10.1.5.1	Not included in Norwegian regulations.
6.10.8	Not included in Norwegian regulations.
6.11	Not included in Norwegian regulations.
6.13	Included from 1 January 2000.

*Recommended Practice

CHAPTER 7

7.1.2 Independence between communication equipment is not formally required for aeroplanes with MTOM exceeding 5 700 kg.

7.2.3 Not included in Norwegian regulations.

APPENDIX Not included in Norwegian regulations.

CHAPTER 4

4.13*	Papua New Guinea legislation does not call up such a requirement.
4.15.3	CAR 254 only requires one pilot to have a seat belt fastened.
4.18.2*	Such a requirement is not called up in CAO 20.9.

CHAPTER 6

6.1.3.1.3*	CAR 254 only requires a seat belt or safety harness.
6.1.4.1 6.1.4.2	Papua New Guinea legislation does not call up such a requirement.
6.2.2*	Papua New Guinea legislation does not address this category of operation and hence does not require VFR aircraft to be fitted with IFR equipment.
6.8	Papua New Guinea does not issue aeroplane noise certificates, hence this standard is not pertinent for domestic operations.
6.9.1 6.9.2* 6.9.5*	The current GPWS requirements is limited to aeroplanes over 15 000 kg or authorized carry more than 30 passengers.
6.10.1.5 6.10.1.5.1	Papua New Guinea legislation does not call up such a requirement.

CHAPTER 7

7.1.2	Papua New Guinea legislation does not call up such a requirement, although CAO 20.8 addresses this issue to some extent.
7.2.2	Appropriate standards are presently being developed but are not yet addressed in legislation.
7.2.4	Papua New Guinea legislation does not call up such a requirement, although CAO 20.8 addresses this issue to some extent.

CHAPTER 8

8.2.3	Papua New Guinea legislation does not call up such a requirement.

*Recommended Practice

CHAPTER 1

Definitions

Approach and landing operations using instrument approach procedures.

Category *II (Cat II) operation.* A Category II operation is defined as having a decision height of 30 m (100 ft) and a runway visual range of not less than 300 m.

CHAPTER 6

6.1.1 General aviation aircraft in Singapore are required to be registered in the Public Transport Category.

CHAPTER 1

Definitions *Night*. The hours between sunset and sunrise.

CHAPTER 1

Definitions	*Aerodrome operating minima.* Not explicitly defined, but partly covered by other definitions.
	Approach and landing operations using instrument approach procedures. Not explicitly defined, but partly covered by other definitions. Will be reconsidered in 2002.
	Approach and landing operations with vertical guidance. Not defined.
	Decision altitude (DA) or decision height (DH). Only precision approach is included in the definition.
	Maintenance programme. Not explicitly defined, but partly covered by other definitions.

CHAPTER 4

4.3.1	Briefing card is not included among the mandatory items in the passenger briefing.
4.10	Swedish regulations only demand carrying of oxygen and breathing equipment, not that it must be used.
4.14	The pilot-in-command is not explicitly responsible for the fitness of the flight crew members.
4.17	Not included in the Swedish regulations.

CHAPTER 6

6.1.3.1.1 b)	Partly covered.
6.1.3.1.1 d) 3 and 4) 6.1.4.1 6.1.4.2	Not included in Swedish regulations.
6.2.1 b) and c)	The altimeter is not required to be of a sensitive type and no timepiece is required for VFR operations.
6.5.2	Not included in Swedish regulations.
6.9.1	The Swedish regulations requires GPWS on aircraft with TOM exceeding 15 000 kg or more than 30 passenger seats.
6.10.1.3	Metal foil FDR recorders are still allowed.
6.10.1.4* 6.10.1.4.1 6.10.1.5	Not included in Swedish regulations.
6.10.1.7	Partly covered.
6.10.1.7.1 to 6.10.1.7.5	Partly covered.

*Recommended Practice

6.10.4 Not included in Swedish regulations.
6.10.6.3
6.10.8
6.11

CHAPTER 7

7.1.2 Independence between communication equipment is not formally required for aeroplanes with MTOM exceeding 5 700 kg.

CHAPTER 8

8.2.2 No 90-day requirement after permanent withdrawal of unit from service.

8.2.3 Not included in Swedish regulations.

CHAPTER 1

Definitions	*Pilot-in-command.* In United Kingdom legislation, "pilot-in-command" in relation to an aircraft means a person who for the time being is in charge of the piloting of the aircraft without being under the direction of any other pilot in the aircraft.

CHAPTER 4

4.6.2.2	The commander of the aircraft must be satisfied before flight that the flight can be safely made, taking into account the weather reports and forecasts and any alternative course of action in case the flight cannot be completed as planned.
4.6.3.1	The requirement to discontinue the flight towards the destination is not mandated.
4.7	The requirement to specify an alternate aerodrome in IFR flight plan is not mandated.
4.9	Oxygen requirements are not mandated.
4.10	Oxygen requirements are not mandated.

CHAPTER 6

6.1.1	The following are not required to be approved: maps, charts and codes; first aid equipment; timepieces; torches; whistles; sea anchors; rocket signals; equipment for mooring, anchoring and manoeuvring on water; paddles; food and water; stove, cooking utensils, snow shovels, ice saws, sleeping bags, arctic suits; and megaphones.
6.1.3.1.1 a), b) and c) 1)	The requirements for first aid kit, fire extinguisher and seats are not mandated for all types of flight.
6.1.4.1	The method of marking break-in areas may differ.
6.1.4.2	The method of marking break-in areas may differ.
6.3.1	Seaplane special equipment is not mandated.
6.3.3	United Kingdom relies on provision of guidance material. United Kingdom recommendations on life jackets and rafts provide a higher level of safety.
6.4	Signalling devices and life-saving equipment are not mandated for areas where search and rescue would be especially difficult.
6.7 c), e) and f)	Landing light, passenger compartment lights and torches for each crew member station are not mandated.
6.10.1.4.1	Use of photographic film flight data recorders has not been prohibited from 1 January 2003.
6.10.1.5	The requirements for recording, correlation and duration of data link communications are not mandated for new aeroplanes from 1 January 2005.
6.10.1.5.1	The requirements for recording, correlation and duration of data link communications are not mandated for new aeroplanes from 1 January 2007.

6.10.1.5.2 The requirement to record the content and time of data link messages is not mandated.

6.10.1.7 The parameters for Type IA flight data recorders are not specified in United Kingdom regulatory material.

6.10.3.1 The requirement for Type I flight data recorders over 27 000 kg is not mandated for all C of A categories.

6.10.4 The requirement for Type IA flight data recorders in new aeroplanes over 5 700 kg from 1 January 2005 is not mandated.

6.10.5.1 The requirements for cockpit voice recorders over 27 000 kg are not mandated for all C of A categories.

6.10.6.3 The requirement for the cockpit voice recorder in new aeroplanes over 5 700 kg from 1 January 2003 to retain the last two hours information is not mandated.

6.12.1 The ELT requirements applicable until 1 January 2005 for extended flights over water and the designated land areas as described in 6.4 are not mandated.

6.12.2 The automatic ELT requirements for extended flights over water and the designated land areas as described in 6.4 are not mandated for new aeroplanes from 1 January 2002.

6.12.3 The automatic ELT requirements for extended flights over water and the designated land areas as described in 6.4 are not mandated for all aeroplanes from 1 January 2005.

6.13.1 Partially implemented. United Kingdom requires pressure-altitude reporting transponder for flight in designated airspace.

6.13.2* The recommendation that all aeroplanes should be equipped with a pressure-altitude reporting transponder is not implemented.

CHAPTER 7

7.1.1 United Kingdom requires radio communication equipment for IFR flight in controlled and notified airspace. Gliders are excepted.

7.1.4 Radio communication equipment capable of communicating on prescribed frequencies is not mandated for extended flights over water and the designated land areas as described in 6.4.

CHAPTER 8

8.1.1 The operator is responsible for maintenance.

8.2.1 The operator is responsible for maintenance.

8.3 The operator is responsible for maintenance.

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*Recommended Practice

GENERAL The United States does not accept any provision of Annexes 2, 6, 10 or 11 or any other Annex as a Standard or Recommended Practice as applicable to State aircraft. In accordance with Article 3(a) of the *Convention on International Civil Aviation*, the Convention and its Annexes are not applicable to State aircraft. In so far as any provisions of Annexes 2, 6, 10 or 11 address the operation or control of State aircraft, the United States considers such provisions to be in the nature of a special recommendation of the Council, advisory only, and not requiring the filing of differences under Article 38 of the Convention.

CHAPTER 1

Definitions *Note.*— The United States expresses distances in terms of feet and miles rather than metres. A significant number of North American operators and aircraft are not equipped with metric unit displays.

Approach and landing operations using instrument approach procedures.
Category I (CAT I) operation. For a Category I operation, the United States requires a decision height (DH) of not less than 200 ft (60 m) and either visibility of not less than one-half mile (800 m) or a runway visual range of 2 400 ft (732 m) (RVR 1 800 ft (548 m)) with operative touchdown zone and runway centre line lights).

Category II (CAT II) operation. The United States requires that Category II provide approaches to minima of less than 200 ft (60 m) decision height/2 400 ft (732 km) runway visual range to as low as 100 ft (30 m) decision height/1 200 ft (365 m) runway visual range.

Category IIIB (CAT IIIB) operation. The United States criteria are the same as those adopted in Annex 6, Part II. However, the runway visual range is expressed in feet less than 700 ft (200 m) but not less than 150 ft (50 m).

Minimum descent altitude (MDA) or minimum descent height (MDH). The United States does not use the term MDH (or height above aerodrome) to describe an altitude or height in a non-precision approach or circling approach below which descent must be made without the required visual reference.

CHAPTER 3

3.5* The pilot-in-command is not required to have available on board the aeroplane information concerning search and rescue services.

CHAPTER 4

General In addition to the flight preparation requirements of Annex 6, Part II, Chapter 4, the United States requires United States-registered large or turbine-powered multi-engine general aviation, passenger-carrying aircraft, wherever operated, to adequately secure and stow food, beverage, and passenger service equipment during aircraft movement on the surface, take-off, and landing.

4.3.1 Except for large and turbine-powered multi-engine aeroplanes, the United States does not require the pilot-in-command to ensure that crew members and passengers are familiar with the location and use of emergency exits, life jackets, oxygen dispensing equipment or other emergency equipment provided for individual use.

*Recommended Practice

4.3.2 Except for large and turbine-powered multi-engine aeroplanes, the United States does not require the pilot-in-command to 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.

4.6.2.1 The United States does not require a destination alternate aerodrome when the weather at the aerodrome of intended landing is forecast to have a ceiling of at least 2 000 ft (600 m) and a visibility of at least 3 miles (4.8 km). In addition, standard alternate aerodrome minima are prescribed 600 ft (185 m) ceiling and 2 miles (3.2 km) visibility for precision approaches, and 800-ft (243 m) ceiling and 2 miles (3.2 km) visibility for non-precision approaches.

4.6.2.2 b) Under United States regulations, the forecast period for the destination alternate aerodrome is from one hour before to one hour after the estimated time of arrival. In addition, the minima for ceiling/visibility at the aerodrome of intended landing are 2 000 ft (600 m) and 3 miles (4.8 km); that is, when at least such minima exist, no alternate aerodrome is required.

4.6.4 In addition to the Standard prescribed in Annex 6, Part II, 4.6.4, the United States prohibits a pilot from taking off a United States-registered large or turbine-powered multi-engine general aviation aeroplane if there is frost, snow, or ice adhering to critical systems, components and surfaces of the aircraft.

4.11 The pilot-in-command is not required to ensure that all persons on board the aircraft during an emergency are instructed in emergency procedures.

4.17 The United States does not specify the authority, qualifications or competency of persons permitted to taxi aeroplanes on the movement area of an aerodrome.

4.18.1* The United States has no provisions concerning aircraft refuelling with passengers on board.
4.18.2*

CHAPTER 6

General In addition to the aeroplane instruments and equipment standards prescribed in Annex 6, Part II, Chapter 6, the United States requires that all United States-registered turbojet-powered aeroplanes wherever operated be equipped with an altitude alerting system or device. The United States also requires that all transport category aeroplanes used in air commerce in the United States and all United States-registered transport category aeroplanes used in air commerce outside the United States must use an aural speed warning device.

6.1.3 The United States requires that all large and turbine powered multi-engine general aviation aircraft of United States registry have the following emergency equipment in addition to the equipment specified in Annex 6, Part II, 6.1.3: two fire extinguishers in the passenger compartment of aircraft accommodating 30 or more passengers; a crash ax for aeroplanes accommodating more than 19 passengers; a portable megaphone for aeroplanes seating more than 60 but less than 100 passengers; and two megaphones for aeroplanes with a seating capacity of more than 100 passengers.

6.1.3.1.1 The United States does not require all aeroplanes to be equipped with: a first-aid kit; portable fire extinguishers; seat or berth for each person; current and suitable air navigation charts; or spare electrical fuses for VFR day operations.

*Recommended Practice

6.1.3.1.2* The United States does not require aeroplanes on all flights to be equipped with ground-air signal codes for search and rescue purposes.

6.1.3.1.3* The United States requires all aeroplanes manufactured after 12 December 1986 to be equipped with a shoulder harness for all crew member seats, in addition to the seat belt. For small civil aeroplanes manufactured after 18 July 1978, a shoulder harness and seat belt are required for the front seats only.

6.2.1 b) An accurate timepiece is not required for VFR flight.

6.2.2* The United States does not require aeroplanes on VFR flights, when operated as controlled flights, to be equipped in accordance to the requirements for aircraft operated under instrument flight rules.

6.3.1 The United States does not require all seaplanes on all flights to be equipped with one life jacket or equivalent individual flotation device for each person on board; equipment for making the sound signals prescribed in the International Regulations for Preventing Collisions at Sea; and anchor; or a sea anchor (drogue).

6.3.2.1* Life jackets or equivalent flotation devices are not required for single-engined aeroplanes flying over water beyond gliding distance from shore unless flying for hire, in which case this equipment and pyrotechnic devices are required.

6.3.3 a) Only large and turbine-powered multi-engine aeroplanes are required to carry life preservers or an approved flotation means for each occupant of an aeroplane on a flight over water more than 50 NM (93 km) from the nearest shore.

6.3.3 b) Only large and turbine-powered multi-engine aeroplanes on flights over water more than 30 minutes flying time or 100 NM (185 km) from the nearest shore must be equipped with life-saving rafts and pyrotechnic signalling devices.

6.4 Aeroplanes operated over land areas designated as areas in which search and rescue would be especially difficult are not required to be equipped with signaling devices or life-saving equipment. The United States does not designate areas in which search and rescue would be especially difficult, and therefore does not require such additional equipment.

6.6 d), h), i) and j) The United States does not require all aeroplanes when operated in accordance with instrument flight rules or when the aeroplane cannot be maintained in a desired altitude without reference to one or more flight instruments, to be equipped with:

a) an airspeed indicating system with a means of preventing malfunctioning due to a condensation or icing;

b) a means of indicating whether the supply of power to the gyroscopic instruments is adequate;

c) an outside air temperature indicator; or

d) a rate-of-climb and descent indicator.

*Recommended Practice

6.7 a) and c) to f) Aeroplanes operated under visual flight rules at night are not required to be equipped with:

a) a turn and slip indicator;

b) an attitude indicator (artificial horizon);

c) heading indicator (directional gyroscope);

d) a means of indicating whether the supply of power to the gyroscopic instruments is adequate;

e) a sensitive pressure altimeter;

f) a means of indicating the outside air temperature;

g) a timepiece with a sweep second hand;

h) an airspeed indicating system with a means of preventing malfunctioning due to condensation or icing;

i) a rate-of-climb and descent indicator;

j) a landing light;

k) illumination for flight instruments and equipment;

l) lights in passenger compartments; and

m) a flashlight (electric torch) for each crew member station.

6.9.1 to 6.9.5* Ground proximity warning systems are not required on general aviation aircraft, including turbine-engined aeroplanes with a take-off weight greater than 5 700 kg or capable of carrying more than nine passengers.

6.10.3.1 6.10.3.2* The United States does not base requirements for flight data recorders on aircraft weight, but on passenger and engine configuration.

6.10.5.1 6.10.5.2* The United States does not base requirements for cockpit voice recorders on aircraft weight, but on passenger and engine configuration.

6.10.9 The United States does not have a specific regulation that requires operational checks and evaluations of recordings from the flight data recorder and cockpit voice recorder to ensure continued serviceability of the recorders. However, the United States does require this maintenance function be carried out as part of the instructions for continued airworthiness.

6.12 All United States-registered aeroplanes are required to be equipped with an ELT meeting TSO-C91 design standard installation, and battery use requirements, except that the United States does not require an emergency locator transmitter for:

a) turbojet-powered aircraft;

b) aircraft operated in scheduled flights by scheduled air carriers;

*Recommended Practice

c) aircraft operated in training operations within a 50-NM (93 km) radius of the aerodrome from which such local flight operations began;

d) flight operations incident to design and testing;

e) new aircraft while engaged in flight operations incident to their manufacture, preparation, and delivery;

f) agricultural aircraft operations;

g) aircraft for research and development purposes;

h) aircraft showing compliance with regulations, crew training, exhibition, air racing, or market surveys; or

i) aircraft equipped to carry not more than one person.

The United States requirement for the installation of an ELT does not make a distinction for extended flights over water or flights over designated land areas.

6.14* The United States does not require crew members on flight deck duty to communicate through boom or throat microphones below the transition level/altitude.

CHAPTER 7

7.1.1 Except when operating under controlled flight, aeroplanes operated at night are not required to have radio communications equipment capable of conducting two-way communications. United States requirements for radio communications equipment are based upon the type of airspace in which the operation occurs, and not on the time of day.

7.1.2 When more than one radio communications equipment unit is required, the United States has no provision that each unit be independent of any other.

7.1.4 Except when operating under controlled flight, aeroplanes on extended flights over water or on flights over underdeveloped land are not required to have radio communications equipment capable of conducting two-way communications.

7.2.1 The United States has no provisions concerning required aircraft navigation instruments enabling a flight to proceed in accordance with a flight plan, prescribed RNP types, or the air traffic services provided. The United States does not specify a minimum distance between landmark references used by flights operating under visual flight rules.

7.2.4 Aeroplanes are not required to have 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 aeroplane to proceed in accordance with Annex 6, Part II, paragraph 7.2.1 through 7.2.3.

*Recommended Practice

CHAPTER 8

8.2.2 The United States does not require records to be maintained after the end of the operating life of the unit.

CHAPTER 9 The pilot-in-command is not required to ensure that the licenses 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 to be satisfied that flight crew members have maintained competence.

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 13 March 2001 and supersedes, on 1 November 2001, all previous editions of Part III of Annex 6.

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

Fifth Edition
July 2001

International Civil Aviation Organization

AMENDMENTS

The issue of amendments is announced regularly in the *ICAO Journal* and in the monthly *Supplement to the Catalogue of ICAO Publications and Audio-visual Training Aids*, which holders of this publication should consult. The space below is provided to keep a record of such amendments.

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No.	Date applicable	Date entered	Entered by
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9	27/11/03		ICAO

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ABBREVIATIONS AND SYMBOLS

(used in this Annex)

Abbreviations

ADREP	Accident/incident reporting
ADS	Automatic dependent surveillance
AFCS	Automatic flight control system
AIG	Accident investigation and prevention
AOC	Aeronautical operational control
AOC	Air operator certificate
ATC	Air traffic control
ATM	Air traffic management
ATS	Air traffic services
CAT I	Category I
CAT II	Category II
CAT III	Category III
CAT IIIA	Category IIIA
CAT IIIB	Category IIIB
CAT IIIC	Category IIIC
CDL	Configuration deviation list
CFIT	Controlled flight into terrain
cm	Centimetre
CPDLC	Controller-pilot data link communications
CVR	Cockpit voice recorder
DA	Decision altitude
DA/H	Decision altitude/height
D-FIS	Data link-flight information services
DH	Decision height
DME	Distance measuring equipment
Distance DR	The horizontal distance that the helicopter has travelled from the end of the take-off distance available
ECAM	Electronic centralized aircraft monitor
EFIS	Electronic flight instrument system
EGT	Exhaust gas temperature
EICAS	Engine indication and crew alerting system
ELT	Emergency locator transmitter
ELT(AF)	Automatic fixed ELT
ELT(AP)	Automatic portable ELT
ELT(AD)	Automatically deployable ELT
ELT(S)	Survival ELT
EUROCAE	European Organization for Civil Aviation Equipment
EPR	Engine pressure ratio
FATO	Final approach and take-off area
FDAU	Flight data acquisition unit
FDR	Flight data recorder
FM	Frequency modulation
ft	Foot
g	Normal acceleration
GNSS	Global navigation satellite system
hPa	Hectopascal
HUMS	Health and usage monitor system
IFR	Instrument flight rules
ILS	Instrument landing system
IMC	Instrument meteorological conditions
INS	Inertial navigation system

Abbreviations

kg	Kilogram
km	Kilometre
LDAH	Landing distance available
LDP	Landing decision point
LDRH	Landing distance required
m	Metre
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
NAV	Navigation
N_1	High pressure turbine speed
N_f	Free power turbine speed
N_g	Engine gas generator speed
NM	Nautical mile
OCA	Obstacle clearance altitude
OCA/H	Obstacle clearance altitude/height
OCH	Obstacle clearance height
PANS	Procedures for Air Navigation Services
PNR	Point of no return
R	Rotor radius
RNP	Required navigation performance
RTODR	Rejected take-off distance required
RVR	Runway visual range
SAR	Search and rescue
SI	International System of Units
SICASP	Secondary Surveillance Radar Improvements and Collision Avoidance Systems Panel
SOP	Standard operating procedures
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
V_{TOSS}	The minimum speed at which climb shall be achieved with the critical power-unit inoperative, the remaining power-units operating within approved operating limits
V_y	Best rate of climb speed
WXR	Weather

Symbols

°C	Degrees Celsius
%	Per cent

PUBLICATIONS

(referred to in this Annex)

Convention on International Civil Aviation (Doc 7300)

European Organization for Civil Aviation Equipment (EUROCAE) Documents ED55 and ED56A

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

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*
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Annex 8 — Airworthiness of Aircraft

Annex 9 — Facilitation

Annex 10 — Aeronautical Telecommunications
Volume III (Part I — *Digital Data Communication Systems;* Part II — *Voice Communication Systems*)
Volume IV *(Surveillance Radar 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

Procedures for Air Navigation Services
OPS — Aircraft Operations (Doc 8168)
Volume I — *Flight Procedures*
Volume II — *Construction of Visual and Instrument Flight Procedures*

ATM — Air Traffic Management (Doc 4444)

Regional Supplementary Procedures (Doc 7030)

Manuals

Accident/Incident Reporting Manual (ADREP Manual) (Doc 9156)

Accident Prevention Manual (Doc 9422)

Airport Services Manual (Doc 9137)
Part 1 — *Rescue and Fire Fighting*
Part 8 — *Airport Operational Services*

Airworthiness Manual (Doc 9760)

Human Factors Training Manual (Doc 9683)

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

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

Manual on Required Navigation Performance (RNP) (Doc 9613)

Preparation of an Operations Manual (Doc 9376)

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 Recommenced 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

Amendment	*Source*	*Subject(s)*	*Adopted* *Effective* *Applicable*
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	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; 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; c) introduction of guidance material concerning recording on FDRs of operational flight information for those helicopters equipped with electronic displays.	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	a) Revision of definitions of heliport operating minima, decision altitude/height, minimum descent altitude/height and introduction of definition of obstacle clearance altitude/height; b) introduction of new definitions for emergency locator transmitters (ELTs), required navigation performance (RNP) and RNP type; c) introduction of a requirement concerning the use of engraving metal foil flight data recorders; d) introduction of carriage requirements for emergency locator transmitters (ELTs) to replace provisions regarding survival radio equipment and emergency location beacon; 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).	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	a) Introduction of new and revised definitions; b) new provisions concerning accident prevention and flight safety programmes; 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;	10 March 1995 24 July 1995 9 November 1995

Amendment	*Source*	*Subject(s)*	*Adopted Effective Applicable*
		d) revision of provisions concerning mass limitations and medical supplies; e) new provisions related to oxygen equipment, revision of the provisions for helicopters operated in accordance with visual flight rules (VFR) and instrument flight rules (IFR); 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	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;	20 March 1998 20 July 1998 5 November 1998

Amendment	*Source*	*Subject(s)*	*Adopted Effective Applicable*
		h) revised provisions concerning pressure-altitude reporting transponders; and i) new provisions concerning Human Factors.	
6	Second meeting of the Flight Recorder Panel, 32nd Session of the Assembly, Air Navigation Commission studies	a) Change of terminology from "cabin attendant" to "cabin crew"; b) revised definitions; 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	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	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	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

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.

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.

Alternate heliport. A heliport specified in the flight plan to which a flight may proceed when it becomes inadvisable to land at the heliport of intended landing.

Note.— An alternate heliport may be the heliport of departure.

Approach and landing operations using instrument approach procedures. Instrument approach and landing operations are classified as follows:

Non-precision approach and landing operations. An instrument approach and landing which utilizes lateral guidance but does not utilize vertical guidance.

Approach and landing operations with vertical guidance. An instrument approach and landing which utilizes lateral and vertical guidance but does not meet the requirements established for precision approach and landing operations.

Precision approach and landing operations. An instrument approach and landing using precision lateral and vertical guidance with minima as determined by the category of operation.

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

a) a ground-based navigation aid; or

b) computer generated navigation data.

Categories of precision approach and landing operations:

Category I (CAT I) operation. A precision instrument approach and landing with 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.

Category II (CAT II) operation. A precision instrument approach and landing with 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 350 m.

Category IIIA (CAT IIIA) operation. A precision instrument approach and landing with:

a) a decision height lower than 30 m (100 ft) or no decision height; and

b) a runway visual range not less than 200 m.

Category IIIB (CAT IIIB) operation. A precision instrument approach and landing with:

a) a decision height lower than 15 m (50 ft) or no decision height; and

b) a runway visual range less than 200 m but not less than 50 m.

Category IIIC (CAT IIIC) operation. A precision instrument approach and landing with no decision height and no runway visual range limitations.

Note.— Where decision height (DH) and runway visual range (RVR) fall into different categories of operation, the instrument approach and landing 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).

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.

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.

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.

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 the precision approach or approach with vertical guidance 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. 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.

Defined point before landing. 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 performance Class 2 helicopters only.

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.

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 power-unit, 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 performance Class 1 helicopters, the defined area includes the rejected take-off area available.

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 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 inter-related 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 operators's maintenance control manual.

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.

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.

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.

Helideck. A heliport located on a floating or fixed off-shore 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.

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 precision approach and landing operations, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H) as appropriate to the category of the operation;

c) landing in approach and landing operations with vertical guidance, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H); and

d) landing in non-precision approach and landing operations, expressed in terms of visibility and/or runway visual range, minimum descent altitude/height (MDA/H) and, if necessary, cloud conditions.

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 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.

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

Note.— LDP applies to performance Class 1 helicopters.

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.

* 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 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.

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 non-precision approach or circling approach 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.

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.

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 approaches 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 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".

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

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 Class 1 helicopter. A helicopter with performance such that, in case of critical power-unit failure, it is able to land on the rejected take-off area or safely continue the flight to an appropriate landing area, depending on when the failure occurs.

Performance Class 2 helicopter. A helicopter with performance such that, in case of critical power-unit failure, it is able to safely continue the flight, except when the failure occurs prior to a defined point after take-off or after a defined point before landing, in which cases a forced landing may be required.

Performance Class 3 helicopter. A helicopter with performance such that, in case of power-unit failure at any point in the flight profile, a forced landing must be performed.

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 navigation performance (RNP). A statement of the navigation performance necessary for operation within a defined airspace.

Note.— Navigation performance and requirements are defined for a particular RNP type and/or application.

Rest period. Any period of time on the ground during which a flight crew member is relieved of all duties by the operator.

RNP type. A containment value expressed as a distance in nautical miles from the intended position within which flights would be for at least 95 per cent of the total flying time.

Example.— RNP 4 represents a navigation accuracy of plus or minus 7.4 km (4 NM) on a 95 per cent containment basis.

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.

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 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 flight trainer. 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.

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, a power-unit failure occurring at this point, either a rejected take-off may be made or a take-off safely continued.

Note.— TDP applies to performance Class 1 helicopters.

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

* As defined in Annex 2.

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 power-unit inoperative, the remaining power-units 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.

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.

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 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.

1.1.6 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.

1.1.7 An operator shall establish and maintain an accident prevention and flight safety programme.

Note.— Guidance on accident prevention is contained in the Accident Prevention Manual *(Doc 9422) and in the manual* Preparation of an Operations Manual *(Doc 9376).*

1.1.8 An operator shall establish a flight safety documents system, for the use and guidance of operational personnel.

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

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 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.

2.1.3 Subject to their published conditions of use, heliports and their facilities shall be kept continuously available for flight operations during their published hours of operations, irrespective of weather conditions.

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 or equivalent document issued by the State of the Operator.

2.2.1.2 The air operator certificate or equivalent document shall authorize the operator to conduct commercial air transport operations in accordance with such conditions and limitations as may be specified.

2.2.1.3 The issue of an air operator certificate or equivalent document 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 F to Part I of Annex 6 contains guidance on the issue of an air operator certificate.

2.2.1.4 The continued validity of an air operator certificate or equivalent document 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 or equivalent document shall contain at least the following:

a) operator's identification (name, location);

b) date of issue and period of validity;

c) description of the types of operations authorized;

d) the type(s) of aircraft authorized for use; and

e) authorized areas of operation or routes.

2.2.1.6 The State of the Operator shall establish a system for both the certification and the continued surveillance of the operator to ensure that the required standards of operations established in 2.2 are maintained.

2.2.2 Operations manual

2.2.2.1 An operator shall provide, for the use and guidance of operations personnel concerned, an operations manual in accordance with the Appendix. The operations manual shall be amended or revised as is necessary to ensure that the information contained therein is kept up to date. All such amendments or revisions shall be issued to all personnel that are required to use this manual.

2.2.2.2 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.— Requirements for the organization and contents of an operations manual are provided in the Appendix.

Note 2.— Specific items in an operations manual require the approval of the State of the Operator in accordance with the Standards in Section II, 2.2.7, 4.1.2, 7.3.1 and 10.3.

2.2.3 Operating instructions — general

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

2.2.3.2 A helicopter rotor shall not be turned under power without a qualified pilot at the controls.

2.2.3.3 **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 included in the operations manual.*

2.2.4 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.

2.2.5 Checklists

The checklists provided in accordance with 4.1.3 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).*

2.2.6 Minimum flight altitudes

2.2.6.1 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.

2.2.6.2 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.

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

2.2.6.4 **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.

2.2.7 Heliport operating minima

2.2.7.1 The State of the Operator shall require that the operator establish heliport operating minima for each heliport 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 by the State in which the heliport is located, except when specifically approved, by that State.

Note.— This Standard does not require the State in which the heliport is located to establish heliport operating minima.

2.2.7.2 The State of the Operator shall require that in establishing the heliport operating minima 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 declared distances;

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 and/or control of the flight path during the approach to landing and the 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.

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

2.2.7.4 **Recommendation.—** *For instrument approach and landing operations, heliport 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 — Meteorological Service for International Air Navigation, *Attachment B.*

2.2.8 Fuel and oil records

2.2.8.1 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.

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

2.2.9 Crew

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

2.2.9.2 *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.

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

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

2.2.10 Passengers

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

a) seat belts;

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.

2.2.10.2 The operator shall inform the passengers of the location and general manner of use of the principal emergency equipment carried for collective use.

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

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

2.2.11 Over-water flights

All helicopters on flights over water 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 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.

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. The operational flight plan shall be approved and signed by the pilot-in-command and, where applicable, signed by the flight operations officer/flight dispatcher, and a copy shall be filed with the operator or a designated agent, or, if these procedures are not possible, it shall be left with the heliport authority or on record in a suitable place at the point of departure.

Note.— The duties of a flight operations officer/flight dispatcher are contained in 2.6.

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

2.3.4 Alternate heliports

2.3.4.1 For a flight to be conducted in accordance with the instrument flight rules, at least one suitable 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 Suitable off-shore alternates may be specified subject to the following:

— the off-shore alternates shall be used only after a point of no return (PNR). Prior to PNR on-shore alternates shall be used;

— mechanical reliability of critical control systems and critical components shall be considered and taken into account when determining the suitability of the alternates;

— one engine inoperative performance capability shall be attainable prior to arrival at the alternate;

— deck availability shall be guaranteed;

— 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.

2.3.4.3 **Recommendation.—** *Off-shore alternates should not be used when it is possible to carry enough fuel to have an on-shore alternate. Such circumstances should be exceptional and should not include payload enhancement in adverse weather conditions.*

2.3.5 Weather conditions

2.3.5.1 A flight to be conducted in accordance with the visual flight rules 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 under the visual flight rules will, at the appropriate time, be such as to render compliance with these rules possible.

2.3.5.2 A flight to be conducted in accordance with instrument flight rules 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 supply

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 *Visual flight rules (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 sufficient to allow the helicopter:

a) to fly to the heliport to which the flight is planned;

b) to fly thereafter for a period of 20 minutes at best-range speed plus 10 per cent of the planned flight time; and

c) to have an additional amount of fuel, sufficient 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 *Instrument flight rules (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 sufficient to allow the helicopter:

2.3.6.3.1 When an alternate is not required, in terms of 2.3.4.1 a), to fly to the heliport to which the flight is planned, and thereafter:

a) to fly 30 minutes at holding speed at 450 m (1500 ft) above the destination heliport under standard temperature conditions and approach and land; and

b) to have an additional amount of fuel, sufficient 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 to which the flight is planned, and thereafter:

a) to fly to the alternate specified in the flight plan; and then

b) 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) to have an additional amount of fuel sufficient 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 2.3.4.1 b), to fly to the heliport to which the flight is planned and thereafter for a period of two hours at holding speed.

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 power-unit 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 re-plan 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.

2.3.7 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;

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 2.2.7.1.

2.4.1.2 An instrument approach shall not be continued beyond the outer marker fix in case of precision approach, or below 300 m (1 000 ft) above the heliport in case of non-precision approach, unless the reported visibility or controlling RVR is above the specified minimum.

2.4.1.3 If, after passing the outer marker fix in case of precision approach, or after descending below 300 m (1 000 ft) above the heliport in case of non-precision approach, 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 In-flight operational instructions

Operational instructions involving a change in the ATS flight plan shall, when applicable, be coordinated with the appropriate ATS unit before transmission to the helicopter.

Note.— When the above coordination has not been possible, operational instructions do not relieve a pilot of the responsibility for obtaining an appropriate clearance from an ATS unit, if applicable, before making a change in flight plan.

2.4.8 Instrument flight procedures

2.4.8.1 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.

2.4.8.2 All helicopters operated in accordance with instrument flight rules 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.

2.4.9 Helicopter operating procedures for noise abatement

Recommendation.— *Noise abatement procedures specified by an operator for any one helicopter type should be the same for all heliports.*

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 2.2.5 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 and an explanation of the term "substantial damage" is given in the Accident/Incident Reporting Manual (ADREP Manual) *(Doc 9156).*

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 when employed in conjunction with a method of flight supervision in accordance with 2.2 shall:

a) assist the pilot-in-command in flight preparation and provide the relevant information required;

b) assist the pilot-in-command in preparing the operational and the ATS flight plans, sign when applicable and file the ATS flight plan with the appropriate ATS unit;

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; and

d) in the event of an emergency, initiate such procedures as may be outlined in the operations manual.

2.6.2 A flight operations officer/flight dispatcher shall avoid taking any action that would conflict with the procedures established by:

a) air traffic control;

b) the meteorological service; or

c) the communications service.

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 comprehensive and detailed code of performance established by the State of Registry in compliance with the applicable Standards of this chapter.

3.1.2 Performance Class 3 helicopters shall only be operated in conditions of weather and light, and over such routes and diversions therefrom, that permit a safe forced landing to be executed in the event of engine failure. The conditions of this paragraph apply also to performance Class 2 helicopters prior to the defined point after take-off and after the defined point before landing.

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 Registry should ensure that the level of performance specified in 3.2 should be met as far as practicable.*

3.1.4 Only performance Class 1 helicopters shall be permitted to operate from elevated heliports in congested areas.

3.1.5 **Recommendation.—** *Performance Class 3 helicopters should not be permitted to operate from elevated heliports or helidecks.*

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 comprehensive and detailed national code referred to in 3.1.1 for the helicopters designated in 3.2.1 shall be at least substantially equivalent to 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 Registry shall take such precautions as are reasonably possible to ensure that the general level of safety contemplated by these provisions is maintained under all expected operating conditions, including those not covered specifically by the provisions of this chapter.

3.2.5 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 comprehensive and detailed 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 3.2.7.1 is complied with, nor the mass at which 3.2.7.2 and 3.2.7.3 are complied with, allowing for expected reductions in mass as the flight proceeds, and for such fuel jettisoning as is envisaged in applying 3.2.7.2 and in respect of alternates 3.2.7 c) and 3.2.7.3.

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

c) In no case shall the estimated mass for the expected time of landing at the destination and at any alternate, exceed the maximum landing mass specified in the flight manual for the pressure-altitude and temperature appropriate to the elevation of those operating sites, and, if used as a parameter to

determine the maximum landing mass, any other local atmospheric condition.

d) In no case shall the mass at the start of take-off, or at the expected time of landing at the 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 *Take-off and initial climb phase*

3.2.7.1.1 *For performance Class 1 helicopters.* The helicopter shall be able, in the event of the critical power-unit failing 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 occurring at or past the take-off decision point, to continue the take-off and then climb, clearing all obstacles along the flight path by an adequate margin until the helicopter is in a position to comply with 3.2.7.2.1.

3.2.7.1.2 *For performance Class 2 helicopters.* The helicopter shall be able, with all engines operating, to clear all obstacles along its flight path by an adequate margin until it is in a position to comply with 3.2.7.2.1. The helicopter shall be able, in the event of the critical power-unit becoming inoperative at any time after reaching a defined point after take-off, to continue the take-off and initial climb and clear all obstacles along its flight path by an adequate margin until it is in a position to comply with 3.2.7.2.1. Before the defined point, failure of a critical power-unit may cause the helicopter to force land, therefore the conditions stated in 3.1.2 shall apply before the defined point.

3.2.7.1.3 *For performance Class 3 helicopters.* The helicopter shall be able, with all engines operating, to clear all obstacles along its flight path by an adequate margin until it is in a position to comply with 3.2.7.2.2. At any point of the flight path, failure of a power-unit will cause the helicopter to force land, therefore the conditions stated in 3.1.2 shall apply.

3.2.7.2 *En-route phase*

3.2.7.2.1 *For performance Class 1 and Class 2 helicopters.* The helicopter shall be able, in the event of the critical power-unit becoming inoperative at any point in the en-route phase, to continue the flight to an operating site at which the Standard of 3.2.7.3.1 for Class 1 helicopters, or the Standard of 3.2.7.3.2 for Class 2 helicopters can be met, without flying below the appropriate minimum flight altitude at any point. In the case of helicopters having three or more power-units, on any part of the route where the location of suitable intermediate operating sites and the total duration of the flight are such that the probability of a second power-unit becoming inoperative must be allowed for if the general level of safety implied by the Standard of this chapter is to be maintained, the helicopter shall be able, in the event of any two power-units becoming inoperative, to continue the flight to a suitable operating site and make a landing thereat.

3.2.7.2.2 *For performance Class 3 helicopters.* The helicopter shall be able, with all power-units 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 a power-unit will cause the helicopter to force land, therefore the conditions stated in 3.1.2 shall apply.

3.2.7.3 *Approach and landing phase*

3.2.7.3.1 *For performance Class 1 helicopters.* In the event of the critical power-unit becoming inoperative 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 by a safe margin, be able to land and stop within the landing distance available or to perform a balked landing and clear all obstacles in the flight path by an adequate margin equivalent to that specified in 3.2.7.1.1. 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.

3.2.7.3.2 *For performance Class 2 helicopters.* With all engines operating, the helicopter shall, at the destination and at any alternate, after clearing all obstacles in the approach path by a safe margin, be able either to land and stop within the landing distance available or to perform a balked landing and clear all obstacles in the flight path by an adequate margin equivalent to that specified in 3.2.7.1.2. In the event of the critical power-unit becoming inoperative before the defined point before landing, the same specifications are applicable. After the defined point, failure of a power-unit may cause the helicopter to force land, therefore the conditions stated in 3.1.2 shall apply.

3.2.7.3.3 *For performance Class 3 helicopters.* With all engines operating, the helicopter shall, at the destination and at any alternate, after clearing all obstacles in the approach path by a safe margin, be able to land and stop within the landing distance available or to perform a balked landing and clear all obstacles in the flight path by an adequate margin equivalent to that specified in 3.2.7.1.3. At any point of the flight path, failure of a power-unit will cause the helicopter to force land, therefore the conditions stated in 3.1.2 shall apply.

Note.— "An adequate margin" referred to in these provisions, and applicable to all performance classes, is illustrated by the examples included in Attachment A to this Annex.

3.3 Obstacle data

3.3.1 Obstacle data shall be provided to enable the operator to develop procedures to comply with 3.2.7.1 and 3.2.7.3.

Note.— See Annex 4 and Annex 15 for methods of presentation of certain obstacle data.

3.3.2 The operator shall take account of charting accuracy when assessing compliance with 3.2.7.1 and 3.2.7.3.

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 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 E contains guidance on the minimum equipment list.

4.1.3 The operator shall provide operations staff and flight crew with an aircraft operating manual, for each aircraft type operated, containing the normal, abnormal and emergency procedures relating to the operation of the aircraft. The manual shall include details of the aircraft systems and of the checklists to be used. The design of the manual shall observe human factors principles.

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 which 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) one or more first-aid kits as appropriate to the number of passengers the helicopter is authorized to carry;

Note.— Guidance on the contents of first-aid kits is given in Attachment D.

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

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

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

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

1) when seat belts are to be fastened;

2) when and how oxygen equipment is to be used if the carriage of oxygen is required;

3) restrictions on smoking;

4) location and use of life jackets or equivalent individual floatation devices where their carriage is required; and

5) location and method of opening emergency exits; and

e) spare electrical fuses of appropriate ratings for replacement of those accessible in flight.

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 x 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

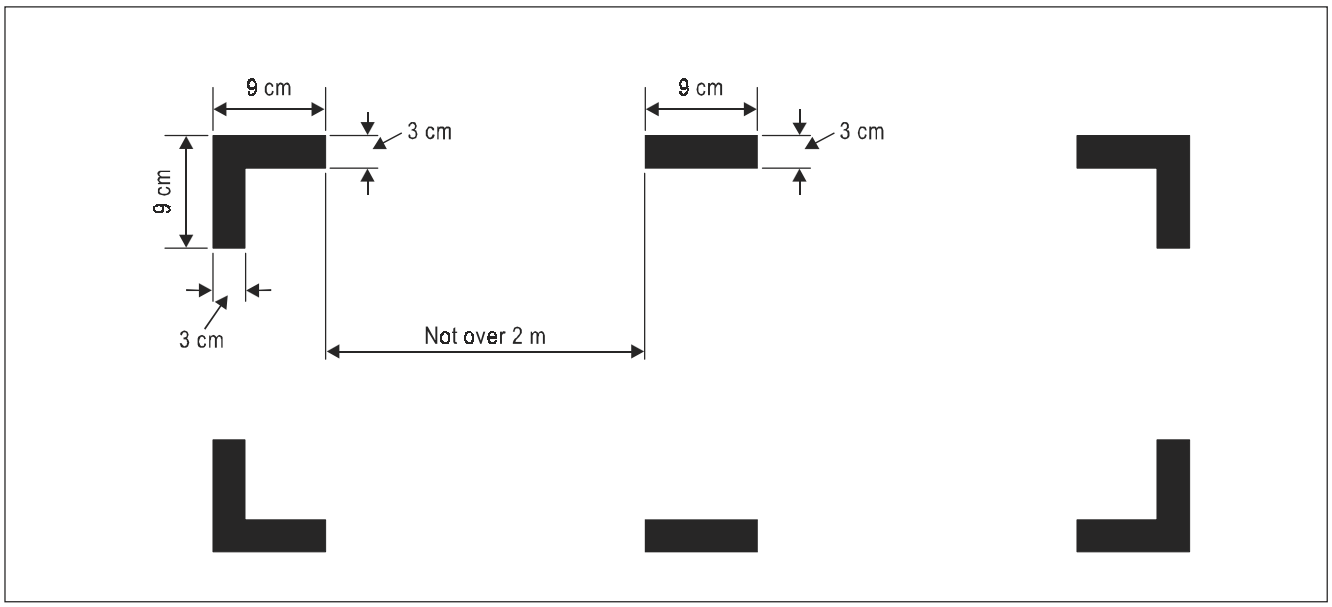
Note 1.— Flight recorders comprise two systems, a flight data recorder (FDR) and a cockpit voice recorder (CVR).

Note 2.— Combination recorders (FDR/CVR) can only be used to meet the flight recorder equipage requirements as specifically indicated in this Annex.

Note 3.— Detailed guidance on flight recorders is contained in Attachment B.

4.3.1 Flight data recorders — types

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



MARKING OF BREAK-IN POINTS (*see* 4.2.4)

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

4.3.1.3 The use of engraving metal foil FDRs shall be discontinued by 1 January 1995.

4.3.1.4 **Recommendation.—** *The use of analogue FDRs using frequency modulation (FM) should be discontinued by 5 November 1998.*

4.3.1.4.1 The use of photographic film FDRs shall be discontinued from 1 January 2003.

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

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

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

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

4.3.1.6 **Recommendation.—** *All helicopters of a maximum certificated take-off mass over 2 700 kg, required to be equipped with an FDR and/or a CVR, may alternatively be equipped with one combination recorder (FDR/CVR).*

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

4.3.1.7.1 The following parameters 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*

4.3.1.7.2 The following parameters satisfy the requirements for attitude:

- Pitch attitude
- Roll attitude
- Yaw rate

4.3.1.7.3 The following parameters satisfy the requirements for engine power:

- Power on each engine: free power turbine speed (N_f), engine torque, engine gas generator speed (N_g), 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 (T_4)*
- Turbine inlet temperature (TIT)*

4.3.1.7.4 The following parameters satisfy the requirements for configuration:

- Landing gear or gear selector position*
- Fuel quantity*
- Ice detector liquid water content*

4.3.1.7.5 The following parameters 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, track timing, exceedance discretes, broadband average engine vibration

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

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

4.3.2 Flight data recorders — duration

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

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

4.3.3.1 All helicopters of a maximum certificated take-off mass of over 7 000 kg shall be equipped with a Type IV FDR.

4.3.3.2 **Recommendation.—** *All helicopters of a maximum certificated take-off mass of over 2 700 kg up to and including 7 000 kg should be equipped with a Type V FDR.*

4.3.4 Flight data recorders — helicopters for which the individual certificate of airworthiness is first issued after 1 January 2005

4.3.4.1 All helicopters of a maximum certificated take-off mass of over 3 180 kg shall be equipped with a Type IVA FDR with a recording duration of at least 10 hours.

Note.— A single, combination CVR/FDR is acceptable.

4.3.5 Cockpit voice recorders — helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1987

4.3.5.1 All helicopters of a maximum certificated take-off mass of over 7 000 kg shall be equipped with a CVR the objective of which is the recording of the aural environment on the flight deck during flight time. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on one track of the CVR.

4.3.5.2 All helicopters of a maximum certificated take-off mass of over 3 180 kg up to and including 7 000 kg shall be equipped with a CVR the objective of which is the recording of the aural environment on the flight deck during flight time. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on one track of the CVR.

4.3.6 Cockpit voice recorders — helicopters for which the individual certificate of airworthiness was first issued before 1 January 1987

All helicopters of a maximum certificated take-off mass of over 7 000 kg shall be equipped with a CVR, the objective of which is the recording of the aural environment on the flight deck during flight time. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on one track of the CVR.

Note.— CVR performance requirements are as contained in the Minimum Operational Performance Specifications (MOPS) document for Flight Recorder Systems of the European Organization for Civil Aviation Equipment (EUROCAE) or equivalent documents.

4.3.7 Cockpit voice recorders — duration

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

4.3.7.2 **Recommendation.—** *A CVR, installed in helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1990, should be capable of retaining the information recorded during at least the last two hours of its operation.*

4.3.7.3 A CVR, installed in helicopters for which the individual certificate of airworthiness is first issued after 1 January 2003, shall be capable of retaining the information recorded during at least the last two hours of its operation.

4.3.8 Flight recorders — 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.

Note.— Industry crashworthiness and fire protection specifications can be found in documents such as the European Organization for Civil Aviation Equipment (EUROCAE) documents ED55 and ED56A.

4.3.9 Flight recorders — operation

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

4.3.9.2 To preserve flight recorder records, flight recorders shall be de-activated upon completion of flight time following an accident or incident. The flight recorders shall not be re-activated before their disposition as determined in accordance with Annex 13.

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 9.6.

4.3.10 Flight recorders — continued serviceability

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

Note.— Procedures for the inspections of the flight data and CVR systems are given in Attachment B.

4.4 All helicopters operated in accordance with visual flight rules

4.4.1 All helicopters when operated in accordance with visual flight rules 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 VFR flights which are operated as controlled flights shall be equipped in accordance with 4.10.

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) flying over water at a distance from land corresponding to more than 10 minutes at normal cruise speed in the case of performance Class 1 or 2 helicopters; or

b) flying over water beyond autorotational or safe forced landing distance from land in the case of performance Class 3 helicopters.

4.5.2 Emergency equipment

4.5.2.1 Performance Class 1 and 2 helicopters, 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;

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

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

4.5.2.2 Performance Class 3 helicopters 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 SAR facilities.

4.5.2.3 Performance Class 3 helicopters when operating outside the provisions of 4.5.2.2 shall be equipped as in 4.5.2.1.

4.5.2.4 In the case of performance Class 2 and Class 3 helicopters, 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 this 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.*

4.6 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 Except as provided for in 4.7.2, until 1 January 2005 all Performance Class 1 and 2 helicopters operating on flights over water as described in 4.5.1 a) and Performance Class 3 helicopters operating as described in 4.5.1 b) shall be equipped with at least one ELT(S) per raft carried but not more than a total of two ELTs are required.

4.7.2 Performance Class 1 and 2 helicopters for which the individual certificate of airworthiness is first issued after 1 January 2002, operating on flights over water as described in 4.5.1 a) and Performance Class 3 helicopters for which the individual certificate of airworthiness is first issued after 1 January 2002, operating as described in 4.5.1 b) shall be equipped with at least one automatic ELT and at least one ELT(S) in a raft.

4.7.3 From 1 January 2005, all Performance Class 1 and 2 helicopters operating on flights over water as described in 4.5.1 a) and Performance Class 3 helicopters operating as described in 4.5.1 b) shall be equipped with at least one automatic ELT and at least one ELT(S) in a raft.

4.7.4 Except as provided for in 4.7.5, until 1 January 2005 helicopters on flights over designated land areas as described in 4.6 shall be equipped with at least one ELT.

4.7.5 Helicopters for which the individual certificate of airworthiness is first issued after 1 January 2002, on flights over designated land areas as described in 4.6 shall be equipped with at least one automatic ELT.

4.7.6 From 1 January 2005, helicopters on flights over designated land areas as described in 4.6 shall be equipped with at least one automatic ELT.

4.7.7 **Recommendation.—** *All helicopters should carry an automatic ELT.*

4.7.8 ELT equipment carried to satisfy the requirements of 4.7.1, 4.7.2, 4.7.3, 4.7.4, 4.7.5, 4.7.6 and 4.7.7 shall operate in accordance with the relevant provisions of Annex 10, Volume III.

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 is 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 All helicopters operated in accordance with instrument flight rules

4.10.1 All helicopters when operated in accordance with the instrument flight rules, 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 with counter drum-pointer or equivalent presentation;

Note.— Neither three-pointer nor drum-pointer altimeters satisfy the requirement in 4.10.1 c).

d) an airspeed indicating system with means of preventing malfunctioning due to either condensation or icing;

e) a slip indicator;

f) three attitude indicators (artificial horizon), one of which may be replaced by a turn indicator;

g) a heading indicator (directional gyroscope);

Note.— The requirements of 4.10.1 e), f) and g) may be met by combinations of instruments or by integrated flight director systems provided that the safeguards against total failure, inherent in the separate instruments, are retained.

h) a means of indicating whether the power supply to the gyroscopic 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 certificating authority that the helicopter possesses, by nature of its design, adequate stability without such a system; and

l) such additional instruments or equipment as may be prescribed by the appropriate authority.

4.10.2 All performance Class 1 and Class 2 helicopters when operated in accordance with the instrument flight rules 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.

4.11 All helicopters when operated at night

4.11.1 All helicopters, when operated at night shall be equipped with:

a) all equipment specified in 4.10;

b) 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. Detailed specifications for lights meeting the requirements of Annex 2 for aircraft in flight or operating on the movement area of a heliport are contained in the Airworthiness Manual *(Doc 9760).*

c) two landing lights;

d) illumination for all instruments and equipment that are essential for the safe operation of the helicopter that are used by the flight crew;

e) lights in all passenger compartments; and

f) an electric torch for each crew member station.

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

4.12 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.*

4.13 All helicopters complying with the noise certification Standards in Annex 16, Volume I

All helicopters 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.— The attestation may be contained in any document, carried on board, approved by the State of Registry.

4.14 Helicopters carrying passengers — cabin crew seats

4.14.1 All helicopters shall be equipped with a forward or rearward facing (within 15° 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.

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

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

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 improve the effectiveness of air traffic services as well as airborne collision avoidance systems.

4.16 Microphones

All flight crew members required to be on flight deck duty shall communicate through boom or throat microphones below the transition level/altitude.

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;

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.

5.2 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 the visual flight rules is accomplished by visual reference to landmarks.

5.2.2 For flights in defined portions of airspace or on routes where an RNP type 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 RNP type(s); and

b) be authorized by the State of the Operator for operations in such airspace.

Note.— Information on RNP and associated procedures, and guidance concerning the approval process, are contained in the Manual on Required Navigation Performance (RNP) *(Doc 9613). This document also contains a comprehensive list of references to other documents produced by States and international bodies concerning navigation systems and RNP.*

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 radio equipment capable of receiving signals 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: powerplants, 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 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.

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 3 180 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, 4.3.5 and 4.3.8.

6.5.2 The operator of a helicopter over 3 180 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 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) 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 who holds a valid licence, issued or rendered valid by the State of Registry, authorizing operation of the type of radio transmitting equipment to be used.

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. Ground and flight training facilities and properly qualified instructors as determined by the State of the Operator shall be provided. The training programme shall consist of ground and flight training in the type(s) of helicopter on which the flight crew member serves, and shall include proper flight crew co-ordination and training in all types of emergency or abnormal situations or procedures caused by powerplant, transmission, rotor, airframe or systems malfunctions, fire or other abnormalities. The training programme shall also include training in knowledge and skills related to human performance and in the transport of dangerous goods. The training for all flight crew members, particularly that relating to abnormal or emergency procedures, shall 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. The training programme shall 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 2.2.4 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 helicopter synthetic flight trainers 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).*

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 helicopter synthetic flight trainers 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

7.4.1 Recent experience — pilot-in-command

An operator shall not assign a pilot to act as pilot-in-command of a helicopter unless, on the same type of helicopter within

the preceding 90 days, that pilot has made at least three take-offs and landings.

7.4.2 Recent experience — co-pilot

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

7.4.3 Pilot-in-command route and heliport qualification

7.4.3.1 An operator shall not utilize a pilot as pilot-in-command of a helicopter on a route or route segment for which that pilot is not currently qualified until such pilot has complied with 7.4.3.2 and 7.4.3.3.

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

a) the route to be flown, and the heliports which are to be used. 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 navigational facilities and procedures associated with the route along 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.

7.4.3.3 A pilot-in-command shall have made an actual approach into each heliport of landing on the route, accompanied by a pilot who is qualified for the heliport, as a member of the flight crew or as an observer on the flight deck, unless:

a) the approach to the heliport is not over difficult terrain and the instrument approach procedures and aids available are similar to those with which the pilot is familiar, and a margin to be approved by the State of the Operator is added to the normal operating minima, or there is reasonable certainty that approach and landing can be made in visual meteorological conditions; or

b) the descent from the initial approach altitude can be made by day in visual meteorological conditions; or

c) the operator qualifies the pilot-in-command to land at the heliport concerned by means of an adequate pictorial presentation.

7.4.3.4 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.

7.4.3.5 An operator shall not continue to utilize a pilot as a pilot-in-command on a route unless, within the preceding 12 months, the pilot has made at least one trip between the terminal points of that route 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 trip on a route in close proximity and over similar terrain, prior to again serving as a pilot-in-command on that route, that pilot must requalify in accordance with 7.4.3.2 and 7.4.3.3.

7.4.4 Pilot proficiency checks

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. Where the operation may be conducted under instrument flight rules, an operator shall ensure that the pilot's competence to comply with such rules is demonstrated to either a check pilot of the operator or 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 simulators approved by the State of the Operator may be used for those parts of the checks for which they are specifically approved.

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 A flight operations officer/flight dispatcher, when employed in conjunction with an approved method of flight supervision requiring the services of licensed flight operations officers/flight dispatchers shall be licensed in accordance with the provisions of Annex 1.

Note.— The above provisions do not necessarily require a flight operations officer/flight dispatcher to hold the licence specified in Annex 1. In accordance with 2.2 the method of flight supervision is subject to approval by the State of the Operator, which may accept proof of qualifications other than the holding of the licence.

8.2 **Recommendation.—** *A flight operations officer/flight dispatcher should not be assigned to duty unless that officer has:*

a) demonstrated to the operator a knowledge of:

1) the contents of the operations manual described in the Appendix;

2) the radio equipment in the helicopters used; and

3) the navigation equipment in the helicopters used;

b) 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;

c) satisfied the operator as to knowledge and skills related to human performance as they apply to dispatch duties; and

d) demonstrated to the operator the ability to perform the duties specified in 2.6.

8.3 **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).*

8.4 **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 8.2 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 2.2.8

Maintenance records — see 6.8

Flight time, flight duty periods and rest periods records — see 2.2.9.3

Flight preparation forms — see 2.3

Operational flight plan — see 2.3.3

Pilot-in-command route and heliport 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) 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, 4.3.5 and 4.3.8;

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 powerplants.

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 being assigned as a cabin crew member. Cabin crew 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 and first-aid kits;

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 has completed the dangerous goods training programme required by Annex 18; and

f) knowledgeable about human performance as related to passenger cabin safety duties and including flight crew-cabin crew coordination.

Note.— Guidance material to design training programmes to develop knowledge in human performance and crew co-ordination 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.

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 and an explanation of the term "substantial damage" is given in the Accident/Incident Reporting Manual (ADREP Manual) *(Doc 9156).*

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 areas and 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 operating minima

The pilot-in-command shall not operate to or from a heliport using operating minima lower than those which may be established for that heliport by the State in which it is located, except with the specific approval of that State.

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 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; 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 the instrument flight rules, 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 — Rules of the Air; *and* Procedures for Air Navigation Services — Air Traffic Management *(PANS-ATM) (Doc 4444).*

2.6 Limitations imposed by weather conditions

2.6.1 Flight in accordance with the visual flight rules

A flight, except one of purely local character in visual meteorological conditions, to be conducted in accordance with the visual flight rules 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 the visual flight rules, will, at the appropriate time, be such as to render compliance with these rules possible.

2.6.2 Flight in accordance with the instrument flight rules

2.6.2.1 *When an alternate is required.* A flight to be conducted in accordance with the instrument flight rules 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 the instrument flight rules 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 beyond the outer marker fix in case of precision approach, or below 300 m (1 000 ft) above the heliport in case of non-precision approach, unless the reported visibility or controlling RVR is above the specified minimum.

2.6.3.3 If, after passing the outer marker fix in case of precision approach, or after descending below 300 m (1 000 ft) above the heliport in case of non-precision approach, 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 the instrument flight rules, 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 off-shore destination.

2.7.2 Suitable off-shore alternates may be specified subject to the following:

— the off-shore alternates shall be used only after passing a point of no return (PNR). Prior to PNR on-shore alternates shall be used;

— mechanical reliability of critical control systems and critical components shall be considered and taken into account when determining the suitability of the alternate;

— one engine inoperative performance capability shall be attainable prior to arrival at the alternate;

— deck availability shall be guaranteed;

— 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.—** *Off-shore alternates should not be used when it is possible to carry enough fuel to have an on-shore alternate. Such circumstances should be exceptions and should not include payload enhancement in adverse weather conditions.*

2.8 Fuel and oil supply

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 *Visual flight rules (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 sufficient to allow the helicopter:

a) to fly to the heliport to which the flight is planned;

b) to fly thereafter for a period of 20 minutes at best-range speed plus 10 per cent of the planned flight time; and

c) to have an additional amount of fuel, sufficient 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 *Instrument flight rules (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 sufficient to allow the helicopter:

2.8.3.1 When no alternate is required, in terms of 2.6.2.2, to fly to the heliport to which the flight is planned, and thereafter:

a) to fly 30 minutes at holding speed at 450 m (1 500 ft) above the destination heliport under standard temperature conditions and approach and land; and

b) to have an additional amount of fuel, sufficient 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 to which the flight is planned, and thereafter:

a) to fly to the alternate specified in the flight plan; and then

b) 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) to have an additional amount of fuel sufficient to provide for the increased consumption on the occurrence of potential contingencies.

2.8.3.3 When no suitable alternate is available, in terms of 2.7.1 b), to fly to the heliport to which the flight is planned and thereafter for a period of two hours at holding speed.

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 power-unit 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 re-plan 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.

2.9 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*

2.9.1 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.

2.9.2 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.

2.10 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.

2.11 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.

2.12 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.*

2.13 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.*

2.14 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.

2.15 Flight crew members at duty stations

2.15.1 Take-off and landing

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

2.15.2 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.

2.15.3 Seat belts

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

2.15.4 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.

2.16 Instrument flight procedures

2.16.1 One or more instrument approach procedures 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.

2.16.2 All helicopters operated in accordance with instrument flight rules 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.

2.17 Instruction — general

A helicopter rotor shall not be turned under power without a qualified pilot at the controls.

2.18 Refuelling with passengers on board or rotors turning

2.18.1 **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.*

2.18.2 **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 2.18.1.*

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.

2.19 Over-water flights

All helicopters on flights over water 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 — Airworthiness of Aircraft, *Part IV, apply to all helicopters intended for the carriage of passengers or cargo or mail in international air navigation.*

3.3 Only performance Class 1 helicopters shall be permitted to operate from elevated heliports in congested areas.

3.4 **Recommendation.—** *Performance Class 3 helicopters should not be permitted to operate from elevated heliports or helidecks.*

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 All helicopters on all flights 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 not readily accessible to the pilot or co-pilot;

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) spare electrical fuses of appropriate ratings for replacement of those accessible in flight.

4.1.3.2 **Recommendation.—** *All helicopters on all flights should be equipped with the ground-air signal codes for search and rescue purposes.*

4.1.3.3 **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 x 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.

4.2 All helicopters operated as VFR flights

4.2.1 All helicopters when operated as VFR flights 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.

4.2.2 **Recommendation.—** *VFR flights which are operated as controlled flights shall be equipped in accordance with 4.6.*

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) flying over water at a distance from land corresponding to more than 10 minutes at normal cruise speed in the case of performance Class 1 or 2 helicopters; or

b) flying over water beyond autorotational or safe forced landing distance from land in the case of performance Class 3 helicopters.

4.3.2 Emergency equipment

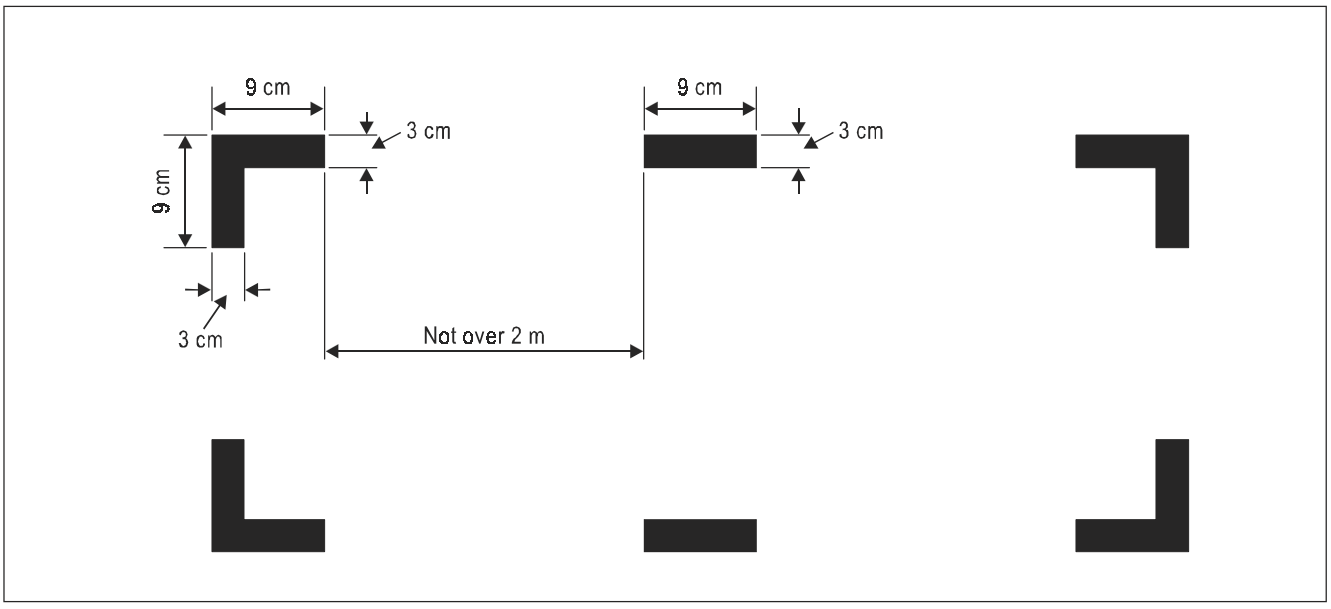
4.3.2.1 Performance Class 1 and 2 helicopters operating in accordance with the provisions of 4.3.1, shall be equipped with:

a) one life jacket, or equivalent individual flotation device, for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided;

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

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

4.3.2.2 Performance Class 3 helicopters 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.



MARKING OF BREAK-IN POINTS (see 4.1.4)

Note.— When determining the distance from land referred to in 4.3.2.2, consideration should be given to environmental conditions and the availability of SAR facilities.

4.3.2.3 Performance Class 3 helicopters when operating outside the provisions of 4.3.2.2 shall be equipped as in 4.3.2.1.

4.3.2.4 In the case of performance Class 2 and Class 3 helicopters, when taking off or landing at a heliport where 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.

4.3.2.5 Each life jacket and equivalent individual floatation 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.

4.3.2.6 **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 4.3.2 should be deployable by remote control.*

4.3.2.7 **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.*

4.3.2.8 **Recommendation.—** *On any helicopter for which the individual certificate of airworthiness was first issued before 1 January 1991, the provisions of 4.3.2.6 and 4.3.2.7 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 operated in accordance with the instrument flight rules

All helicopters, when operated in accordance with the instrument flight rules 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) a sensitive pressure altimeter;

Note.— Due to the long history of misreadings, the use of drum-pointer altimeters is not recommended.

d) an airspeed indicating system with a means of preventing malfunctioning due to either condensation or icing;

e) a slip indicator;

f) two attitude indicators (artificial horizon), one of which may be replaced by a turn indicator;

g) a heading indicator (directional gyroscope);

Note.— The requirements of 4.6 e), f) and g), may be met by combinations of instruments or by integrated flight director systems provided that the safeguards against total failure, inherent in the separate instruments, are retained.

h) means of indicating whether the supply of power to the gyroscopic instruments is adequate;

i) a means of indicating in the flight crew compartment the outside air temperature;

j) a rate-of-climb and descent indicator; and

k) such additional instruments or equipment as may be prescribed by the appropriate authority.

4.7 All helicopters when operated at night

4.7.1 All helicopters, when operated at night, shall be equipped with:

a) all the equipment specified in 4.6;

b) 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. Detailed specifications for lights meeting the requirements of Annex 2 for aircraft in flight or operating on the movement area of a heliport are contained in the Airworthiness Manual *(Doc 9760).*

c) a landing light;

d) illumination for all flight instruments and equipment that are essential for the safe operation of the helicopter;

e) lights in all passenger compartments; and

f) an electric torch for each crew member station.

4.7.2 **Recommendation.—** *The landing light should be trainable, at least in the vertical plane.*

4.8 All helicopters complying with the noise certification Standards in Annex 16, Volume I

A helicopter shall carry a document attesting noise certification.

Note.— The attestation may be contained in any document, carried on board, approved by the State of Registry.

4.9 Flight recorders

Note 1.— Flight recorders comprise two systems — a flight data recorder (FDR) and a cockpit voice recorder (CVR).

Note 2.— Combination recorders (FDR/CVR) can only be used to meet the flight recorder equipage requirements as specifically indicated in this Annex.

Note 3.— Detailed guidance on flight recorders is contained in Attachment B.

4.9.1 Flight data recorders — types

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

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

4.9.1.3 The use of engraving metal foil FDRs shall be discontinued by 1 January 1995.

4.9.1.4 **Recommendation.—** *The use of analogue FDRs using frequency modulation (FM) should be discontinued by 5 November 1998.*

4.9.1.4.1 The use of photographic film FDRs shall be discontinued from 1 January 2003.

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

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

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

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

4.9.1.6 **Recommendation.—** *All helicopters of a maximum certificated take-off mass over 2 700 kg, required to be equipped with an FDR and/or a CVR, may alternatively be equipped with one combination recorder (FDR/CVR).*

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

4.9.1.7.1 The following parameters 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*

4.9.1.7.2 The following parameters satisfy the requirements for attitude:

– Pitch attitude
– Roll attitude
– Yaw rate

4.9.1.7.3 The following parameters satisfy the requirements for engine power:

– Power on each engine: free power turbine speed (N_f), engine torque, engine gas generator speed (N_g), 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 (T_4)*
– Turbine inlet temperature (TIT)*

4.9.1.7.4 The following parameters satisfy the requirements for configuration:

– Landing gear or gear selector position*
– Fuel contents*
– Ice detector liquid water content*

4.9.1.7.5 The following parameters 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, track timing, exceedance discretes, broadband average engine vibration

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

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

4.9.2 Flight data recorders — duration

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

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

4.9.3.1 All helicopters of a maximum certificated take-off mass of over 7 000 kg shall be equipped with a Type IV FDR.

4.9.3.2 **Recommendation.—** *All helicopters of a maximum certificated take-off mass of over 2 700 kg up to and including 7 000 kg should be equipped with a Type V FDR.*

4.9.4 Flight data recorders — helicopters for which the individual certificate of airworthiness is first issued after 1 January 2005

4.9.4.1 All helicopters of a maximum certificated take-off mass of over 3 180 kg shall be equipped with a Type IVA FDR with a recording duration of at least 10 hours.

Note.— A single, combination CVR/FDR is acceptable.

4.9.5 Cockpit voice recorders — helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1987

Note.— CVR performance requirements are as contained in the Minimum Operational Performance Specifications (MOPS) document for Flight Recorder Systems of the European Organization for Civil Aviation Equipment (EUROCAE) or equivalent documents.

4.9.5.1 All helicopters of a maximum certificated take-off mass of over 7 000 kg shall be equipped with a CVR the

objective of which is the recording of the aural environment on the flight deck during flight time. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on one track of the CVR.

4.9.5.2 **Recommendation.—** *All helicopters of a maximum certificated take-off mass of over 3 180 kg, up to and including 7 000 kg, should be equipped with a CVR, the objective of which is the recording of the aural environment on the flight deck during flight time. For helicopters not equipped with an FDR, at least main rotor speed should be recorded on one track of the CVR.*

4.9.6 Cockpit voice recorders — duration

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

4.9.6.2 **Recommendation.—** *A CVR, installed in helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1990, should be capable of retaining the information recorded during at least the last two hours of its operation.*

4.9.6.3 A CVR, installed in helicopters for which the individual certificate of airworthiness is first issued after 1 January 2003, shall be capable of retaining the information recorded during at least the last two hours of its operation.

4.9.7 Flight recorders — 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.

4.9.8 Flight recorders — operation

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

4.9.8.2 To preserve flight recorder records, flight recorders shall be de-activated upon completion of flight time following an accident or incident. The flight recorders shall not be re-activated before their disposition as determined in accordance with Annex 13.

Note 1.— The need for removal of the flight recorder records from the aircraft is to 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 9.6.

4.9.9 Flight recorders — continued serviceability

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

Note.— Procedures for the inspections of the flight data and CVR systems are given in Attachment B.

4.10 Emergency locator transmitter (ELT)

4.10.1 Except as provided for in 4.10.2, until 1 January 2005 all Performance Class 1 and 2 helicopters operating on flights over water as described in 4.3.1 a) and Performance Class 3 helicopters operating as described in 4.3.1 b) shall be equipped with at least one ELT(S) per raft carried but not more than a total of two ELTs are required.

4.10.2 Performance Class 1 and 2 helicopters for which the individual certificate of airworthiness is first issued after 1 January 2002, operating on flights over water as described in 4.3.1 a) and Performance Class 3 helicopters for which the individual certificate of airworthiness is first issued after 1 January 2002, operating as described in 4.3.1 b) shall be equipped with at least one automatic ELT and one ELT(S) in a raft.

4.10.3 From 1 January 2005, all Performance Class 1 and 2 helicopters operating on flights over water as described in 4.3.1 a) and Performance Class 3 helicopters operating as described in 4.3.1 b) shall be equipped with at least one automatic ELT and one ELT(S) in a raft.

4.10.4 Except as provided for in 4.10.5, until 1 January 2005 helicopters on flights over designated land areas as described in 4.4. shall be equipped with at least one ELT.

4.10.5 Helicopters for which the individual certificate of airworthiness is first issued after 1 January 2002, on flights over designated land areas as described in 4.4 shall be equipped with at least one automatic ELT.

4.10.6 From 1 January 2005, helicopters on flights over designated land areas as described in 4.4 shall be equipped with at least one automatic ELT.

4.10.7 **Recommendation.—** *All helicopters should carry an automatic ELT.*

4.10.8 ELT equipment carried to satisfy the requirements of 4.10.1, 4.10.2, 4.10.3, 4.10.4, 4.10.5, 4.10.6 and 4.10.7 shall operate in accordance with the relevant provisions of Annex 10, Volume III.

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

4.11.1 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.

4.11.2 **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 4.11.1 and 4.11.2 are intended to support the effectiveness of ACAS as well as to improve 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.

4.12 Microphones

Recommendation.— *All flight crew members required to be on flight deck duty should communicate through boom or throat microphones below the transition level/altitude.*

CHAPTER 5. HELICOPTER COMMUNICATION AND NAVIGATION EQUIPMENT

5.1 Communication equipment

5.1.1 A helicopter to be operated in accordance with the instrument flight rules 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 the visual flight rules, 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 121.5 MHz.*

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 the visual flight rules 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 flights in defined portions of airspace or on routes where an RNP type 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 RNP type(s); and

b) be authorized by the State of Registry for operations in such airspace.

Note.— Information on RNP and associated procedures, and guidance concerning the approval process, are contained in the Manual on Required Navigation Performance (RNP) *(Doc 9613). This document also contains a comprehensive list of references to other documents produced by States and international bodies concerning navigation systems and RNP.*

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 radio equipment capable of receiving signals 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: powerplants, 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 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 3 180 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, paragraphs 4.3.5 and 4.3.8.

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) 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.

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

APPENDIX

APPENDIX. ORGANIZATION AND CONTENTS OF AN OPERATIONS MANUAL

(*See Section II, Chapter 2, 2.2.2.1)*

1. Organization

1.1 **Recommendation.—** *An operations manual, which may be issued in separate parts corresponding to specific aspects of operations, provided in accordance with Chapter 2, 2.2.2.1 should be organized with the following structure:*

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 Chapter 2, 2.2.2.1 shall 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 shall 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 navigational equipment to be carried.

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 the failure of one or more powerplants 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 and landing 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 accident prevention and flight safety programme provided in accordance with Section II, Chapter 1, 1.1.7, including a statement of safety policy and the responsibility of personnel.

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.

2.2 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, 4.1.3.

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, 4.1.3.

2.2.7 The minimum equipment list for the helicopter types operated and specific operations authorized.

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 and aerodromes

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.

2.4 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, 8.2.

ANNEX 6 — PART III

ATTACHMENTS

ATTACHMENT A. HELICOPTER PERFORMANCE AND OPERATING LIMITATIONS

Purpose and scope

The purpose of the following example is to illustrate the level of performance intended by the provisions of Section II, Chapter 3, and Section III, Chapter 3.

1. Definitions

1.1 Only applicable to performance Class 1 helicopters

Landing distance required (LDRH). The horizontal distance required to land and come to a full stop from a point 10.7 m (35 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 a power-unit 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 height of 10.7 m (35 ft) above the take-off surface, and a positive climb gradient are achieved, following failure of the critical power-unit at TDP, the remaining power-units operating within approved operating limits.

1.2 Applicable to all classes of helicopters

Distance DR. DR is 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.

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.

Touchdown and lift-off area (TLOF). A load bearing area on which a helicopter may touch down or lift off.

V_y Best rate of climb speed.

2. General

2.1 Significant factors

To determine the performance of the helicopter, account is taken of at least the following factors:

a) mass of the helicopter;

b) elevation or pressure-altitude and temperature;

c) wind; for take-off and landing, accountability for wind shall be no more than 50 per cent of any reported steady head wind component of 5 knots or more. Where take-off and landing with a tail wind component is permitted in the flight manual, not less than 150 per cent of any reported tail wind component shall 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; and

d) operating techniques.

2.2 For performance Class 2 or 3 helicopters in any flight phase where a power-unit failure may cause the helicopter to force land:

a) a minimum visibility must be defined by the operator, taking into account the characteristics of the helicopter, but never less than 1 000 m for performance Class 2 helicopters and 1 500 m for performance Class 3 helicopters;

b) the operator is obliged to verify that the surface below the intended flight path permits the pilot to execute a safe forced landing; in addition, in case of a flight over water, the operator must also verify that the helicopter has been certificated for ditching.

In addition, performance Class 3 operations are not to be performed:

c) out of the sight of the surface; or

d) at night; or

e) when the cloud ceiling is less than 180 m (600 ft).

3. Operating area considerations

3.1 Touchdown and lift-off area

On surface level heliports, the length or width of the undercarriage, whichever is the greater, does not exceed 2/3 the diameter of the circle contained in the touchdown and lift-off area. On elevated heliports and on helidecks, it is presumed that the FATO and the touchdown and lift-off area will be coincidental.

3.2 FATO

The over-all length or width of the helicopter, whichever is the greater, does not exceed 2/3 the smallest dimension of the FATO except in case of a water heliport. In this case, it does not exceed 1/2 the width of the FATO. If the FATO includes water surface, the helicopter is to be specifically approved in its flight manual for routine water operations including rejected take-off onto water surfaces. For performance Class 1 helicopters, the dimensions of the FATO are not less than those which are indicated in the flight manual of the helicopter.

3.3 Helicopter clearway

The over-all length or width of the helicopter, whichever is greater, does not exceed 2/3 the width of the helicopter clearway in case of a land heliport or half the width of the helicopter clearway in case of a water heliport.

4. Limitations resulting from performance

4.1 Performance Class 1 helicopters

4.1.1 *Take-off*

4.1.1.1 No helicopter is taken off at a mass that exceeds the maximum take-off mass specified in the flight manual for the altitude of the heliport and for the ambient temperature existing at the time of the take-off.

4.1.1.2 Take-off from a surface-level heliport (Figure A-1)

The take-off mass is such that:

a) the rejected take-off distance required does not exceed the rejected take-off distance available;

b) the take-off distance required does not exceed the take-off distance available; or

As an alternative (Figure A-2), the take-off distance required may be disregarded provided that the helicopter with the critical power-unit failure at the TDP can, when continuing the take-off, clear all obstacles between the end of the take-off distance available and the point at which it becomes established in a climb at V_{TOSS} by a vertical margin of 10.7 m (35 ft) or more. An obstacle is considered to be in the path of the helicopter if its distance from the nearest point on the surface below the intended line of flight does not exceed 30 m or 1.5 times the maximum dimension of the helicopter, whichever is greater.

4.1.1.3 Take-off from an elevated heliport or helideck (Figure A-3)

The take-off mass is such that:

a) it is possible to reject the take-off and land on the FATO in case of the critical power-unit failure occurring before the TDP;

b) it is possible to continue the flight if the critical power-unit failure occurs at or after the TDP. In this case, the flight path of the helicopter may descend below the height of the FATO in order to achieve V_{TOSS} if the following conditions are satisfied:

1) A clearance margin is established in relation to the elevated heliport or helideck itself and to all obstacles located on the elevated heliport or helideck. 4.5 m (15 ft) has been found appropriate to a wide range of helicopters.

2) The vertical clearance above all obstacles not located on the elevated heliport or helideck is at least equal to 10.7 m (35 ft). An obstacle is considered if its distance from the flight path does not exceed 30 m or 1.5 times the maximum dimension of the helicopter, whichever is greater.

4.1.2 *Initial climb*

4.1.2.1 The take-off mass is 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) + 0.01 DR for IFR operations above all obstacles located in the climb path, the critical power-unit failure occurring at the TDP.

4.1.2.2 An obstacle is considered if its lateral distance from the nearest point on the surface below the intended flight path does not exceed 30 m or 1.5 times the over-all length of the helicopter, whichever is greater, plus:

0.10 DR for VFR day operations
0.15 DR for VFR night operations
0.30 DR for IFR operations without electronic guidance
0.15 DR for IFR operations with electronic guidance
0.10 DR for IFR operations with ILS or MLS guidance

except 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 navigation aids; and

d) 900 m in the other cases.

4.1.2.3 Where a change of direction of more than 15° is made, obstacle clearance requirements are to be increased by 5 m (15 ft) from the point at which the turn is initiated. This turn is not to be initiated before reaching a height of 30 m (100 ft) above the take-off surface.

4.1.3 *En route*

The take-off mass is such that it is possible, in case of the critical power-unit 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.

4.1.4 *Approach, landing and balked landing*
(Figures A-7 and A-8)

4.1.4.1 The estimated landing mass at the destination or alternate is such that:

a) it does not exceed the maximum landing mass specified in the flight manual, taking into account the parameters specified in 2.1;

b) the landing distance required does not exceed the landing distance available;

c) in case of the critical power-unit failure occurring at any point after the LDP, it is possible to land and stop within the FATO; and

d) in case of the critical power-unit failure occurring at any point before the LDP, it is possible either to land and stop within the FATO, or to overshoot and clear all obstacles in the flight path by a vertical interval of 10.7 m (35 ft) for VFR plus an additional margin of 0.01 DR for IFR.

An obstacle is considered if its lateral distance from the nearest point on the surface below the intended line of flight does not exceed 30 m or 1.5 times the over-all length of the helicopter, whichever is greater, plus:

0.10 DR for VFR day operations
0.15 DR for VFR night operations
0.30 DR for IFR operations without electronic guidance
0.15 DR for IFR operations with electronic guidance
0.10 DR for IFR operations with ILS or MLS guidance

except obstacles may be disregarded if they are situated beyond:

e) 7 R* for day operations if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;

f) 10 R* for night operations if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;

g) 300 m if navigational accuracy can be achieved by navigation aids; and

h) 900 m in the other cases.

4.1.4.2 In case of a landing on an elevated heliport or helideck, the flight path may descend below the height of the landing surface in order to achieve V_{TOSS} if the following conditions are satisfied:

a) A clearance margin is established in relation to the elevated heliport or helideck itself and to all obstacles located on the elevated heliport or helideck. 4.5 m (15 ft) has been found appropriate to a wide range of helicopters.

b) The vertical clearance above all obstacles not located on the elevated heliport or helideck is at least equal to that specified in 4.1.4.1.

4.2 Performance Class 2 helicopters

4.2.1 *Take-off*
(Figures A-4 and A-5)

4.2.1.1 The mass of the helicopter at take-off does not exceed the maximum take-off mass specified in the flight manual taking into account the parameters specified in 2.1.

4.2.1.2 The take-off mass is such that a safe forced landing can be achieved in the event of a power-unit failure prior to reaching the defined point after take-off.

* R is the rotor radius.

4.2.1.3 In case of a take-off from an elevated heliport or helideck and a failure of the critical power-unit occurring before V_y is obtained, the flight path may descend to achieve V_y if the following conditions are satisfied:

a) A clearance margin is established in relation to the elevated heliport or helideck itself and to all obstacles located on the elevated heliport or helideck. 4.5 m (15 ft) has been found appropriate to a wide range of helicopters.

b) The vertical clearance above all obstacles not located on the elevated heliport or helideck is at least equal to 10.7 m (35 ft). An obstacle is considered if its distance from the flight path does not exceed 30 m or 1.5 times the over-all length of the helicopter whichever is greater.

4.2.2 *Initial climb*

4.2.2.1 The take-off mass is 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) + 0.01 DR for IFR operations above all obstacles located in the climb path, the critical power-unit failure occurring at the defined point after take-off.

4.2.2.2 An obstacle is considered if its lateral distance from the nearest point on the surface below the intended flight path does not exceed 30 m or 1.5 times the over-all length of the helicopter, whichever is greater, plus:

0.10 DR for VFR day operations
0.15 DR for VFR night operations
0.30 DR for IFR operations without electronic guidance
0.15 DR for IFR operations with electronic guidance
0.10 DR for IFR operations with ILS or MLS guidance

except 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 navigation aids; and

d) 900 m in the other cases.

4.2.3 *En route*

The take-off mass is such that it is possible, in case of the critical power-unit 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.

4.2.4 *Approach, landing and balked landing* (Figures A-9 and A-10)

4.2.4.1 The estimated landing mass at the destination or alternate is such that:

a) it does not exceed the maximum landing mass specified in the flight manual, taking into account the parameters specified in 2.1;

b) a safe forced landing can be achieved in the event of an engine failure after reaching the defined point before landing;

c) it is possible to perform a balked landing, all engines operating, at any point of the flight path and clear all obstacles in the flight path by a vertical clearance of not less than:

10.7 m (35 ft) for VFR operations; and
10.7 m (35 ft) + 0.01 DR for IFR operations; and

d) it is possible, in case of the critical power-unit failure occurring before the defined point before landing, either to land and stop within the FATO, or to overshoot and clear all obstacles in the flight path by a vertical interval of 10.7 m (35 ft).

An obstacle is considered if its lateral distance from the nearest point on the surface below the intended line of flight does not exceed 30 m or 1.5 times the over-all length of the helicopter, whichever is greater, plus:

0.10 DR for VFR day operations
0.15 DR for VFR night operations
0.30 DR for IFR operations without electronic guidance
0.15 DR for IFR operations with electronic guidance
0.10 DR for IFR operations with ILS or MLS guidance

except obstacles may be disregarded if they are situated beyond:

e) 7 R* for day operations if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;

f) 10 R* for night operations if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;

g) 300 m if navigational accuracy can be achieved by navigation aids; and

h) 900 m in the other cases.

* R is the rotor radius.

4.2.4.2 In case of a landing on an elevated heliport or helideck, the flight path may descend below the height of the FATO in order to achieve V_y if the following conditions are satisfied:

a) A clearance margin is established in relation to the elevated heliport or helideck itself and to all obstacles located on the elevated heliport or helideck. 4.5 m (15 ft) has been found appropriate to a wide range of helicopters;

b) The vertical clearance above all obstacles not located on the elevated heliport or helideck is at least equal to that specified in 4.2.4.1.

4.3 Performance Class 3 helicopters

4.3.1 *Take-off*
(Figure A-6)

4.3.1.1 The mass of the helicopter at take-off does not exceed the maximum take-off mass specified in the flight manual taking into account the parameters specified in 2.1.

4.3.1.2 The take-off mass is such that a safe forced landing can be achieved in the event of an engine failure.

4.3.2 *Initial climb*

4.3.2.1 The take-off mass is such that the climb path provides a vertical clearance of not less than 10.7 m (35 ft) above all obstacles located along the climb path, all engines operating.

4.3.2.2 An obstacle is considered if its lateral distance from the nearest point on the surface below the intended flight path does not exceed 30 m or 1.5 times the over-all length of the helicopter, whichever is greater, plus 0.10 DR, except obstacles may be disregarded if they are situated beyond 7 R*.

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, landing and balked landing*
(Figure A-11)

The estimated landing mass at the destination or alternate is such that:

a) it does not exceed the maximum landing mass specified in the flight manual, taking into account the parameters specified in 2.1;

b) a safe forced landing can be achieved in the event of an engine failure;

c) it is possible to perform a balked landing, all engines operating, at any point of the flight path and clear all obstacles by a vertical interval of 10.7 m (35 ft).

An obstacle is considered if its lateral distance from the nearest point on the surface below the intended line of flight does not exceed 30 m or 1.5 times the over-all length of the helicopter, whichever is greater, plus 0.10 DR, except obstacles may be disregarded if they are situated beyond 7 R*.

---

* R is the rotor radius.

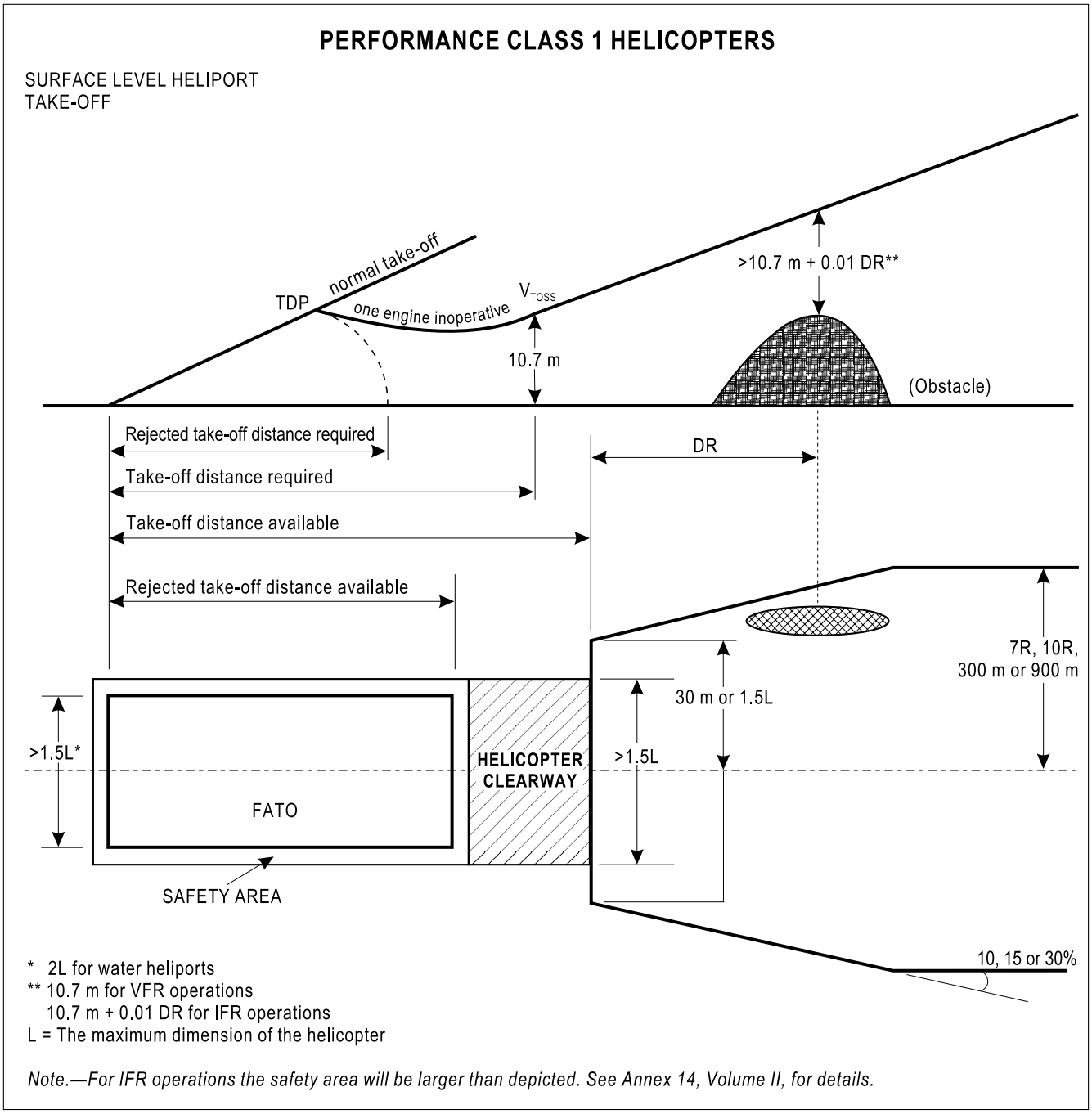

PERFORMANCE CLASS 1 HELICOPTERS
SURFACE LEVEL HELIPORT
TAKE-OFF
TDP
normal take-off
one engine inoperative
V_{TOSS}
10.7 m
>10.7 m + 0.01 DR**
(Obstacle)
Rejected take-off distance required
Take-off distance required
Take-off distance available
Rejected take-off distance available
DR
7R, 10R,
300 m or 900 m
30 m or 1.5L
>1.5L*
HELICOPTER
CLEARWAY
>1.5L
FATO
SAFETY AREA
10, 15 or 30%
* 2L for water heliports
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
L = The maximum dimension of the helicopter
Note.—For IFR operations the safety area will be larger than depicted. See Annex 14, Volume II, for details.

Figure A-1

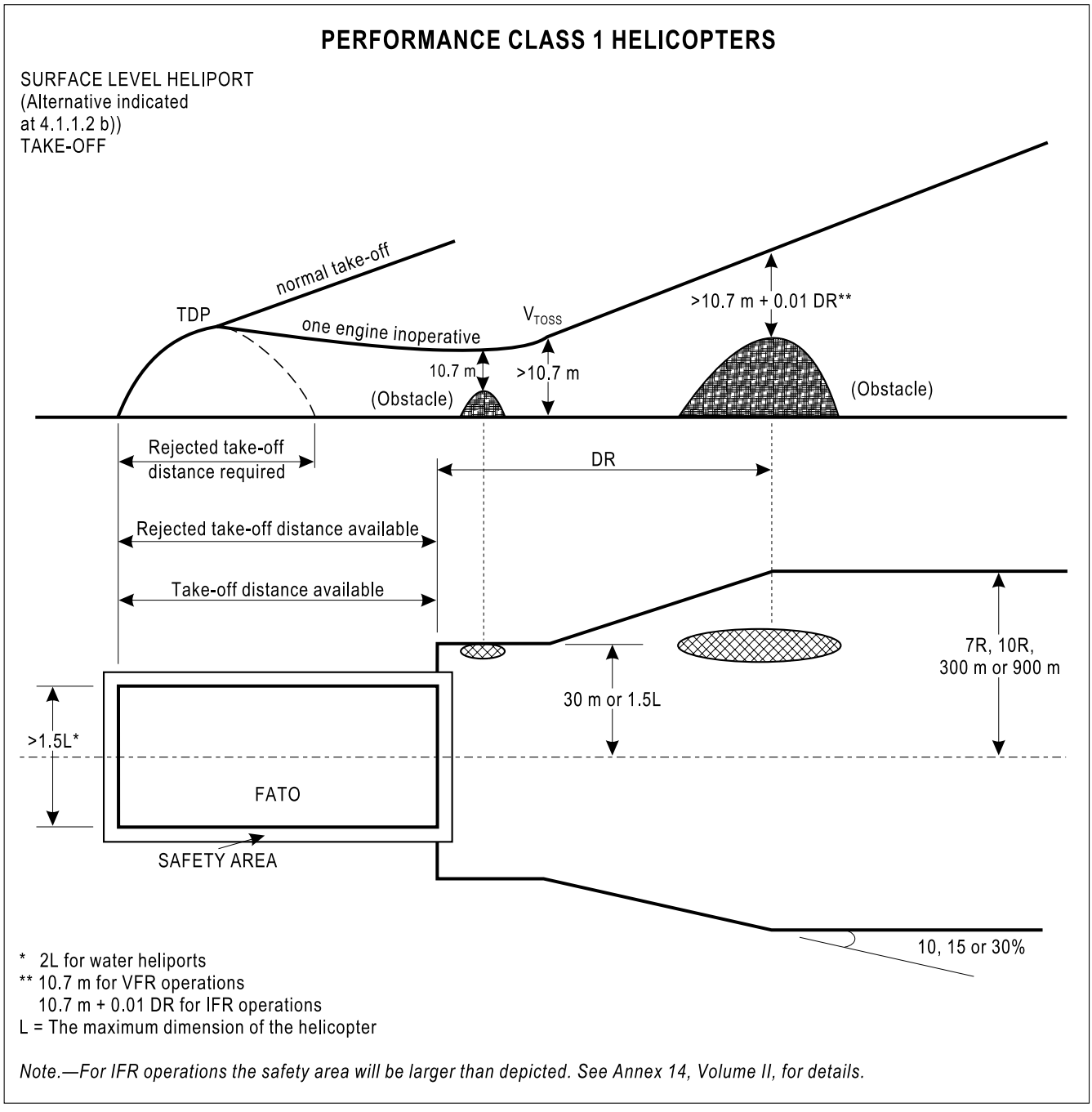

PERFORMANCE CLASS 1 HELICOPTERS
SURFACE LEVEL HELIPORT
(Alternative indicated
at 4.1.1.2 b))
TAKE-OFF
normal take-off
TDP
one engine inoperative
V_{TOSS}
>10.7 m + 0.01 DR**
10.7 m
>10.7 m
(Obstacle)
(Obstacle)
Rejected take-off
distance required
DR
Rejected take-off distance available
Take-off distance available
7R, 10R,
300 m or 900 m
30 m or 1.5L
>1.5L*
FATO
SAFETY AREA
10, 15 or 30%
* 2L for water heliports
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
L = The maximum dimension of the helicopter
Note.—For IFR operations the safety area will be larger than depicted. See Annex 14, Volume II, for details.

Figure A-2

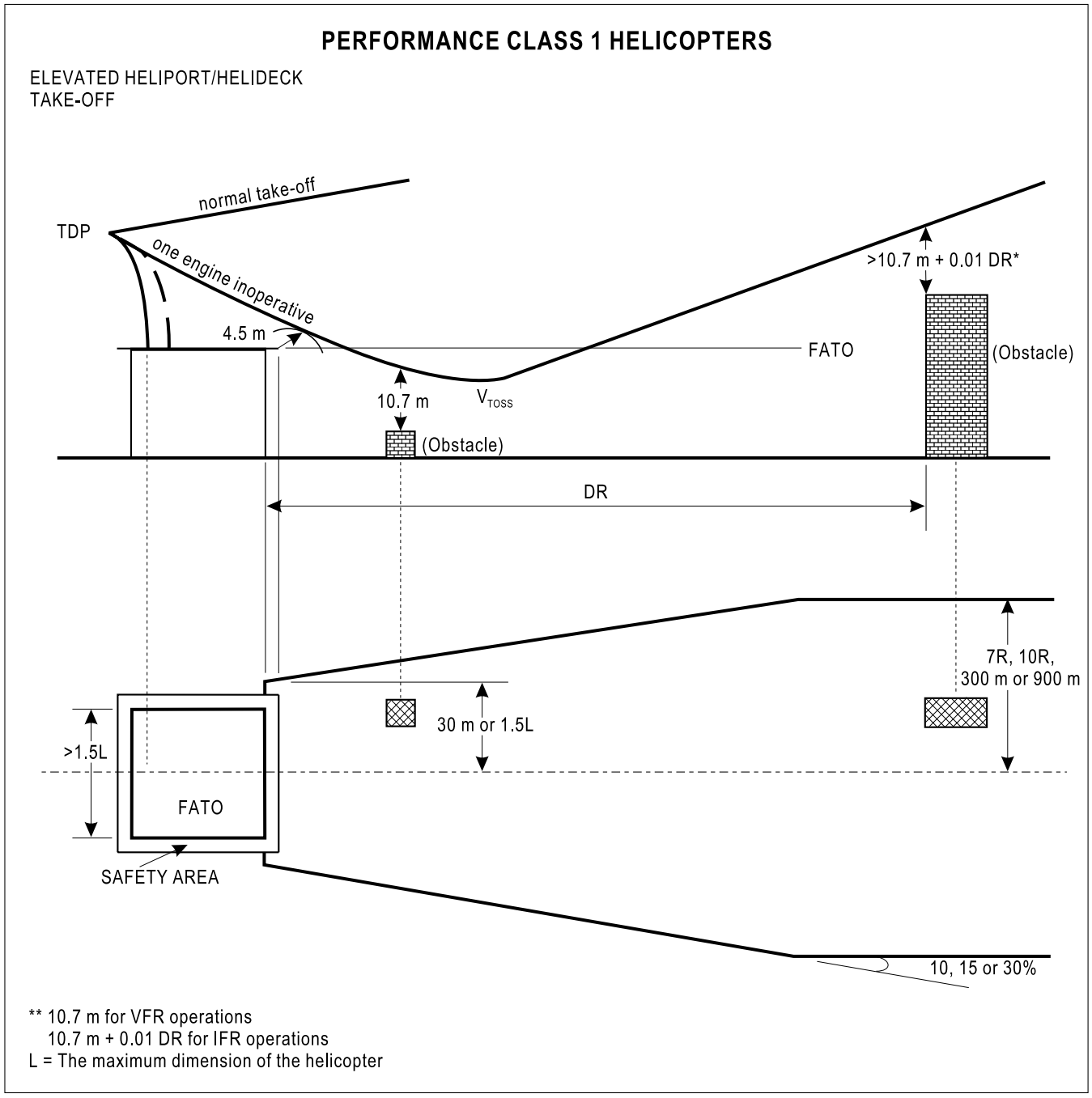
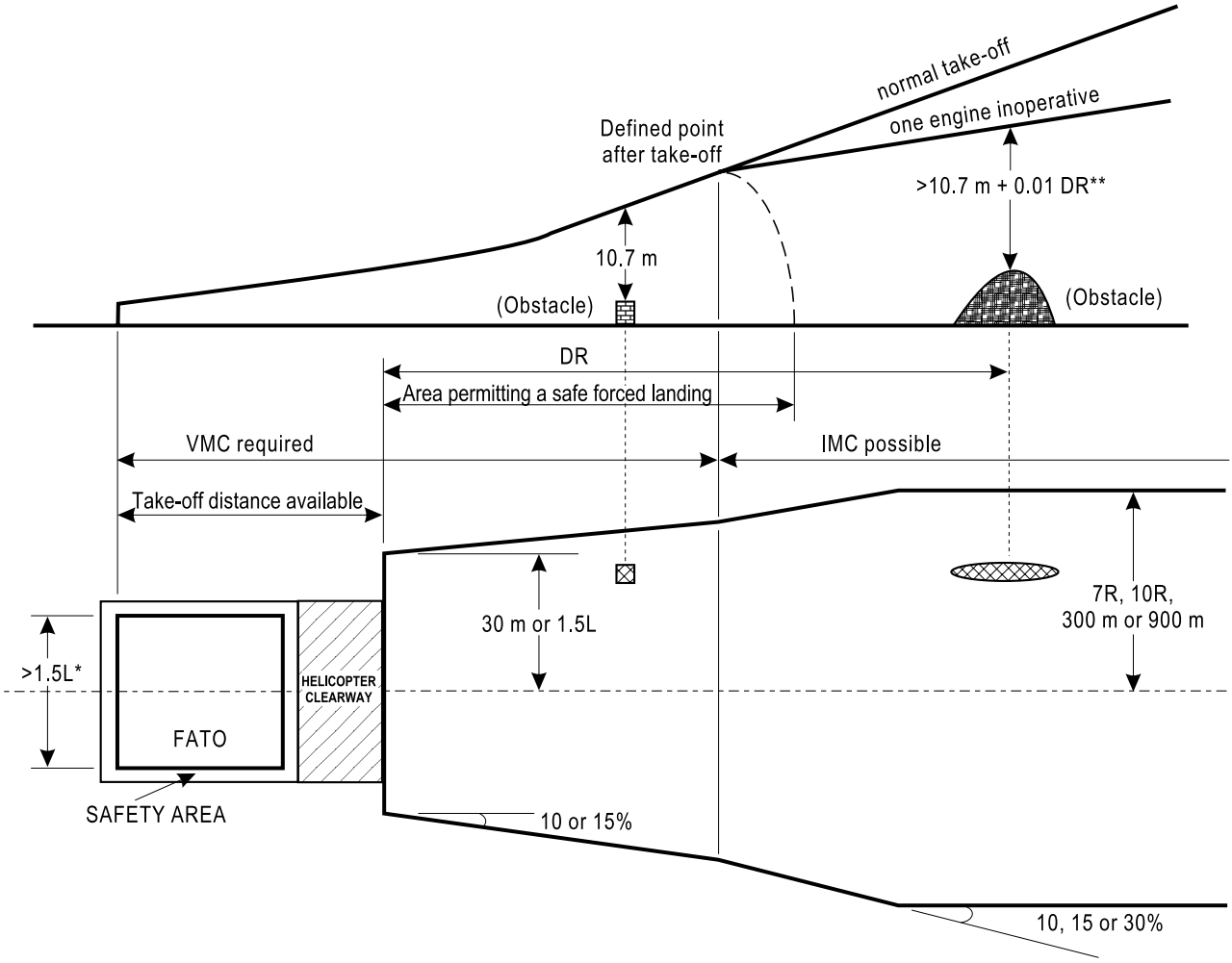

PERFORMANCE CLASS 1 HELICOPTERS
ELEVATED HELIPORT/HELIDECK
TAKE-OFF
normal take-off
TDP
one engine inoperative
4.5 m
FATO
>10.7 m + 0.01 DR*
(Obstacle)
10.7 m
V_{TOSS}
(Obstacle)
DR
7R, 10R,
300 m or 900 m
30 m or 1.5L
>1.5L
FATO
SAFETY AREA
10, 15 or 30%
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
L = The maximum dimension of the helicopter

Figure A-3

PERFORMANCE CLASS 2 HELICOPTERS

SURFACE LEVEL HELIPORT
TAKE-OFF



* 2L for water heliports
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
L = The maximum dimension of the helicopter

Note.—For IFR operations the safety area will be larger than depicted. See Annex 14, Volume II, for details.

Figure A-4

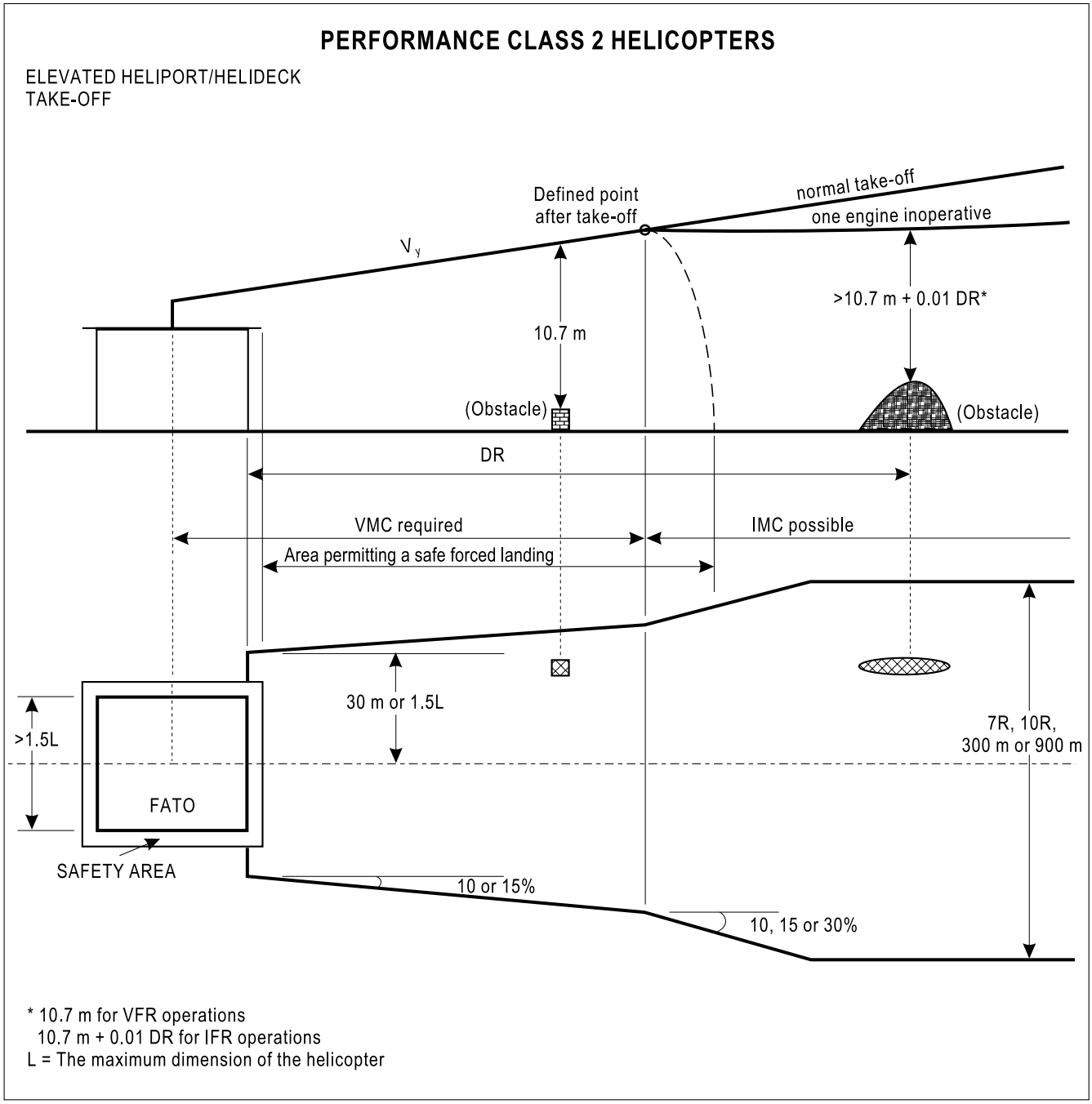

PERFORMANCE CLASS 2 HELICOPTERS
ELEVATED HELIPORT/HELIDECK
TAKE-OFF
Defined point
after take-off
normal take-off
one engine inoperative
V_y
10.7 m
>10.7 m + 0.01 DR*
(Obstacle)
(Obstacle)
DR
VMC required
IMC possible
Area permitting a safe forced landing
30 m or 1.5L
>1.5L
7R, 10R,
300 m or 900 m
FATO
SAFETY AREA
10 or 15%
10, 15 or 30%
* 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
L = The maximum dimension of the helicopter

Figure A-5

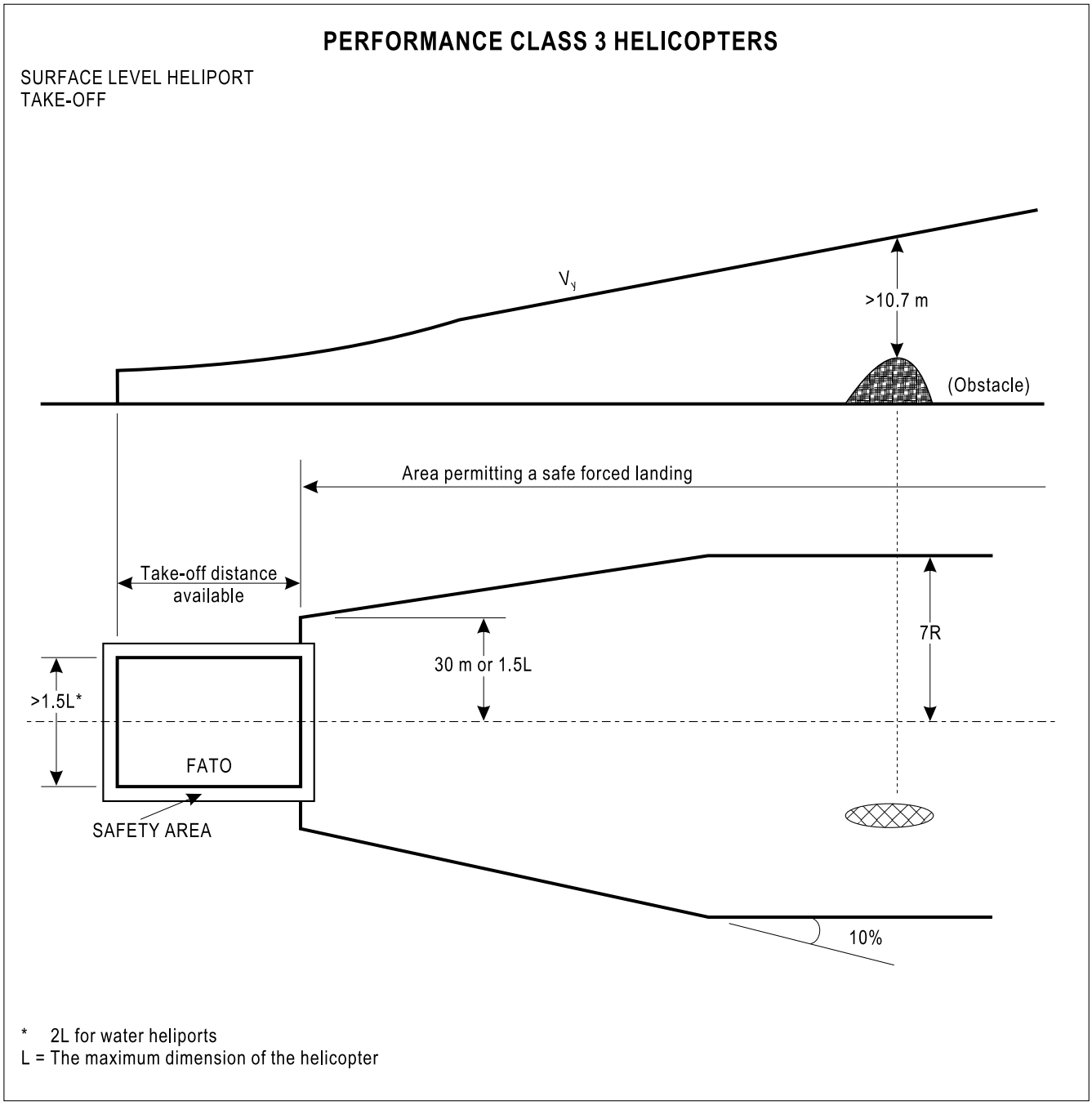

PERFORMANCE CLASS 3 HELICOPTERS
SURFACE LEVEL HELIPORT
TAKE-OFF
V_y
>10.7 m
(Obstacle)
Area permitting a safe forced landing
Take-off distance available
30 m or 1.5L
7R
>1.5L*
FATO
SAFETY AREA
10%
* 2L for water heliports
L = The maximum dimension of the helicopter

Figure A-6

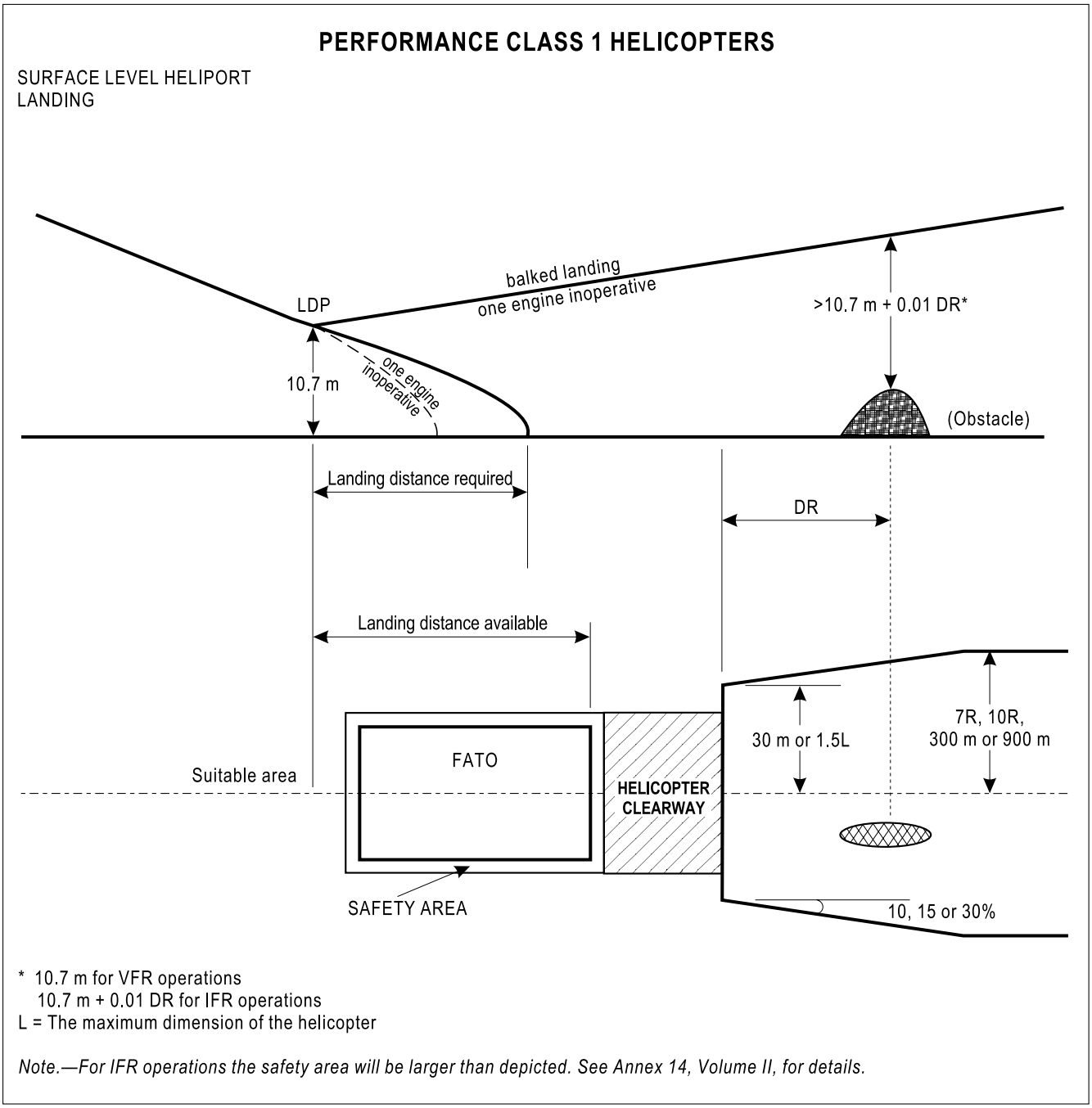

PERFORMANCE CLASS 1 HELICOPTERS
SURFACE LEVEL HELIPORT
LANDING
balked landing
one engine inoperative
LDP
>10.7 m + 0.01 DR*
10.7 m
one engine inoperative
(Obstacle)
Landing distance required
DR
Landing distance available
30 m or 1.5L
7R, 10R,
300 m or 900 m
FATO
Suitable area
HELICOPTER CLEARWAY
SAFETY AREA
10, 15 or 30%
* 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
L = The maximum dimension of the helicopter
Note.—For IFR operations the safety area will be larger than depicted. See Annex 14, Volume II, for details.

Figure A-7

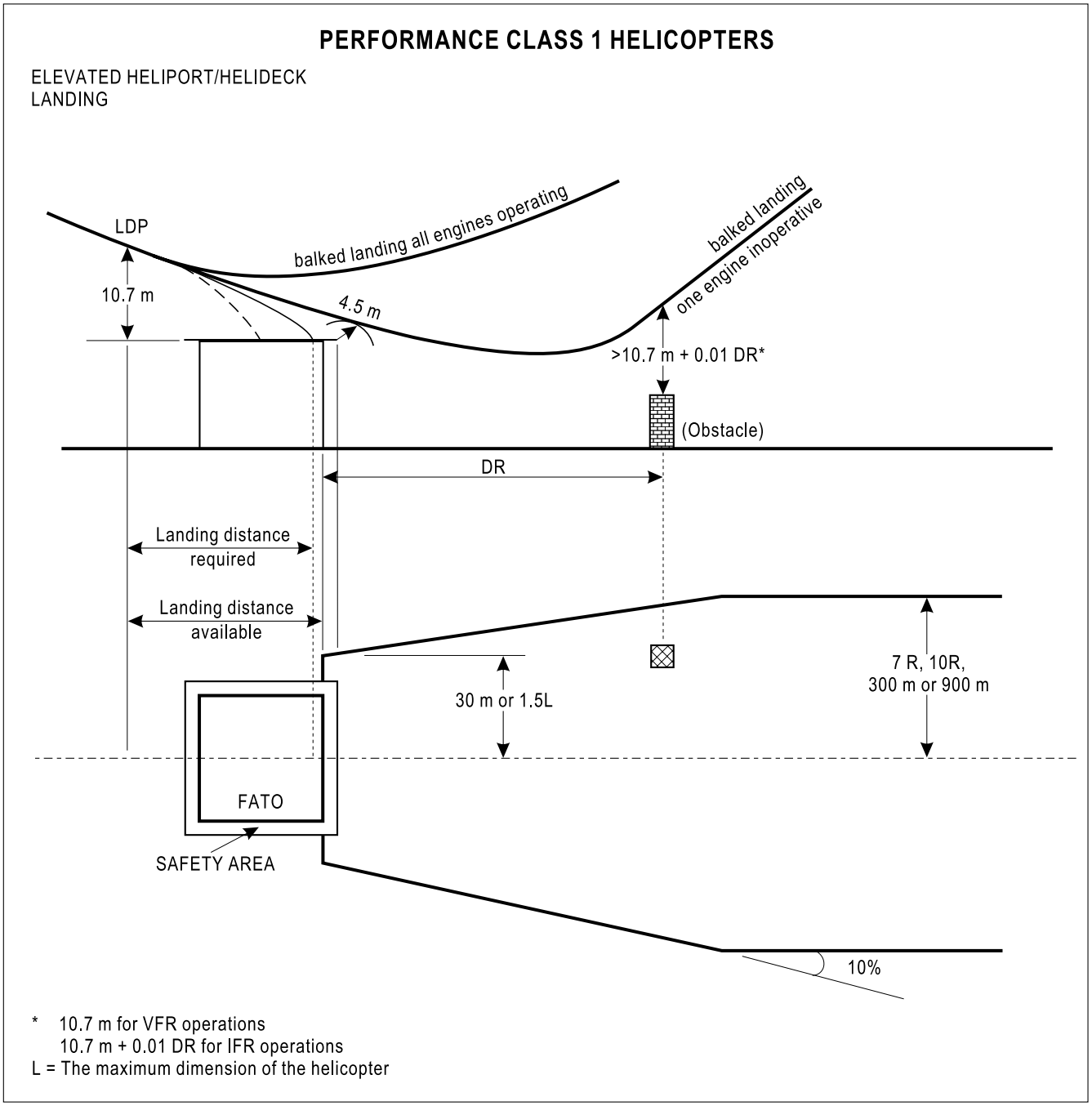

PERFORMANCE CLASS 1 HELICOPTERS
ELEVATED HELIPORT/HELIDECK
LANDING
LDP
balked landing all engines operating
balked landing
one engine inoperative
10.7 m
4.5 m
>10.7 m + 0.01 DR*
(Obstacle)
DR
Landing distance
required
Landing distance
available
30 m or 1.5L
7 R, 10R,
300 m or 900 m
FATO
SAFETY AREA
10%
* 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
L = The maximum dimension of the helicopter

Figure A-8

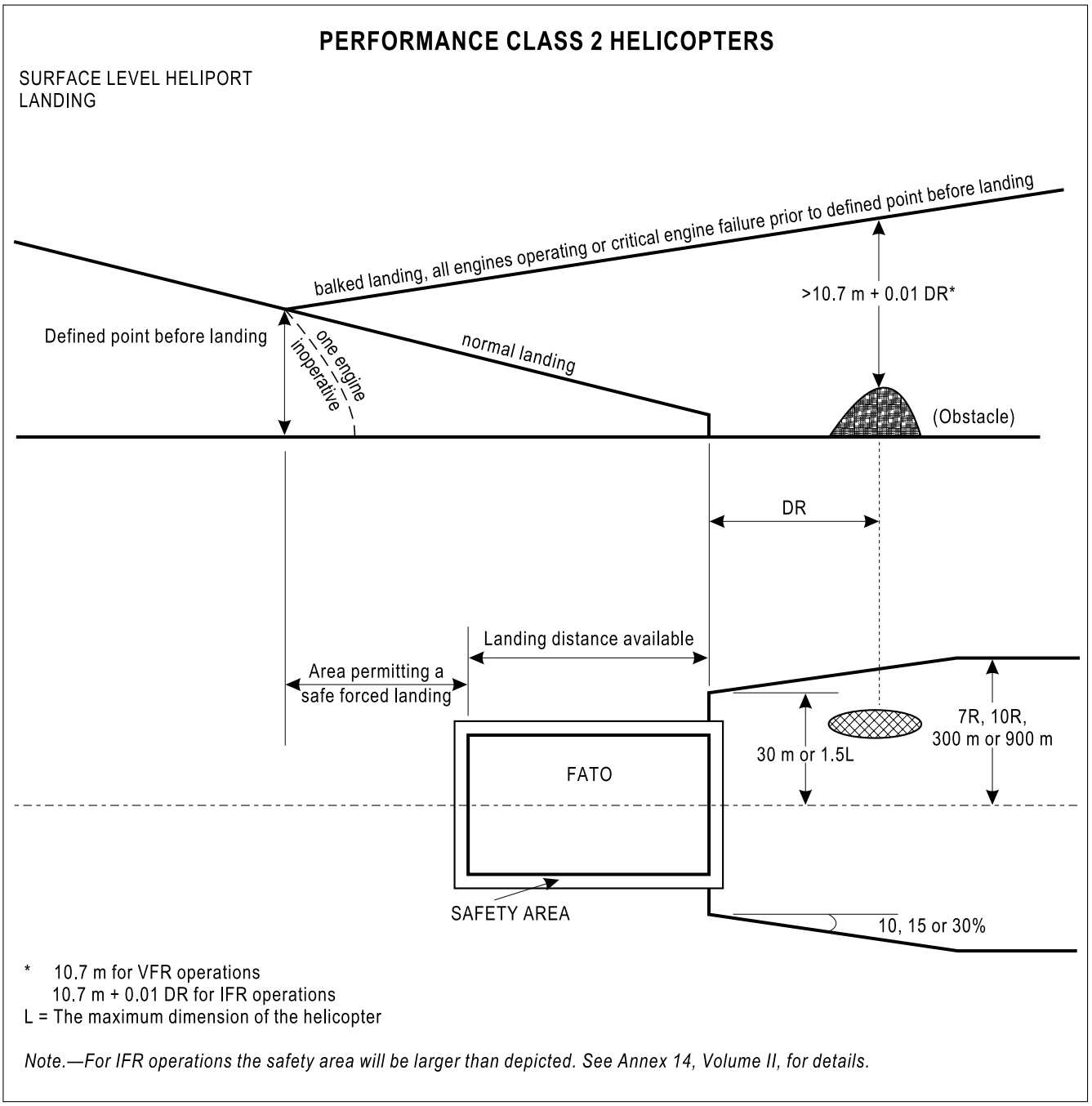

PERFORMANCE CLASS 2 HELICOPTERS
SURFACE LEVEL HELIPORT
LANDING
balked landing, all engines operating or critical engine failure prior to defined point before landing
>10.7 m + 0.01 DR*
Defined point before landing
one engine inoperative
normal landing
(Obstacle)
DR
Landing distance available
Area permitting a safe forced landing
7R, 10R, 300 m or 900 m
30 m or 1.5L
FATO
SAFETY AREA
10, 15 or 30%
* 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
L = The maximum dimension of the helicopter
Note.—For IFR operations the safety area will be larger than depicted. See Annex 14, Volume II, for details.

Figure A-9

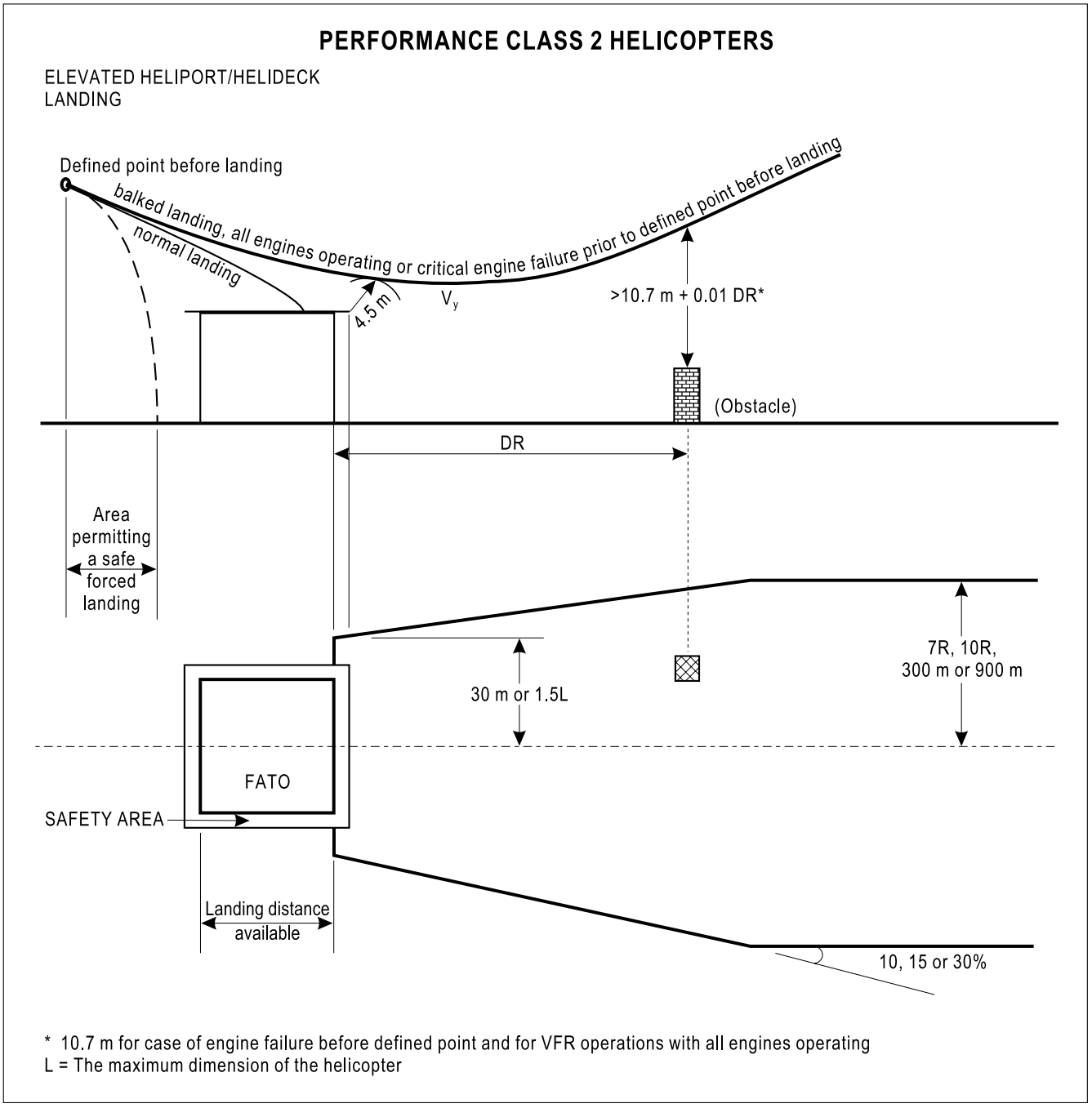

PERFORMANCE CLASS 2 HELICOPTERS
ELEVATED HELIPORT/HELIDECK
LANDING
Defined point before landing
balked landing, all engines operating or critical engine failure prior to defined point before landing
normal landing
4.5 m
V_y
>10.7 m + 0.01 DR*
(Obstacle)
DR
Area permitting a safe forced landing
30 m or 1.5L
7R, 10R, 300 m or 900 m
FATO
SAFETY AREA
Landing distance available
10, 15 or 30%
* 10.7 m for case of engine failure before defined point and for VFR operations with all engines operating
L = The maximum dimension of the helicopter

Figure A-10

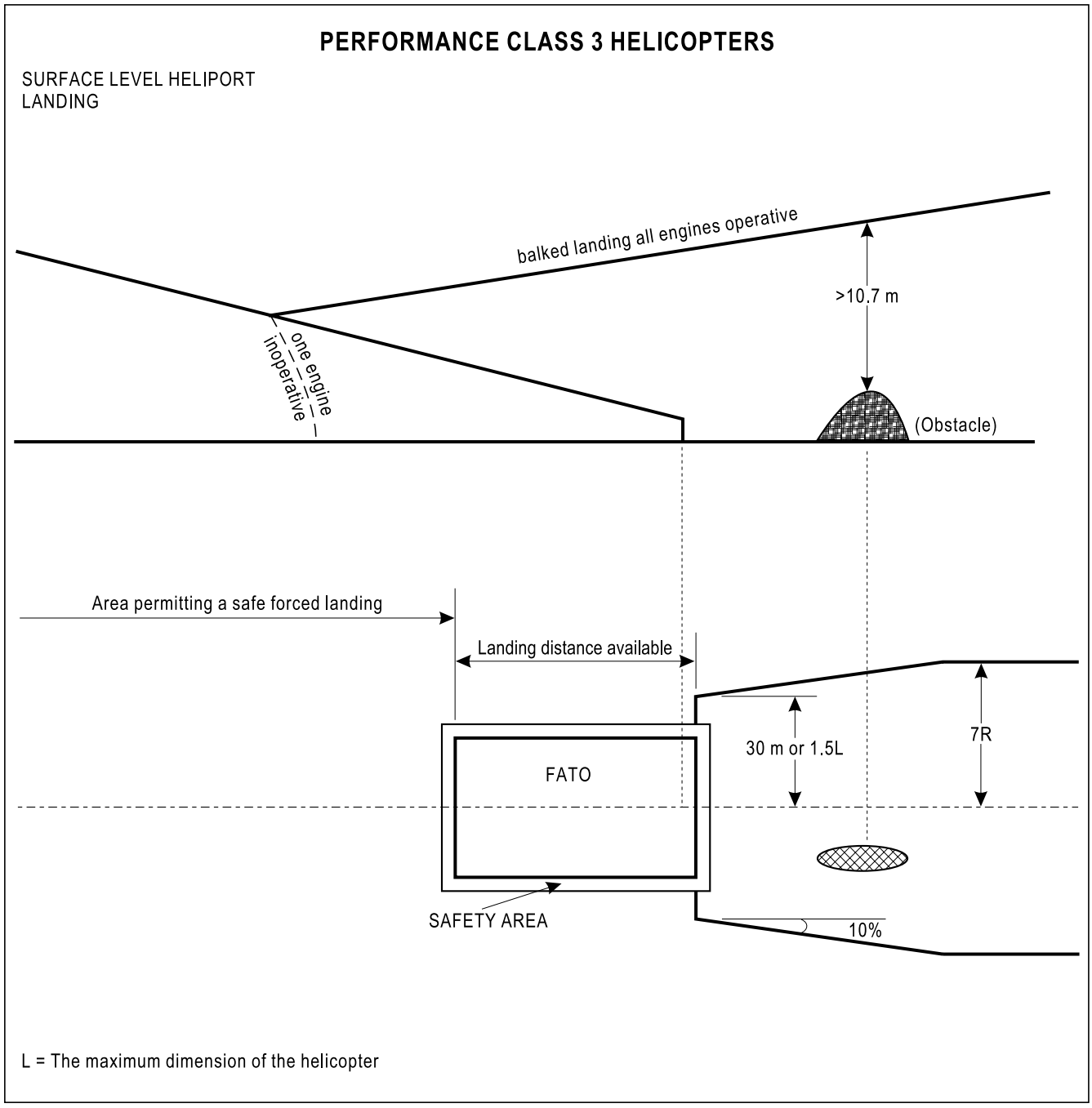

PERFORMANCE CLASS 3 HELICOPTERS
SURFACE LEVEL HELIPORT
LANDING
balked landing all engines operative
>10.7 m
one engine inoperative
(Obstacle)
Area permitting a safe forced landing
Landing distance available
30 m or 1.5L
7R
FATO
SAFETY AREA
10%
L = The maximum dimension of the helicopter

Figure A-11

ATTACHMENT B. FLIGHT RECORDERS

Supplementary to Section II, Chapter 4, 4.3 and Section III, Chapter 4, 4.9

Introduction

The material in this Attachment concerns flight recorders intended for installation in helicopters engaged in international air navigation. Flight recorders comprise two systems — a flight data recorder and a cockpit voice recorder. Flight data recorders for helicopters are classified as Type IV and Type V depending upon the number of parameters to be recorded.

1. Flight data recorder (FDR)

1.1 General requirements

1.1.1 The FDR is to record continuously during flight time.

1.1.2 The FDR container is to:

a) be painted a distinctive orange or yellow colour;

b) carry reflective material to facilitate its location; and

c) have securely attached an automatically activated underwater locating device.

1.1.3 The FDR is to be installed so that:

a) the probability of damage to the recording is minimized;

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

c) there is an aural or visual means for pre-flight checking that the FDR is operating properly.

1.2 Parameters to be recorded

1.2.1 *Type IV FDR.* This FDR will be capable of recording, as appropriate to the helicopter, at least the thirty parameters in Table B-1. However, other parameters may be substituted with due regard to the helicopter type and the characteristics of the recording equipment.

1.2.2 *Type V FDR.* This FDR will be capable of recording, as appropriate to the helicopter, at least the first fifteen parameters in Table B-1. However, other parameters may be substituted with due regard to the helicopter type and the characteristics of the recording equipment.

1.3 Additional information

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

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

a) manufacturer's operating instructions, equipment limitations and installation procedures;

b) parameter origin or source and equations which relate counts to units of measurement; and

c) manufacturer's test reports.

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

2. Cockpit voice recorder (CVR)

2.1 General requirements

2.1.1 The CVR is to be designed so that it will record at least the following:

a) voice communication transmitted from or received in the 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;

d) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker;

e) voice communication of flight crew members using the passenger address system, if installed; and

f) digital communications with ATS, unless recorded by the FDR.

2.1.2 The CVR container is to:

a) be painted a distinctive orange or yellow colour;

b) carry reflective material to facilitate its location; and

c) have securely attached an automatically activated underwater locating device.

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

2.1.4 The CVR is to be installed so that:

a) the probability of damage to the recording is minimized;

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

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

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

2.2 Performance requirements

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

2.2.2 The preferred track allocation is as follows:

Track 1 — co-pilot headphones and live boom microphone

Track 2 — pilot headphones and live boom microphone

Track 3 — area microphone

Track 4 — time reference, main rotor speed or the flight deck vibration environment, the third and fourth crew member's headphone and live microphone, if applicable.

Note 1.— Track 1 is located closest to the base of the recording head.

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

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

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

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

2.3 Additional information

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

a) manufacturer's operating instructions, equipment limitations and installation procedures; and

b) manufacturer's test reports.

3. Inspections of FDR and CVR systems

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

3.2 Annual inspections should be carried out as follows:

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

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

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

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

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

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

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

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

3.5 Calibration of the FDR system:

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

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

Table B-1
Helicopters — Parameters for Flight Data Recorders

Serial number	Parameter	Measurement range	Recording interval (seconds)	Accuracy limits (sensor input compared to FDR read-out)
1	Time (UTC when available, otherwise elapsed time)	24 hours	4	±0.125% per hour
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)
3	Indicated airspeed	As the installed measuring system	1	±3%
4	Heading	360°	1	±2°
5	Normal acceleration	–3 g to +6 g	0.125	±1%
6	Pitch attitude	±75°	0.5	±2°
7	Roll attitude	±180°	0.5	±2°
8	Radio transmission keying	On-off (one discrete)	1	
9	Power on each engine *(Note 1)*	Full range	1 (per engine)	±2%
10	Main rotor speed	50-130%	0.5	±2%
11	Pilot input and/or control surface position-primary controls (Collective pitch, longitudinal cyclic pitch, lateral cyclic pitch, tail rotor pedal) (*Note 2)*	Full range	1	±2% unless higher accuracy uniquely required.
12	Hydraulics, each system (low pressure)	Discrete	2	
13	Outside air temperature	Sensor range	2	±2°C
14	Autopilot/auto throttle/AFCS mode and engagement status	A suitable combination of discretes	1	
15	Stability augmentation system engagement	Discrete	1	

Note.— The preceding 15 parameters satisfy the requirements for a Type V FDR.

16	Main gearbox oil pressure	As installed	1	As installed
17	Main gearbox oil temperature	As installed	2	As installed
18	Yaw acceleration (or yaw rate)	±1 g	0.25	±1.5% max range excluding datum error of ±5%
19	Sling load force	0-200% of certified load	0.5	±3% of max range

Serial number	Parameter	Measurement range	Recording interval (seconds)	Accuracy limits (sensor input compared to FDR read-out)
20	Longitudinal acceleration	±1 g	0.25	±1.5% max range excluding datum error of ±5%
21	Lateral acceleration	±1 g	0.25	±1.5% max range excluding datum error of ±5%
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)
23	Glide path deviation	Signal range	1	±3%
24	Localizer deviation	Signal range	1	±3%
25	Marker beacon passage	Discrete	1	
26	Master warning	Discrete	1	
27	NAV 1 and 2 frequency selection *(Note 3)*	Full range	4	As installed
28	DME 1 and 2 distance *(Notes 3 and 4)*	0-370 km	4	As installed
29	Navigation data (latitude/longitude, ground speed) *(Note 5)*	As installed	2	As installed
30	Landing gear or gear selector position	Discrete	4	As installed

Note.— The preceding 30 parameters satisfy the requirements for a Type IV FDR.

Notes.—

1. Record sufficient inputs to determine power.
2. For helicopters with conventional control systems ‘‘or’’ applies. For helicopters with non-mechanical control systems ‘‘and’’ applies.
3. If signal available in digital form.
4. Recording of latitude and longitude from INS or other navigation system is a preferred alternative.
5. If signals readily available.

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

a) operational information from electronic display systems, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS).

Use the following order of priority:

1) parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and autoflight system engagement and mode indications if not recorded from another source;

2) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY, etc.;

3) warnings and alerts data; and

4) the identity of displayed pages for emergency procedures and checklists; and

b) additional engine parameters (EPR, N1, EGT, fuel flow, etc.).

ATTACHMENT C. FLIGHT TIME AND FLIGHT DUTY PERIOD LIMITATIONS

Supplementary to Section II, Chapter 2, 2.2.9.3

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 this Part 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) especially sleep deprivation arising from interruption of the normal sleep/wake cycle; and

i) 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

For example, the following pro forma table is provided to illustrate one of many forms in which the Standard at Section II, 2.2.9.3, may be implemented.

Crew	*Maximum flight duty period in 24 hours*	*Maximum flight time (hours)*				*Rest periods*	
		Daily 24 hours	*Monthly*	*Quarterly*	*Annually*	*Daily*	*Per week*
Pilot-in-command 1st Officer							

ATTACHMENT D. MEDICAL SUPPLIES

Supplementary to Section II, Chapter 4, 4.2.2 a)

The following is suggested as being typical contents of a first-aid kit for carriage aboard a helicopter:

— a handbook on first aid
— "ground-air visual signal code for use by survivors" as contained in Annex 12
— materials for treating injuries
— ophthalmic ointment
— a decongestant nasal spray
— insect repellent
— emollient eye drops
— sunburn cream
— water-miscible antiseptic/skin cleanser
— materials for treatment of extensive burns
— oral drugs as follows:
analgesic, antispasmodic, central nervous system stimulant, circulatory stimulant, coronary vasodilator, antidiarrhoeic and motion sickness medications.
— an artificial plastic airway and splints.

ATTACHMENT E. MINIMUM EQUIPMENT LIST (MEL)

Supplementary to Section II, Chapter 4, 4.1.2

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 F. AIR OPERATOR CERTIFICATE OR EQUIVALENT DOCUMENT

Supplementary to Section II, Chapter 2, 2.2.1

1. The State of the Operator regulations and rules for the operational certification of operators and the conduct of subsequent commercial air transport operations should be in conformity with the Annexes to the Convention on International Civil Aviation and have sufficient detail to ensure that compliance will result in the desired level of safety.

2. The State of the Operator regulations should provide a framework of positive control and guidance but also allow the operator sufficient flexibility to develop and update instructions for the detailed guidance of personnel essential to the conduct of operations.

3. The State of the Operator regulations should require the operator to submit detailed information on the organization, method of control and supervision of flight operations, training programme and maintenance arrangements as a basis for operational certification. As required by this part, the operator's material should be submitted in the form of an operations manual (see Appendix) and a maintenance manual containing at least the material specified in Section II, 9.2 and 9.3 and such other material as the State may require.

4. The State of the Operator, in addition to assessing the operator's ability and competence, should guide the operator in regulatory, organizational and procedural matters. The State of the Operator should be satisfied concerning the operator's eligibility for operational certification. This includes the ability and competence to conduct safe and efficient operations and proof of compliance with applicable regulations.

5. Continuing surveillance by the State of the Operator of an air operator certificate holder's operations is inherent in the system of certification and is an essential part of the State's responsibility to ensure that the required standards of operations are maintained in order to provide a safe and reliable commercial air transportation service to the public. Adequate authority for certification and continuing surveillance of an air operator certificate holder's operations should be contained in the provisions of the basic aviation law of the State.

Note 1.— Guidance on the operations manual is given in the manual Preparation of an Operations Manual *(Doc 9376).*

Note 2.— Guidance on the certification and continued surveillance of the operator is given in the Manual of Procedures for Operations Inspection, Certification and Continued Surveillance *(Doc 8335).*

ATTACHMENT G. FLIGHT SAFETY DOCUMENTS SYSTEM

Supplementary to Section II, Chapter 1, 1.1.8

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, 1.1.8. The guidelines are based not only upon scientific research, but also upon current best industry 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.

— END —

30/9/02

Transmittal Note

SUPPLEMENT TO

ANNEX 6 — OPERATION OF AIRCRAFT

Part III — International Operations — Helicopters

(Fifth Edition)

1. The attached Supplement supersedes all previous Supplements to Annex 6, Part III and includes differences notified by Contracting States up to 30 September 2002 with respect to all amendments up to and including Amendment 8.

2. This Supplement should be inserted at the end of Annex 6, Part III (Fifth Edition). Additional differences received from Contracting States will be issued at intervals as amendments to this Supplement.

SUPPLEMENT TO
ANNEX 6 — OPERATION OF AIRCRAFT

Part III — International Operations — Helicopters

(Fifth Edition)

Differences between the national regulations and practices of Contracting States and the corresponding International Standards and Recommended Practices contained in Annex 6, Part III, as notified to ICAO in accordance with Article 38 of the *Convention on International Civil Aviation* and the Council's resolution of 21 November 1950.

SEPTEMBER 2002

INTERNATIONAL CIVIL AVIATION ORGANIZATION

RECORD OF AMENDMENTS TO SUPPLEMENT

No.	*Date*	*Entered by*

No.	*Date*	*Entered by*

AMENDMENTS TO ANNEX 6 , PART III, ADOPTED OR APPROVED BY THE COUNCIL SUBSEQUENT TO THE FIFTH EDITION ISSUED JULY 2001

No.	*Date of adoption or approval*	*Date applicable*

No.	*Date of adoption or approval*	*Date applicable*

1. Contracting States which have notified ICAO of differences

The Contracting States listed below have notified ICAO of differences which exist between their national regulations and practices and the International Standards and Recommended Practices of Annex 6, Part III (Fifth Edition), up to and including Amendment 8, or have commented on implementation.

The page numbers shown for each State and the dates of publication of those pages correspond to the actual pages in this Supplement.

State	*Date of notification*	*Pages in Supplement*	*Date of publication*
Argentina	29/11/01	2	30/9/02
Australia	16/8/02	5	30/9/02
Czech Republic	31/7/01	1	30/9/02
Denmark	24/9/01	2	30/9/02
Finland	28/9/01	2	30/9/02
France	15/10/01	6	30/9/02
Georgia	16/11/01	2	30/9/02
Germany	17/9/01	1	30/9/02
India	25/10/01	1	30/9/02
New Zealand	4/9/01	7	30/9/02
Norway	16/10/01	1	30/9/02
Papua New Guinea	15/1/02	4	30/9/02
Romania	15/10/01	1	30/9/02
Slovakia	23/11/01	1	30/9/02
South Africa	13/11/01	2	30/9/02
Sweden	21/9/01	3	30/9/02
United Kingdom	30/10/01	6	30/9/02
United States	7/9/01	9	30/9/02

2. Contracting States which have notified ICAO that no differences exist

State	*Date of notification*	*State*	*Date of notification*
Bahrain	21/7/01	Jordan	13/6/01
Barbados	1/6/01	Lebanon	18/9/01
Bolivia	30/7/01	Netherlands	29/6/01
Burundi	13/8/01	Pakistan	25/9/01
China	28/8/01	Portugal	15/10/01
China (Hong Kong SAR)	28/9/01	Republic of Moldova	24/9/01
Colombia	12/2/02	Singapore	21/11/01
Egypt	6/4/01	The former Yugoslav Republic of Macedonia	29/6/01
Eritrea	11/5/01		
Ghana	4/10/01	United Arab Emirates	19/8/01

3. Contracting States from which no information has been received

Afghanistan
Albania
Algeria
Andorra
Angola
Antigua and Barbuda
Armenia
Austria
Azerbaijan
Bahamas
Bangladesh
Belarus
Belgium
Belize
Benin
Bhutan
Bosnia and Herzegovina
Botswana
Brazil
Brunei Darussalam
Bulgaria
Burkina Faso
Cambodia
Cameroon
Canada
Cape Verde
Central African Republic
Chad
Chile
Comoros
Congo
Cook Islands
Costa Rica
Côte d'Ivoire
Croatia
Cuba
Cyprus
Democratic People's Republic of Korea
Democratic Republic of the Congo
Djibouti
Dominican Republic
Ecuador
El Salvador
Equatorial Guinea
Estonia
Ethiopia
Fiji
Gabon
Gambia
Greece
Grenada
Guatemala
Guinea
Guinea-Bissau
Guyana
Haiti
Honduras
Hungary
Iceland
Indonesia
Iran (Islamic Republic of)
Iraq
Ireland
Israel
Italy
Jamaica
Japan
Kazakhstan
Kenya
Kiribati
Kuwait
Kyrgyzstan
Lao People's Democratic Republic
Latvia
Lesotho
Liberia
Libyan Arab Jamahiriya
Lithuania
Luxembourg
Madagascar
Malawi
Malaysia
Maldives
Mali
Malta
Marshall Islands
Mauritania
Mauritius
Mexico
Micronesia (Federated States of)
Monaco
Mongolia
Morocco
Mozambique
Myanmar
Namibia
Nauru
Nepal
Nicaragua
Niger
Nigeria
Oman
Palau
Panama
Paraguay
Peru
Philippines
Poland
Qatar
Republic of Korea
Russian Federation
Rwanda
Saint Kitts and Nevis
Saint Lucia
Saint Vincent and the Grenadines
Samoa
San Marino
Sao Tome and Principe
Saudi Arabia
Senegal
Seychelles
Sierra Leone
Slovenia
Solomon Islands
Somalia
Spain
Sri Lanka
Sudan
Suriname
Swaziland
Switzerland
Syrian Arab Republic
Tajikistan
Thailand
Togo
Tonga
Trinidad and Tobago
Tunisia
Turkey
Turkmenistan
Uganda
Ukraine
United Republic of Tanzania
Uruguay
Uzbekistan
Vanuatu
Venezuela
Viet Nam
Yemen
Yugoslavia
Zambia
Zimbabwe

4. Paragraphs with respect to which differences have been notified

Paragraph	*Differences notified by*
General	Germany
SECTION I	
General	United Kingdom
	United States
Chapter 1 — Definitions	Argentina
	Denmark
	Finland
	New Zealand
	Slovakia
	United Kingdom
Chapter 2	Czech Republic
SECTION II	
General	United Kingdom
Chapter 1	
General	United States
1.1.3	Papua New Guinea
1.1.5	New Zealand
	United States
1.1.6	Papua New Guinea
	United Kingdom
	United States
Chapter 2	
2.1.2	South Africa
	United Kingdom
2.1.3	Papua New Guinea
	South Africa
	United States
2.2.2.1	United States
2.2.3.2	New Zealand
	Norway
	Sweden
	United Kingdom
	United States
2.2.4	New Zealand
	Papua New Guinea
	South Africa
	United States
2.2.5	Denmark
	Finland
	New Zealand
	United Kingdom
2.2.6	New Zealand
2.2.6.2	Australia
2.2.6.4	South Africa
2.2.7	Papua New Guinea
2.2.7.1	Georgia
	New Zealand
2.2.7.2	Georgia
2.2.7.3	Georgia
2.2.7.4	Papua New Guinea
	United Kingdom
2.2.8.1	France
	United States
2.2.8.2	Papua New Guinea
	United States
2.2.9.2	Australia
2.2.11	Australia
	Denmark
	Finland
	New Zealand
	Norway
	Papua New Guinea
	Sweden
	United Kingdom
	United States
2.3.1	New Zealand
2.3.2	United States
2.3.3.1	Australia
	Denmark
	Finland
	France
2.3.3.2	Australia
	United States
2.3.4.1	New Zealand
	United States
2.3.4.2	Australia
	Georgia
	New Zealand
	Papua New Guinea
	South Africa
	Sweden
	United Kingdom
	United States
2.3.4.3	Australia
	Georgia
	New Zealand

	Norway
	Papua New Guinea
	South Africa
	United Kingdom
	United States
2.3.5.4	Papua New Guinea
2.3.6.2	Denmark
	Finland
	France
	New Zealand
	Norway
	Sweden
	United States
2.3.6.3	Australia
	Papua New Guinea
2.3.6.3.1	United States
2.3.6.3.2	Norway
	United States
2.3.6.3.3	New Zealand
	United States
2.3.6.4	France
	United States
2.3.7	France
	Georgia
	Papua New Guinea
	United States
2.3.8	Sweden
	United States
2.3.8.1	Georgia
2.3.8.2	Denmark
	Finland
	Georgia
	Sweden
2.4.3	New Zealand
	Papua New Guinea
2.4.4	New Zealand
2.4.4.3	Papua New Guinea
2.4.4.4	United States
2.4.5	Sweden
2.4.6	Georgia
	Sweden
2.4.7	Denmark
	Finland
	Papua New Guinea
	United Kingdom
2.4.9	Australia
	France
	Papua New Guinea
2.5.1	Denmark
	Finland
	United Kingdom
2.5.2	France
2.5.5	Australia
2.6	New Zealand
	Norway
	South Africa
	United States
2.6.1	Denmark
	Finland
	Georgia
	Sweden
	United Kingdom
2.6.2	Denmark
	Finland
	Georgia
	Sweden
	United Kingdom
Chapter 3	
3.1	Norway
3.1.1	Australia
	Papua New Guinea
	Sweden
	United States
3.1.2	Australia
	France
	New Zealand
	Norway
	Papua New Guinea
	Sweden
	United States
3.1.3	Australia
	New Zealand
	Papua New Guinea
	South Africa
	Sweden
	United States
3.1.4	Australia
	France
	Georgia
	New Zealand
	Papua New Guinea
	Sweden
	United States
3.1.5	Australia
	France
	Georgia
	New Zealand
	Papua New Guinea
	Sweden
	United Kingdom
	United States
3.2.1	Papua New Guinea
	South Africa
	United States

3.2.2	Papua New Guinea
	South Africa
3.2.7	Australia
	United States
3.2.7.1	New Zealand
3.2.7.1.1	Papua New Guinea
3.2.7.1.2	France
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	Sweden
3.2.7.1.3	France
	Papua New Guinea
3.2.7.2	New Zealand
3.2.7.2.1	France
	Papua New Guinea
3.2.7.2.2	Papua New Guinea
3.2.7.3	New Zealand
3.2.7.3.1	Papua New Guinea
3.2.7.3.2	France
	Papua New Guinea
	Sweden
3.2.7.3.3	France
	Papua New Guinea
3.3.1	Australia
	Papua New Guinea
3.3.2	Australia
	Denmark
	Finland
	France
	New Zealand
	Papua New Guinea

Chapter 4

4.1.2	Denmark
	Finland
	Norway
	Sweden
4.1.3	United States
4.2.2	Australia
	Denmark
	Finland
	France
	New Zealand
	United States
4.2.3	United States
4.2.4	New Zealand
	Sweden
4.2.4.1	Denmark
	Papua New Guinea
4.2.4.2	Papua New Guinea
	Sweden
	United Kingdom
4.3	Denmark
	United States
4.3.1	Denmark
	Finland
4.3.1.1	Australia
4.3.1.2	Australia
	Papua New Guinea
4.3.1.3	Australia
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	France
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4.3.1.5.2	Australia
	France
	United Kingdom
4.3.1.6	Australia
	Georgia
	Papua New Guinea
4.3.1.7	Argentina
	Australia
	France
	United Kingdom
4.3.1.7.1	Argentina
	Australia
	United Kingdom
4.3.1.7.2	Argentina
	Australia
	United Kingdom
4.3.1.7.3	Argentina
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	United Kingdom
4.3.1.7.4	Argentina
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	United Kingdom
4.3.1.7.5	Argentina
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	Finland
	France
	Romania
4.3.3	Finland
	Norway

4.3.3.1	Australia
	Romania
	United States
4.3.3.2	Australia
	France
	Georgia
	United States
4.3.4	France
	New Zealand
4.3.4.1	Argentina
	Australia
	United Kingdom
4.3.5	Georgia
	New Zealand
	Norway
4.3.5.1	Argentina
	Australia
	France
	Romania
	United States
4.3.5.2	Argentina
	Australia
	France
	Papua New Guinea
	United States
4.3.6	Australia
	France
	Georgia
	Norway
	United States
4.3.7.2	Australia
	Georgia
	Papua New Guinea
	United Kingdom
4.3.7.3	Australia
	France
	United Kingdom
4.3.9.1	Finland
	France
4.3.9.2	Australia
4.3.10	Australia
4.4.1	Norway
4.4.2	Australia
	Denmark
	Finland
	France
	Norway
	Papua New Guinea
	Sweden
	United States
4.5.1	Australia
	Georgia
	New Zealand
	Norway
	United States
4.5.2	Australia
4.5.2.1	Georgia
	New Zealand
	United States
4.5.2.2	Georgia
	New Zealand
4.5.2.3	Georgia
	United States
4.5.2.4	Georgia
	New Zealand
	United States
4.5.2.5	Georgia
	Sweden
4.5.2.6	Australia
	Georgia
	India
	New Zealand
	Papua New Guinea
	United States
4.5.2.7	Australia
	Georgia
	New Zealand
	Papua New Guinea
	Sweden
	United States
4.5.2.8	Australia
	Georgia
	New Zealand
	Papua New Guinea
	United States
4.6	Georgia
	New Zealand
	United States
4.7	United States
4.7.1	France
	Georgia
	New Zealand
4.7.2	Australia
	Georgia
4.7.3	Australia
	Georgia
4.7.4	Georgia
4.7.5	Australia
	United Kingdom
4.7.6	Australia
	United Kingdom
4.7.7	Australia
	Georgia
	United Kingdom
4.8.1	Georgia
	Sweden

4.8.2	Georgia
	Sweden
4.8.3	Georgia
	Sweden
4.8.4	Australia
	Georgia
	Sweden
4.10.1	Denmark
	Finland
	France
	Romania
	United Kingdom
	United States
4.10.2	New Zealand
4.11	Sweden
4.11.1	United States
4.11.2	Australia
	New Zealand
	Papua New Guinea
	South Africa
	United States
4.12	Australia
	France
	Georgia
	New Zealand
	Sweden
	United States
4.13	Australia
	Georgia
	New Zealand
	Papua New Guinea
4.14.1	Georgia
4.14.2	Georgia
	New Zealand
4.15	Australia
	Denmark
	Finland
	United Kingdom
	United States
4.16	Australia
	Denmark
	Finland
	France
	New Zealand
	South Africa
	United Kingdom
	United States

Chapter 5

5.1.2	Australia
5.2.1	Norway
	United States
5.2.2	Australia
	Papua New Guinea
5.3	Papua New Guinea

Chapter 6

6.1	United States
6.2.4	Papua New Guinea
	Sweden
	United Kingdom
6.3	Australia
	United Kingdom
	United States
6.3.1	New Zealand
6.4	Papua New Guinea
6.4.2	Argentina
6.6	Papua New Guinea
6.8.2	United States

Chapter 7

7.1.2	United States
7.3	New Zealand
7.4.1	Australia
	Denmark
	Finland
	United States
7.4.2	Australia
	Finland
	New Zealand
	Papua New Guinea
	United States
7.4.3.2	United States
7.4.3.3	New Zealand
	United States
7.4.3.5	France
7.4.4	Finland
	France
	United States
7.5	Georgia
	United States

Chapter 8

General	New Zealand
8.1	South Africa
	United Kingdom
	United States
8.2	Georgia
	United Kingdom
	United States
8.3	United Kingdom

	United States
8.4	Australia
	France
	United Kingdom
	United States
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9.4.1	United States
9.4.2	New Zealand
	United States
9.4.3	United States
9.5	Papua New Guinea
	United States
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10.1	Georgia
10.2	Georgia
10.3	France
	Georgia
10.4	Australia
	Georgia
	New Zealand
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General	New Zealand
11.1	United States
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2.3.2	United States
2.4	United States
2.6.1	Australia
2.6.2	New Zealand
2.6.2.1	United States
2.6.2.2	Sweden
	United Kingdom
	United States
2.6.3.1	France
	New Zealand
	United Kingdom
2.6.3.2	New Zealand
2.6.4	New Zealand
	South Africa
2.7.1	France
	New Zealand
	United Kingdom
2.7.2	Australia
	France
	Papua New Guinea
	Sweden
	United Kingdom
	United States
2.7.3	New Zealand
	Papua New Guinea
	Sweden
	United States
2.8.2	New Zealand
	United States
2.8.3.1	Australia
	New Zealand
	United States
2.8.3.2	Australia
	New Zealand
	United States
2.8.3.3	Australia
	France
	New Zealand
	Papua New Guinea
	United States
2.8.4	France
	New Zealand
	United States
2.9.1	France
	Sweden
	United Kingdom
	United States
2.9.2	Sweden
	United Kingdom
	United States
2.10	France
	Sweden
	United Kingdom
	United States
2.11	United States
2.12	New Zealand
2.13	New Zealand
	Papua New Guinea

2.14	United States
2.15.3	Papua New Guinea
2.17	France
	New Zealand
	Sweden
	United States
2.18	New Zealand
2.18.1	United States
2.18.2	Australia
	Papua New Guinea
	United States
2.19	France
	New Zealand
	Sweden
	United Kingdom
	United States
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3.1	New Zealand
	United States
3.3	Australia
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	Papua New Guinea
	Sweden
	United States
3.4	Australia
	France
	New Zealand
	Papua New Guinea
	South Africa
	Sweden
	United States
Chapter 4	
4.1.1	United Kingdom
4.1.3.1	Australia
	France
	New Zealand
	United Kingdom
	United States
4.1.3.2	France
	New Zealand
	United States
4.1.3.3	Australia
	France
	New Zealand
	Papua New Guinea
	United States
4.1.4	New Zealand
	Sweden
4.1.4.1	Papua New Guinea
	United Kingdom
4.1.4.2	Papua New Guinea
	United Kingdom
4.2.1	France
	United States
4.2.2	Australia
	France
	New Zealand
	Papua New Guinea
	United States
4.3.1	New Zealand
	Sweden
	United Kingdom
	United States
4.3.2.1	New Zealand
	United Kingdom
	United States
4.3.2.2	United Kingdom
4.3.2.3	New Zealand
	United Kingdom
4.3.2.4	United Kingdom
	United States
4.3.2.5	United Kingdom
	United States
4.3.2.6	Australia
	France
	New Zealand
	Papua New Guinea
	South Africa
	Sweden
	United States
4.3.2.7	Australia
	France
	New Zealand
	Papua New Guinea
	South Africa
	Sweden
	United States
4.3.2.8	Australia
	France
	New Zealand
	Papua New Guinea
	South Africa
	Sweden
	United States
4.4	United Kingdom
	United States
4.5.1	Sweden
	United Kingdom
4.5.2	Sweden
4.6	New Zealand
	United States
4.7.1	France

	New Zealand
	United States
4.7.2	Australia
	New Zealand
	Papua New Guinea
	United States
4.8	New Zealand
	Papua New Guinea
4.9	New Zealand
4.9.1.1	Australia
	Sweden
4.9.1.2	Australia
	Papua New Guinea
	Sweden
4.9.1.3	Australia
4.9.1.4	Australia
4.9.1.4.1	Australia
	United Kingdom
4.9.1.5	Australia
	France
	Papua New Guinea
	Sweden
	United Kingdom
4.9.1.5.1	Australia
	France
	Papua New Guinea
	Sweden
	United Kingdom
4.9.1.5.2	Australia
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	United Kingdom
4.9.1.6	Australia
	Papua New Guinea
	South Africa
4.9.1.7	Argentina
	Australia
	France
	United Kingdom
4.9.1.7.1	Argentina
4.9.1.7.2	Argentina
4.9.1.7.3	Argentina
4.9.1.7.4	Argentina
4.9.1.7.5	Argentina
4.9.2	Australia
	France
	Sweden
4.9.3.1	Australia
	United States
4.9.3.2	Australia
	France
	Sweden
	United States
4.9.4.1	Argentina
	Australia
	France
	United Kingdom
4.9.5.1	Argentina
	Australia
	France
	Sweden
	United Kingdom
4.9.5.2	Argentina
	Australia
	France
	Papua New Guinea
	South Africa
	Sweden
4.9.6.2	Australia
	France
	Papua New Guinea
4.9.6.3	France
	United Kingdom
4.9.8.1	France
4.9.8.2	Australia
4.9.9	United States
4.10.1	New Zealand
	United Kingdom
	United States
4.10.2	Australia
	United Kingdom
	United States
4.10.3	Australia
	United Kingdom
	United States
4.10.4	United Kingdom
	United States
4.10.5	United Kingdom
	United States
4.10.6	United Kingdom
	United States
4.10.7	Slovakia
	United States
4.10.8	United States
4.11.1	Australia
	France
	United Kingdom
4.11.2	Australia
	France
	United Kingdom
	United States
4.12	Australia
	France
	New Zealand
	United States

Chapter 5	
5.1.1	United Kingdom
	United States
5.1.2	Papua New Guinea
	United States
5.1.4	United Kingdom
	United States
5.1.5	Australia
5.2	United States
5.2.1	United States
5.2.2	Australia
	Papua New Guinea
5.2.3	Papua New Guinea
Chapter 6	
6.1	New Zealand
6.1.1	United Kingdom
6.1.2	New Zealand
6.1.3	France
6.2.1	United Kingdom
6.2.2	Argentina
	New Zealand
	United States
6.2.3	New Zealand
6.3	United Kingdom
Chapter 7	
7.1	New Zealand
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2	United Kingdom
5.16	France
14	France

SECTION I

Chapter 1

Definitions

Approach and landing operations using instrument approach procedures. Argentine regulations retain the former definition of instrument approach and landing operations.

Decision altitude (DA) or decision height (DH). The text has not been amended. Argentine regulations retain the former definition.

Flight time — helicopters. The text has not been amended. Argentine regulations retain the former definition.

Heliport operating minima. Argentine regulations retain the former definition of heliport operating minima, which does not refer to approach and landing operations with vertical guidance.

SECTION II

Chapter 4

4.3.1.7 The Argentine Republic does not require the installation of a Type IVA FDR.

4.3.1.7.1 The Argentine Republic only requires recording of the following parameters: pressure altitude; indicated airspeed; heading; normal acceleration; lateral acceleration; longitudinal acceleration; and time.

4.3.1.7.2 The Argentine Republic only requires recording of the following parameters: pitch attitude and roll attitude.

4.3.1.7.3 The Argentine Republic only requires recording of free power turbine speed on each engine, main rotor speed and gearbox oil temperature.

4.3.1.7.4 The Argentine Republic does not require that these parameters be recorded.

4.3.1.7.5 The Argentine Republic only requires recording of hydraulics low pressure, warnings, primary flight controls, each navigation receiver frequency selection, AFCS mode and engagement status, stability augmentation system engagement and altitude rate.

4.3.4.1 The Argentine Republic only requires this recorder for turbine-powered helicopters with seating for 10 or more passengers or an equivalent payload capacity.

4.3.5.1
4.3.5.2 A cockpit voice recorder is required for turbine-powered helicopters with seating for 6 or more passengers or an equivalent payload capacity.

Chapter 6

6.4.2 In the Argentine Republic, the operator must keep the maintenance records in 6.4.1 for a minimum period of five years.

SECTION III

Chapter 4

4.9.1.7 The Argentine Republic does not require the installation of a Type IVA FDR.

4.9.1.7.1 The Argentine Republic only requires recording of the following parameters: pressure altitude, indicated airspeed, heading, normal acceleration, lateral acceleration, longitudinal acceleration and time.

4.9.1.7.2 The Argentine Republic only requires recording of the following parameters: pitch attitude and roll attitude.

4.9.1.7.3 The Argentine Republic only requires recording of free power turbine speed on each engine, main rotor speed, and gearbox oil temperature.

4.9.1.7.4 The Argentine Republic does not require recording of these parameters.

4.9.1.7.5 The Argentine Republic only requires recording of hydraulics low pressure, warnings, primary flight controls, each navigation receiver frequency selection, AFCS mode and engagement status, stability augmentation system engagement and altitude rate.

4.9.4.1 The Argentine Republic only requires this recorder for turbine-powered helicopters with seating for 10 or more passengers or an equivalent payload capacity.

4.9.5.1
4.9.5.2* A cockpit voice recorder is required for turbine-powered helicopters which are equipped with seating for 6 or more passengers or an equivalent payload capacity and which require two pilots to operate them. Flight data recorders are required for turbine-powered helicopters with seating for 10 or more passengers or an equivalent payload capacity.

Chapter 6

6.2.2 In the Argentine Republic, the operator must keep the maintenance records in 6.2.1 for a minimum period of five years.

*Recommended Practice

SECTION II

Chapter 2

2.2.6.2	Australian legislation mandates the method by which minimum flight altitude must be determined, but does not require the method to be incorporated in the operations manual.
2.2.9.2	Flight time, flight duty time limitations and rest periods are mandated. Several exemptions and standing exemptions are issued. These limitations do not apply to other than flight crew.
2.2.11	Australian legislation does not require helicopters to be certificated for ditching.
2.3.3.1 2.3.3.2	Australia does not mandate preparation of an operational flight plan for every flight, and does not specify the content of the plan.
2.3.4.2 2.3.4.3*	Australian legislation does not refer to off-shore alternates.
2.3.6.3	The only requirements are the general fuel requirement provisions.
2.4.9*	Operators are not required to specify noise abatement procedures. Such procedures are specified by the State.
2.5.5	There is no requirement for a journey log book. However, trip records are required.

Chapter 3

3.1.1 3.1.2 3.1.3* 3.1.4 3.1.5*	Australia uses a different helicopter classification system and does not place route operating or landing area limitations on helicopters according to performance.
3.2.7	Australia specifies helicopter performance standards according to aircraft certification.
3.3.1	Provision is mandated only for major international aerodromes.
3.3.2	Not implemented because Australian legislation does not yet address detailed performance operating limitations for helicopters.

Chapter 4

4.2.2	The requirements for carriage of first-aid kits and fire extinguishers are not implemented as prescribed.
4.3.1.1 4.3.1.2	Australian legislation does not refer to FDRs by Type, but specifies the parameters to be recorded.
4.3.1.3	Metal foil FDRs are still permitted.

*Recommended Practice

4.3.1.4* Current legislation specifies that analogue recorders will not be approved for fitment to aircraft which receive their initial Certificate of Airworthiness after 1 January 1984.

4.3.1.4.1 Photographic film recorders are not approved.

4.3.1.5 There are no legislative requirements to give effect to this Standard.
4.3.1.5.1
4.3.1.5.2

4.3.1.6* Australian legislation does not refer to combination recorders.

4.3.1.7 Australian legislation does not refer to FDRs by Type. Parameters currently required to be recorded are
4.3.1.7.1 to less comprehensive than the Annex Standards.
4.3.1.7.5

4.3.2 Australia does not refer to type, but requires the FDR to be capable of retaining the information for at least 25 hours of recording.

4.3.3.1 Legislation does not refer to type. Australian helicopters, turbine-powered, first certificated after
4.3.3.2* 1 July 1965, in excess of 5 700 kg MCTM must have an FDR.
4.3.4.1

4.3.5.1 Australia does not require recording of main rotor speed. For helicopters greater than 5 700 kg
4.3.5.2 MCTM, issued with an Australian Certificate of Airworthiness after 1 January 1985, CVRs are required.
4.3.6

4.3.7.2* Australian turbine-powered helicopters first certificated after 1 July 1965, above 5 700 kg MCTM, must have a CVR capable of retaining the last 30 minutes of recording.

4.3.7.3 Australian legislation does not require a CVR recording duration of two hours.

4.3.9.2 There is no requirement for operators to establish a procedure to that effect.

4.3.10 Australia does not legislate for continued serviceability checks.

4.4.2 Australian legislation does not base the requirement to be equipped in accordance with 4.10 on whether the flight is a controlled flight or not.

4.5.1 Australia requires carriage of flotation equipment in any helicopter carrying passengers in a flight over water if the helicopter is unable to remain airborne following failure of a power unit.

4.5.2 Australia requires carriage of:

a) life jackets in all helicopters for flights beyond 50 NM;

b) life jackets for flights of 50 NM or less to/from platforms and off-shore vessels, and in all helicopters which are unable to remain airborne following failure of a power unit;

c) life rafts on all flights over water at a distance corresponding to 30 minutes at normal cruising speed;

d) pyrotechnic signalling equipment at all times when the carriage of life rafts is required.

*Recommended Practice

4.5.2.6* Australia does not require deployment of rafts using mechanical assistance or remote control.
4.5.2.7*
4.5.2.8*

4.7.2 Australian legislation requires the carriage of an ELT(S) when one life raft is carried, and at least two
4.7.3 ELTs when two or more life rafts are carried. Carriage of an atuomatically activated ELT is not required.
4.7.5
4.7.6
4.7.7*

4.8.4* Australia has no requirement to operate helicopters in commercial air transport at altitudes where the atmospheric pressure is less than 620 hPa.

4.11.2* Australian legislation does not specify a requirement for trainability.

4.12* In Australia the requirement for weather radar to be carried applies only to helicopters which are:

a) above 5 700 kg MCTM;

b) turbine-powered;

c) operating under IFR; and

d) operated by two or more flight crew.

4.13 There is no requirement for a noise certificate to be carried.

4.15 This requirement is applicable only within Class C airspace where there is radar coverage.

4.16 Australia's requirement is not based on transition altitude.

Chapter 5

5.1.2 The requirement for 121.5 MHz is not specifically mandated.

5.2.2 Australia requires specific equipment to be installed relative to the route being operated.

Chapter 6

6.3 There is no requirement for human factors to be taken into account when designing a maintenance programme.

Chapter 7

7.4.1 Australia does not require recent experience to be in the same type.
7.4.2

*Recommended Practice

Chapter 8

8.4* Australian legislation does not specify training or recency requirements in detail for flight dispatch personnel.

Chapter 10

10.4 Flight time, duty and rest periods for flight attendants are not mandated by the Authority.

SECTION III

Chapter 2

2.6.1 Australia places the decision-making responsibility on the pilot-in-command for commencement and continuation of a flight.

2.7.2 Australian legislation does not refer to off-shore alternates.

2.8.3.1
2.8.3.2 The only requirements are the general fuel requirements provisions.

2.8.3.3 Prescribed fuel requirements are general and do not mandate specific times.

2.18.2* There is no requirement to maintain two-way communications between the aircraft and the ground crew while refuelling with passengers on board.

Chapter 3

3.3
3.4* Australia uses a different helicopter classification system, and places no restriction on the use of elevated heliports and helidecks.

Chapter 4

4.1.3.1 The requirements for carriage of first-aid kits and fire extinguishers are not implemented as prescribed.

4.1.3.3* This recommendation is implemented for helicopters manufactured from 1992 onwards.

4.2.2* Australian legislation does not base the requirement to be equipped in accordance with 4.6 on whether the flight is a controlled flight.

4.3.2.6*
4.3.2.7*
4.3.2.8* Australia does not require deployment of rafts using mechanical assistance or remote control.

4.7.2* Australian legislation does not specify a requirement for trainability.

4.9.1.1
4.9.1.2 Australian legislation does not refer to FDRs by Type, but specifies the parameters to be recorded.

*Recommended Practice

4.9.1.3	Metal foil FDRs are still permitted.
4.9.1.4*	Current legislation specifies that analogue recorders will not be approved for fitment to aircraft which receive their initial Certificate of Airworthiness after 1 January 1984.
4.9.1.4.1	Photographic film recorders are not approved.
4.9.1.5 4.9.1.5.1 4.9.1.5.2	There are no legislative requirements to give effect to these Standards.
4.9.1.6*	Australian legislation does not refer to combination recorders.
4.9.1.7	Australian legislation does not refer to FDRs by Type. Parameters currently required to be recorded are less comprehensive than the Annex standards.
4.9.2	Australia does not refer to Type, but requires the FDR to be capable of retaining the information for at least 25 hours of recording.
4.9.3.1 4.9.3.2*	Australian helicopters, turbine-powered, first certificated after 1 July 1965, in excess of 5 700 kg MCTM must have an FDR.
4.9.4.1	Australian legislation does not refer to FDRs by Type. Parameters currently required to be recorded are less comprehensive than the Annex Standards.
4.9.5.1	Australia does not require recording of main rotor speed. For helicopters greater than 5 700 kg MCTM, issued with an Australian Certificate of Airworthiness after 1 January 1985, cockpit voice recorders are required.
4.9.5.2* 4.9.6.2*	Australian turbine-powered aeroplanes first certificated after 1 July 1965, above 5 700 kg MCTM, must have a CVR capable of retaining the last 30 minutes of recording.
4.9.8.2	There is no requirement for operators to establish a procedure to that effect.
4.10.2 4.10.3	Australian legislation allows a single ELT(S) if only one life raft is carried.
4.11.1 4.11.2*	This requirement is applicable only within Class C airspace where there is radar coverage.
4.12*	Australia's requirement is not based on transition altitude.

Chapter 5

5.1.5*	The requirement for 121.5 MHz is not specifically mandated.
5.2.2	Australian legislation allows carriage of a single radio navigation aid if the helicopter is operating outside controlled airspace.

*Recommended Practice

SECTION I

Chapter 2 The Standards and Recommended Practices contained in Annex 6, Part III shall be applicable to all helicopters engaged in commercial air transport operations or general aviation operations and parts to helicopters engaged in aerial work.

SECTION I

Chapter 1

Definitions — *Approach and landing operations using instrument approach procedure.*
Category II (CAT II) operation. Category II operations are defined as operations with a runway visual range of not less than 300 metres.

SECTION II

Chapter 2

2.2.5 — No explicit Human Factors principles are required or established in the design and utilization of checklists. Anticipated compliance by 1 April 2002.

2.2.11 — There is no requirement for ditching certification but floats or emergency float installations are required.

2.3.3.1 — There is an exception for the submission of an operational flight plan for VFR operations.

2.3.6.2 b) — For VFR operations, 10 per cent extra fuel is required. For VFR operations in a non-hostile environment, 5 per cent extra fuel is required.

2.3.8.2 — Oxygen supply requirements for pressurized helicopters are not described.

2.4.7 — There are no formal requirements established for the coordination of in-flight operational instructions. Anticipated compliance by 1 April 2002.

2.5.1 — The responsibilities of the pilot-in-command are not fully reflected in JAR-OPS 3.085. Anticipated compliance by 1 April 2002.

2.6.1
2.6.2 — The duties of the flight operations officer/flight dispatcher are not explicitly addressed in JAR-OPS 3.205. Anticipated compliance by 1 April 2002.

Chapter 3

3.3.2 — Not explicitly addressed in JAR-OPS 3.205. Anticipated compliance by 1 April 2002.

Chapter 4

4.1.2 — With respect to the minimum equipment list required for helicopters, the KOL(H) established for helicopters is less than 2 730 kg.

4.2.2 c) 1) and 2) — Not applicable for transportation of parachutists to be dropped from the aircraft. (DCAA BL 5-6, 5.1.)

4.2.4.1 — There is no description of marking of break-in points.

4.3 — JAR-OPS 3.715/720 is not fully in accordance with Annex 6 text. Anticipated compliance by 1 April 2002.

4.3.1 — This paragraph will not be implemented in time due to lack of standards and an obligation to provide ample warning for workshops and operators/owners.

4.3.2 — The duration time for flight data recorders is eight hours.

4.4.2 IFR equipment is only required for VFR night operations.

4.10.1 c) Counter-drum pointer is not required in JAR-OPS 1.652 c). Anticipated compliance by 1 April 2002.

4.15 Pressure-altitude reporting transponder is only required for VFR operation in Danish airspace C.

4.16 JAR-OPS 3 has no formal requirement for use of boom or throat microphone below transition level/attitude.

Chapter 7

7.4.1 Recency may also be maintained by flying a flight simulator, qualified and approved for the purpose of the helicopter type to be used. Recency may be extended up to a maximum of 120 days by line flying under supervision of a nominated commander.

SECTION I

Chapter 1

Definitions	*Approach and landing operations using instrument approach procedure.* *Category II (CAT II) operation*. A Category II operation is defined with a runway visual range minimum not less than 300 metres.

SECTION II

Chapter 2

2.2.5	No explicit Human Factors Principles requirements established in JAR-OPS 3.210 and 3.1040.
2.2.11	No requirement for ditching certification for all Category B performance class 3 helicopters, if operated for maximum of 10 minutes on each flight over water out of distance for safe forced landing, but floats or emergency float installation are required.
2.3.3.1	Operational flight plan for every intended flight (VFR maximum 100 km) is not required.
2.3.6.2 b)	Instead of 10 per cent extra fuel in case of VFR flight, 5 per cent extra fuel in non-hostile environment is required.
2.3.8.2	Pressurized helicopters are not described in JAR-OPS 3.
2.4.7	No formal requirements for in-flight instruction coordination with ATS are established in JAR-OPS 3. Anticipated compliance is 1 April 2002.
2.5.1	Pilot-in-command responsibilities are not fully reflected in JAR-OPS 3.085 and JAR-OPS 3.210 (d). Anticipated compliance is 1 April 2002.
2.6.1 2.6.2	Not explicitly expressed in JAR-OPS 3.205. Anticipated compliance 1 April 2002.

Chapter 3

3.3.2	Not explicitly expressed in JAR-OPS 3.225. Anticipated compliance 1 April 2002.

Chapter 4

4.1.2	For single engine VFR helicopters, MEL is not mandatory, but then all the equipment shall be installed and in condition.
4.2.2 c) 1) and 2)	Not applicable for transportation of parachutists to be dropped from the aircraft with a maximum of 10 passenger seats.
4.3.1 and 4.3.3	JAR-OPS 3.715/3.720 are not fully in accordance with Annex 6 text. Anticipated compliance is 1 April 2002.
4.3.2	Instead of FDR recording duration of ten hours, eight hours is required.

4.3.9.1 A CVR may be switched off during the flight time following an accident or incident, if the pilot-in-command believes that the recorded data to be preserved for accident or incident investigation would otherwise be automatically erased.

4.4.2 IFR equipment only required for VFR night operation.

4.10.1 c) Counter drum pointer not required in JAR-OPS 3.652 (c). Anticipated compliance 1 April 2002.

4.15 Pressure-altitude reporting transponder in JAR-OPS 3.865 is only required for VFR operation, if the requirement is applicable to the area or route flown. Anticipated compliance 1 April 2002.

4.16 JAR-OPS 3.650/3.652 has no formal requirement for use of boom or throat microphone below transition level/altitude.

Chapter 7

7.4.1
7.4.2 Recency may also be maintained by flying a flight simulator, qualified and approved for the purpose, of the helicopter type to be used. Recency may be extended up to a maximum of 120 days by line flying under supervision of a nominated commander.

7.4.4 The period of validity of an operator proficiency check is 6 calendar months in addition to the remainder of the month of issue. If issued within the final 3 calendar months of validity of a previous proficiency check, the period of validity shall extend from the date of issue to 6 calendar months from the expiry date of the previous operator proficiency check.

SECTION II

Chapter 2

2.2.8.1 France does not require that oil records be maintained.

2.3.3.1 French regulations do not contain specific requirements concerning the signing of the operational flight plan.

2.3.6.2 For VFR operations in a non-hostile environment, France only requires a 5 per cent supply, rather than 10 per cent.

2.3.6.4 French regulations do not take into account the loss of pressurization in computing fuel requirements. No operators in France use pressurized helicopters.

2.3.7* France does not forbid refuelling when the rotors are turning but does require that the procedures for doing so be specified in the operations manual.

2.4.9* France does not require that noise abatement procedures specified by an operator for any one helicopter type be the same for all heliports.

2.5.2 Pending implementation of Sub-part N of JAR-OPS 3, there is no specific requirement that the pilot-in-command ensure the checklists are complied with, although that is standard practice.

Chapter 3

3.1.2 France authorizes several exceptions:

— operation over a hostile body of water for a maximum period of 10 minutes during the same flight; and

— operation in a hostile environment outside of congested areas (in performance Class 2 for helicopters with a maximum capacity of 9 passengers and in performance Class 3 for helicopters with a maximum capacity of 6 passengers) under certain conditions.

3.1.4 France authorizes performance Class 2 operations from elevated heliports in congested areas until 31 December 2009, provided that there are safe forced landing areas.

3.1.5* France authorizes operations from elevated heliports in a non-hostile environment with an exposure time to power unit failure during take-off or landing until 31 December 2009.

3.2.7.1.2 Until 31 December 2004, French operators may obtain a special authorization for emergency medical service flights, with take-off and landing phases over a hostile environment (no possibility of forced landing).

3.2.7.1.3 France has no particular requirements concerning the ability to clear obstacles along the flight path.

3.2.7.2.1 France does not take into account the failure of two power-units. No French operator uses helicopters with more than two power-units.

*Recommended Practice

3.2.7.3.2 Until 31 December 2004, French operators may obtain a special authorization for emergency medical service flights with take-off and landing phases over a hostile environment (no possibility of a forced landing).

3.2.7.3.3 France has no specific requirements for clearing obstacles in the approach path.

3.3.2 France has no regulatory requirements for taking into account charting accuracy.

Chapter 4

4.2.2 France does not require spare fuses.

4.3.1.5
4.3.1.5.1
4.3.1.5.2 French regulations have not yet incorporated the provisions relating to recording of data link communications.

4.3.1.7 The list of parameters required by French regulations does not fully comply with the requirements in Annex 6.

4.3.2 France requires a recording time of five hours for helicopters certificated prior to 1 August 1999 and eight hours for those certificated later.

4.3.3.2* France requires a data recorder for helicopters with a maximum certificated take-off mass of under 7 000 kg in the following cases:

— helicopter with a maximum certificated take-off mass of over 2 730 kg and certificated on 1 August 1999 or later; and

— helicopters with more than nine passengers and certificated between 1 January 1989 and 31 July 1999.

4.3.4 France has not yet incorporated this requirement into its regulations.

4.3.5.1 France does not require a cockpit voice recorder for helicopters of over 7 000 kg, with less than 10 passengers, and which were certificated prior to 1 August 1999.

4.3.5.2 France only requires a cockpit voice recorder for helicopters of with a maximum certificated take-off mass of over 3 180 kg and up to and including 7 000 kg if they were certificated on 1 August 1999 or later.

4.3.6 France does not require cockpit voice recorders for helicopters with a maximum certificated take-off mass of over 7 000 kg or with a capacity of less than 10 passengers if the helicopters were certificated before 1 August 1999.

4.3.7.3 France only requires one hour of recording time for cockpit voice recorders.

4.3.9.1 France has no specific requirements concerning the switching off of flight recorders.

4.4.2 France has no specific requirements concerning VFR flights operated as controlled flights other than the requirements of the air traffic services.

4.7.1 France does not require an emergency locator transmitter (ELT) onboard the raft.

*Recommended Practice

4.10.1 French regulations do not require any specific type of presentation for altimeters.

4.10.1 f) France only requires two attitude indicators when operating under single-pilot instrument flight rules.

4.12* France only requires weather radar for helicopters with a capacity of more than nine passengers.

4.16 France has no specific requirements concerning the use of boom or throat microphones below the transition level/altitude.

Chapter 7

7.4.3.5 Pending implementation of Sub-part N of JAR-OPS 3, France has no specific requirements concerning route qualification.

7.4.4 Pending implementation of Sub-part N of JAR-OPS 3, France requires an on-line and an off-line proficiency check once a year.

Chapter 8

8.4* France has no specific requirement concerning the recent experience of flight operations officers.

Chapter 10

10.3 Pending adoption of European Community rules, France has no specific requirements concerning the training of cabin crew in knowledge about human performance.

SECTION III

Chapter 2

2.6.3.1 France has no specific requirement concerning the continuation of a flight based on the meteorological conditions to the heliport of intended landing or alternate heliport.

2.7.1 b) 2) and 3) France does not require a prescribed instrument approach procedure for isolated heliports nor the determination of a point of no return (PNR) for off-shore heliports, when determining the need for an alternate aerodrome.

2.7.2 France has no restrictions on the use of off-shore alternates.

2.8.3.3 For light helicopters (maximum certificated take-off mass of under 2 730 kg and maximum capacity of five passengers), France does not require a two-hour fuel reserve for a flight to an isolated heliport.

2.8.4 For light helicopters (maximum certificated take-off mass of under 2 730 kg and maximum capacity of five passengers), French regulations do not specify the parameters to be taken into account when computing fuel requirements. For heavy helicopters, the loss of pressurization is not taken into account (no pressurized helicopters are operated in France).

*Recommended Practice

2.9.1 France only requires oxygen to be carried:

— for the crew, if the flight level is above 125 (3 800 m); and

— for other occupants, if the flight level is above 145 (4 400 m)

2.10 France only requires that a single pilot shall use breathing oxygen.

2.17 France does not require that a rotor only be turned under power with a qualified pilot at the controls.

2.19 France requires that any heavy helicopter (maximum certificated take-off mass of over 2 730 kg or maximum capacity of six or more passengers) be certificated for ditching or equipped with emergency floatation capability:

— for performance Class 1, if the helicopter is more than ten minutes' flying time from shore; and

— for performance Class 2 or 3, if the helicopter is farther from shore than from the safe forced landing distance.

Chapter 3

3.4* France does not forbid light performance Class 3 helicopters (maximum certificated take-off mass of under 2 730 kg and maximum capacity of five passengers) from taking off from elevated heliports or helidecks.

Chapter 4

4.1.3.1 a),b)and e) France does not require light helicopters (maximum certificated take-off mass under 2 730 kg and maximum capacity five passengers) to carry a first-aid kit or a fire extinguisher other than during flights over water or designated land areas. Fuses are only required for night flights.

4.1.3.2* France does not require ground-air signal codes for search and rescue purposes except during flights over designated land areas.

4.1.3.3* France does not require safety harnesses in older helicopters.

4.2.1 b) France does not require light helicopters (maximum certificated take-off mass of under 2 730 kg and maximum capacity of five passengers) on VFR flights to carry an accurate timepiece.

4.2.2* France has no specific requirements for controlled VFR flights other than the requirements of the air traffic services.

4.3.2.6*
4.3.2.7*
4.3.2.8* France has no requirement for the remote control or mechanically assisted deployment of life rafts.

4.7.1 France does not require helicopters operating at night under VFR to be equipped with an accurate timepiece, thermometer, pitot de-icing, or lights in the passenger compartment.

*Recommended Practice

4.9.1.5
4.9.1.5.1
4.9.1.5.2

French regulations have not yet incorporated the requirements relating to data link communications.

4.9.1.7

The list of parameters required by French regulations does not fully comply with the requirements in Annex 6.

4.9.2

France requires a recording time of five hours for helicopters certificated before 1 August 1999 and eight hours for helicopters certificated later.

4.9.3.2*

France requires a data recorder for helicopters with a maximum take-off mass of under 7 000 kg under the following circumstances:

— helicopters with a maximum take-off mass of over 2 730 kg and certificated 1 August 1999 or later; and

— helicopters with a capacity of more than nine passengers and which were certificated after 1 January 1989.

4.9.4.1

France requires a recording time of five hours for helicopters certificated before 1 August 1999 and eight hours for those certificated later.

4.9.5.1

France does not require a cockpit voice recorder for helicopters of over 7 000 kg, with less than 10 passengers, and certificated before 1 August 1999.

4.9.5.2*

France does not require a cockpit voice recorder for helicopters with a maximum certificated take-off mass of over 3 180 kg and up to and including 7 000 kg unless they were certificated on 1 August 1999 or later.

4.9.6.2*
4.9.6.3

France requires only one hour of recording time for cockpit voice recorders.

4.9.8.1

France has no specific requirements relating to switching off of flight recorders.

4.11.1
4.11.2*

Under VFR, France does not require the systematic carriage of a transponder unless it is required by the control services.

4.12*

France has no specific requirements relating to the use of boom or throat microphones below the transition level/altitude.

Chapter 6

6.1.3

France allows the maintenance release to be signed by an individual who is not licensed in accordance with Annex 1 and for maintenance operations to be undertaken outside the approved framework in the following cases:

— basic maintenance; and

— maintenance of light aircraft with a restricted certificate not in compliance with Annex 8.

In such cases the validity of the certificate of airworthiness is limited to six months.

*Recommended Practice

APPENDIX

5.16 14 Pending implementation of Sub-part N of JAR-OPS 3, French regulations concerning the contents of an operations manual do not contain specific provisions relating to:

— route and destination familiarization; and

— training cabin crew in Human Factors.

SECTION II

Chapter 2

2.2.7.1 to 2.2.7.3	Not implemented. The State has no dedicated heliports.
2.3.4.2 2.3.4.3*	Not implemented. The State has no off-shore heliports.
2.3.7*	Not implemented. Not allowed under existing regulations.
2.3.8.1 2.3.8.2	Not implemented.
2.4.6*	Not implemented.
2.6.1 2.6.2	Not implemented. The system currently in use does not utilize the services of flight dispatchers.

Chapter 3

3.1.4 3.1.5*	Not implemented. The State does not currently have any elevated heliports.

Chapter 4

4.3.1.3 4.3.1.4*	Not implemented. No rotorcraft currently operated in the State are equipped with flight data recorders.
4.3.1.6* 4.3.3.2* 4.3.5 4.3.6 4.3.7.2* 4.5.1 4.5.2.1 to 4.5.2.5 4.5.2.6* 4.5.2.7* 4.5.2.8*	Not implemented.
4.6	Not implemented. No land areas have been designated by the State as areas in which search and rescue would be especially difficult.
4.7.1 4.7.2 4.7.3	Not implemented.
4.7.4 4.7.7*	Not implemented.

*Recommended Practice

4.8.1 to 4.8.3 4.8.4* 4.12* 4.13 4.14.1 4.14.2	Not implemented.

Chapter 7

7.5	Not implemented.

Chapter 8

8.2*	Not implemented. The system currently in use does not utilize the services of flight dispatchers.

Chapter 10

10.1 to 10.4	Not implemented. The State has no rotorcraft that require the use of flight attendants.

SECTION III Not implemented. The State has no internationally operated general aviation rotorcraft.

*Recommended Practice

General Germany will not adopt Annex 6, Part III until harmonized European Standards, including Part III Standards, have been developed.

SECTION II

Chapter 4

4.5.2.6* It is not feasible at the present to have a requirement in India for deployment of 50 per cent of life rafts by remote control on helicopters.

*Recommended Practice

SECTION I

Chapter 1

Definitions

Crew member. A person carried by an aircraft who is:

a) employed, engaged, or contracted by the operator of the aircraft; or

b) carried for the sole purpose of undergoing or giving instruction in the control and navigation of the aircraft; or

c) a person exercising a function which that person is duly authorized in writing by the Director under the Act or rules made under the Act to exercise; or

d) a flight examiner.

Flight crew member. A crew member assigned by an operator for duty in an aircraft during flight time as a pilot or flight engineer.

Flight time — helicopters. The total time from the moment the aircraft moves under its own power for the purpose of taking off until the moment it comes to rest at the end of the flight.

General aviation operation. In the New Zealand civil aviation system, the generic term "general aviation" can include commercial operations. In such cases the more stringent provision of Annex 6, Part II, as appropriate, are applied.

Pilot-in-command. In relation to any aircraft, means the pilot responsible for the operation and safety of the aircraft.

SECTION II

Chapter 1

1.1.5 Not implemented.

Chapter 2

2.2.3.2 Not implemented.
2.2.4

2.2.5 CAR 91.221 — Flying equipment and operating information:

b) Each pilot-in-command of an aircraft in excess of 5 700 kg MCTOW, or having a certificated seating capacity of 10 passenger seats or more, shall require flight crew members to use a cockpit checklist covering the normal and emergency procedures for the operation of the aircraft in accordance with the aircraft flight manual.

2.2.6 Minimum flight altitudes are established by the State.

2.2.7.1 The State prescribes operating minima.

2.2.11 Not implemented.

2.3.1 The Standards are met; however, certifying is not a requirement.

2.3.4.1	An alternate aerodrome is required unless: The aerodrome of intended landing has a standard instrument approach procedure, and for at least 1 hour before and after the ETA at the aerodrome of intended landing, the reported or forecast weather shall be such that the ceiling at the aerodrome of intended landing is at least 1 000 ft (305 m) above the minima prescribed for the instrument procedure to be used and the visibility at least 5 km.
2.3.4.2 2.3.4.3*	Not implemented.
2.3.6.2	Twenty minutes or for flights less than 20 minutes, a period equal to the anticipated flight time.
2.3.6.3.3 2.4.3	Not implemented.
2.4.4	CAR 91.205 — Crew members at stations. CAR only refers to take-off and landing.
2.6	Not implemented.

Chapter 3

3.1.2 3.1.3* 3.1.4 3.1.5* 3.2.7.1 3.2.7.2 3.2.7.3	Not implemented.
3.3.2	Not required by rules.

Chapter 4

4.2.2 a)	Applicable for aircraft with a certificated seating capacity of 10 passenger seats or more.
4.2.2 c)	Shoulder harness (in addition to safety belt) for each crew seat of an aircraft having 10 passenger seats or more or for low flying or for flight training.
4.2.2 c) 3)* 4.2.4	Not implemented.
4.3.4 4.3.5	Where the helicopter flight manual requires two or more flight crew and the helicopter has a certificated seating capacity of 10 seats or more excluding any required pilot seats.
4.5.1	For single engine helicopters operating more than 10 NM beyond autorotational distance from shore. In addition, occupants are required to wear immersion suits.

*Recommended Practice

4.5.2.1 CAR 91.525 — Flights over water: ... b) for single engine aircraft on flights more than 100 NM from shore.

a) CAR 135.87 (a) (2) more than 10 NM beyond autorotational distance from shore

b) CAR 135.87 (a) (1) more than 10 NM beyond autorotational distance from shore

c) not implemented.

4.5.2.2 CAR 135.87 (a) (2) more than 10 NM beyond autorotational distance from shore.

4.5.2.4 Not implemented.
4.5.2.6*
4.5.2.7*
4.5.2.8*

4.6 There is no requirement for means of sustaining life.

4.7.1 CAR 91.525 — Flights overs water: (a) (3) for single engine aircraft on flights of more than 100 NM from shore.

4.10.2 Not implemented.
4.11.2*
4.12*
4.13
4.14.2
4.16

Chapter 6

6.3.1 The requirement to observe Human Factors principles is not included.

Chapter 7

7.3 Human Factors is not included in the requirements.

7.4.2 CAR 61.37: Recent flight experience applicable only to pilot-in-command.

7.4.3.3 Requirement is for one or more landings at an aerodrome representative of the operations to be flown rather than an actual approach into each heliport of landing on the route.

Chapter 8 Not implemented.

Chapter 9

9.4.2* Not implemented.

*Recommended Practice

Chapter 10

10.4 Not governed by Civil Aviation Rules. Limitation is established by industrial agreement.

Chapter 11 Not implemented.

SECTION III

General Aviation In the New Zealand civil aviation system, the generic term "general aviation" can include commercial operations. In such cases the more stringent provisions of Annex 6, Part III, Section II are applied.

Chapter 1

1.1.5* Not implemented.

Chapter 2

2.6.2 CAR 91.405 — IFR alternate aerodrome requirement:

a) Each pilot-in-command of an aircraft operating under IFR shall make provision for at least one alternate aerodrome unless:

1) the aerodrome of intended landing has a standard instrument approach procedure prescribed under Part 97; and

2) for at least 1 hour before and 1 hour after the estimated time of arrival at the aerodrome of intended landing, the weather reports or weather forecasts or any combination of the two indicate at the time of submitting the flight plan that:

i) the ceiling at the aerodrome will be at least 1 000 ft (305 m) above the minima prescribed under Part 97 for the instrument procedure likely to be used; and

ii) visibility will be at least 5 km.

b) A pilot-in-command of an aircraft required to make provision for an alternate aerodrome under paragraph a) shall not list any aerodrome as an alternate on the IFR flight plan unless the weather forecasts at the time of submitting the flight plan indicate that, at the estimated time of arrival at the alternate aerodrome, the ceiling and visibility at that aerodrome will be at or above the following weather minima:

1) if an instrument approach procedure with alternate minima has been prescribed under Part 97 for the aerodrome, the specified alternate aerodrome minima for that instrument approach procedure; or

2) if an instrument approach procedure without alternate minima has been prescribed under Part 97, the following minima:

i) for a precision approach procedure, ceiling of 600 ft (183 m) and visibility of 3 000 m; and

*Recommended Practice

ii) for a non-precision approach procedure, ceiling of 800 ft (244 m) or 200 ft (61 m) above MDA, whichever is the higher, and visibility of 4 000 m or 1 500 m more than the prescribed minima, whichever is the greater; and

3) if no instrument approach procedure has been prescribed under Part 97 for the alternate aerodrome, the ceiling and visibility minima prescribed in Subpart D for VFR operation for descent below the minimum altitude for IFR flight prescribed under 91.423.

c) A pilot-in-command of an aircraft required to make provision for an alternate aerodrome under paragraph a) shall not list any aerodrome as an alternate aerodrome in the IFR flight plan unless that alternate aerodrome is equipped with a secondary electric power supply for:

1) the electronic navigation aids to be used; and

2) for night operations, the aerodrome night lighting.

(Until Part 97 comes into force, instrument approach procedures are prescribed under Part 19).

2.6.3.1 Not implemented.
2.6.3.2

2.6.4 Take-off under VFR in an aircraft that has snow, ice, or frost, adhering to the wings, stabilisers or control surfaces is prohibited.

A pilot-in-command operating an aircraft under IFR shall not fly an aircraft into known or forecast icing conditions unless the aircraft is certificated with ice protection equipment for flight in the type of known icing conditions.

2.7.1 CAR 91.405 — IFR alternate aerodrome requirements:

a) Unless the aerodrome of intended landing has a standard instrument approach procedure and for at least 1 hour before and 1 hour after the estimated time of arrival at the aerodrome of intended landing, the weather reports or weather forecasts or any combination of the two indicate at the time of submitting the flight plan that:

i) the ceiling at the aerodrome will be at least 1 000 ft (305 m) above the minima prescribed under Part 97 for the instrument procedure likely to be used;

ii) visibility will be at least 5 km.

2.7.3* Not implemented.

2.8.2 CAR 91.305 — Fuel requirements for flights under VFR:

b) A pilot-in-command of a helicopter shall not begin a flight under VFR unless, in the forecast weather conditions, the helicopter has enough fuel to fly to the first point of intended landing at the planned cruising speed, and to fly:

1) after that for at least 20 minutes; or

2) for flights of less than 20 minutes duration, after that for a period equal to the anticipated flight time.

*Recommended Practice

2.8.3.1 CAR 91.403 — Fuel requirements for flights under IFR:

1) When an alternate aerodrome is not required:

— 30 minutes at holding speed at a height of 1 500 ft (457 m) above that aerodrome for turbine-powered aeroplanes and helicopters.

2.8.3.2 When an alternate aerodrome is required, fly from the aerodrome of intended landing to the alternate aerodrome and for turbine-powered helicopters, fly after that for 30 minutes at holding speed at a height of 1 500 ft (457 m) above the aerodrome.

2.8.3.3 Not implemented.
2.8.4
2.12*
2.13*
2.17
2.18*
2.19

Chapter 3

3.1 c) Not implemented.
3.3
3.4*

Chapter 4

4.1.3.1 a) CAR 91.523 — Emergency equipment a) 1) for aircraft with 10 passenger seats or more.

4.1.3.1 b) CAR 91.523 — Emergency equipment a) 2) for aircraft with 10 passsenger seats or more.

4.1.3.1 d) 3) Not implemented.
d) 4)
e)

4.1.3.2* Not implemented.

4.1.3.3* CAR 91.505 — Seating and restraints: a) 4) for aircraft with 10 passenger seats or more and for aircraft when low flying.

4.1.4 Not implemented.

4.2.2* Refer to 4.6.

4.3.1 Not implemented.
4.3.2.1 c)
4.3.2.3
4.3.2.6*
4.3.2.7*
4.3.2.8*

*Recommended Practice

4.6	Implemented except for j) a rate-of-climb and descent indicator.
4.7.1	Im plemented except for c) landing light and e) lights in all passenger compartments.
4.7.2* 4.8	Not implemented.
4.9	Flight recorders not required for Part 91 operations.
4.10.1 4.12*	Not implemented.

Chapter 6

6.1	CAR 91.603 — General maintenance requirements. Except that in the NZCAR, the onus is put on the "operator". New Zealand Civil Aviation rules define "operator" in relation to an aircraft, as the person flying or using the aircraft, or causing or permitting the aircraft to be flown, be used, or be in any place, whether or not the person is present with the aircraft.
6.1.2	The issue of Aviation Documents (Airworthiness Certificate) is a statutory function of the Director of Civil Aviation.
6.2.2	CAR 91.631 — Retention of records provides for periods of 2 years or 6 months.
6.2.3	In the context of the New Zealand Civil Aviation Rules, the "lessee", like the "owner," is the operator.

Chapter 7

7.1	Not implemented.

APPENDIX Operations manual content requirements do not include all the elements indicated in the Appendix.

*Recommended Practice

SECTION II

Chapter 2

2.2.3.2	Rotors are allowed to be kept running while the pilot leaves the aircraft for the purpose of loading and off-loading, etc.
2.2.11	No requirement for ditching certification if the helicopter is properly equipped for emergency landing on water.
2.3.4.3*	Off-shore alternate may be used to allow payload enhancement.
2.3.6.2	Fuel reserves are not required to include the additional 10 per cent.
2.3.6.3.2	The Norwegian regulations do not specify the altitude for calculating the holding fuel.
2.6	Flight operations officers are not provided for in the Norwegian Regulations.

Chapter 3

3.1	Multi-engine helicopters are not subdivided into performance classes.
3.1.2	The restrictions of paragraph 3.1.2 are only applied to normal passenger-carrying operations.

Chapter 4

4.1.2	A MEL is only required for multi-engine helicopters.
4.3.3	Flight data recorders are not required.
4.3.5	Main rotor speed is not required to be recorded.
4.3.6	Main rotor speed is not required to be recorded.
4.4.1	The pressure altimeter is not required to be of a sensitive type.
4.4.2	There is no Norwegian requirement to carry IFR equipment for controlled VFR flights.
4.5.1 a)	Norwegian regulations have no specific time limit.

Chapter 5

5.2.1 b)	There is no Norwegian requirement for helicopter operations related to RNP.

*Recommended Practice

SECTION II

Chapter 1

1.1.3	CAR 93 vests this power with ATC rather than the pilot-in-command.
1.1.6	Papua New Guinea legislation does not call up such a requirement.

Chapter 2

2.1.3	Papua New Guinea legislation does not call up such a requirement.
2.2.4	Addressed in company operations manuals. No legislation exists.
2.2.7	Papua New Guinea legislation does not permit an operator to establish heliport minima which may differ from those established by CAA pursuant to CAR 260.
2.2.7.4*	Papua New Guinea legislation does not call up such a requirement.
2.2.8.2	No period of retention is specified
2.2.11	While some helicopters are required to be fitted with approved flotation equipment, ditching certification, per se, is not required nor is it considered necessary.
2.3.4.2 2.3.4.3*	Papua New Guinea legislation does not address off-shore heliports or alternates.
2.3.5.4	Papua New Guinea legislation does not call up such a requirement nor is there a need for such, at least for domestic operations.
2.3.6.3	Papua New Guinea legislation does not provide this option — pertinent for long-range off-shore operations to isolated islands/helidecks.
2.3.7*	Relevant Papua New Guinea legislation (CAO 20.9) does not specifically address helicopter operations. As in 2.3.6.3.3, such requirement may be relevant when engine shut-down on an off-shore helideck is not possible or desirable.
2.4.3	Papua New Guinea legislation does not call up such a requirement.
2.4.4.3	CAR 254 only requires one pilot to have seat belt fastened.
2.4.7	This is not addressed in Papua New Guinea legislation.
2.4.9*	Papua New Guinea legislation does not call up such a requirement. Such NAP as are prescribed in AIP have been developed by the regulatory authority rather than operators.

*Recommended Practice

Chapter 3

3.1.1 3.1.2 3.1.3* 3.1.4 3.1.5* 3.2.1 3.2.2 3.2.7.1.1 3.2.7.1.2 3.2.7.1.3 3.2.7.2.1 3.2.7.2.2 3.2.7.3.1 3.2.7.3.2 3.2.7.3.3 3.3.1 3.3.2	Papua New Guinea does not prescribe a detailed performance code for helicopters comparable to the aeroplane performance code (CAO 20.7 series)

Chapter 4

4.2.4.1	Papua New Guinea legislation does not call up such a requirement.
4.2.4.2	See 4.2.4.1 above.
4.3.1.2	Papua New Guinea legislation does not call up a specific type of FDR.
4.3.1.5 4.3.1.5.1	Papua New Guinea legislation does not call up such a requirement.
4.3.1.6*	Papua New Guinea legislation does not call up such a requirement.
4.3.5.2	CAO 20.18 only requires CVR for aircraft over 5 700 kg.
4.3.7.2*	CAO 20.18 only requires 30 minutes.
4.4.2	Papua New Guinea legislation does not address this category of operation and hence does not require VFR helicopters to be fitted with IFR equipment.
4.5.2.6* 4.5.2.7* 4.5.2.8* 4.11.2*	Papua New Guinea legislation does not call up such a requirement.
4.13	Papua New Guinea does not issue helicopter (or aeroplane) noise certificates, hence this Standard is not pertinent for domestic operations.

*Recommended Practice

Chapter 5

5.2.2 5.3	Papua New Guinea legislation does not call up such a requirement, although CAO 20.8 addresses this issue to some extent.

Chapter 6

6.2.4 6.4 6.6	Papua New Guinea legislation does not call up such a requirement.

Chapter 7

7.4.2	Papua New Guinea legislation does not call up such a requirement, only for the pilot-in-command.

Chapter 9

9.5	Papua New Guinea legislation does not call up such a requirement.

SECTION III

Chapter 2

2.7.2 2.7.3*	Papua New Guinea legislation does not address off-shore heliports and alternates.
2.8.3.3	Papua New Guinea legislation does not provide for this option — pertinent for long range off-shore operations to remote islands/helidecks.
2.13*	Papua New Guinea legislation does not call up such a requirement.
2.15.3	CAR 254 only requires one pilot to have seat belt fastened.
2.18.2*	Such a requirement is not called up in CAO 20.9.

Chapter 3

3.3 3.4*	Papua New Guinea does not prescribe a detailed performance code for helicopters.

Chapter 4

4.1.3.3*	CAR 254 only requires a seat belt on safety harness.
4.1.4.1 4.1.4.2	Papua New Guinea legislation does not call up such a requirement.

*Recommended Practice

4.2.2*	Papua New Guinea legislation does not address this category of operation and hence does not require VFR helicopters to be fitted with IFR equipment.
4.3.2.6* 4.3.2.7* 4.3.2.8* 4.7.2*	Papua New Guinea legislation does not call up such a requirement.
4.8	Papua New Guinea does not issue helicopter (or aeroplane) noise certificates, hence this Standard is not pertinent to domestic operations.
4.9.1.2	Papua New Guinea does not call up a specific type of FDR.
4.9.1.5 4.9.1.5.1 4.9.1.6*	Papua New Guinea legislation does not call up such a requirement.
4.9.5.2*	CAO 20.8 only requires CVR for aircraft above 5 700 kg.
4.9.6.2*	CAO 20.18 only requires 30 minutes.

Chapter 5

5.1.2	Papua New Guinea legislation does not call up such a requirement, although CAO 20.8 addresses the issue to some extent.
5.2.2	See 5.1.2 above.
5.2.3	Papua New Guinea legislation does not call up such a requirement.

*Recommended Practice

SECTION II

Chapter 4

4.3.2	An FDR shall retain data for five hours.
4.3.3.1	The obligation for carrying an FDR for a helicopter begins with those having an individual Certificate of Airworthiness issued on or after 1 August 1999.
4.3.5.1	The obligation for carrying a CVR for a helicopter begins with those having an individual Certificate of Airworthiness issued on or after 1 August 1999.
4.10.1 f)	Only one attitude indicator is required for IFR or night operations.
4.10.1 k)	No requirements for a stabilization system for certain helicopters.

SECTION I

Chapter 1

Definitions *Night*. The hours between sunset and sunrise.

SECTION III

Chapter 4

4.10.7* All helicopters registered in the Aircraft Registry of the Slovak Republic on the flights out of CTR shall carry an automatic ELT.

*Recommended Practice

SECTION II

Chapter 2

2.1.2 2.1.3	Not implemented.
2.2.4	The Civil Aviation Regulation Article 91.07.26 requires the operator to ensure that no emergency or abnormal situations are simulated when passengers are being carried. The requirement for cargo flight is not implemented.
2.2.6.4* 2.3.4.2 2.3.4.3* 2.6	Not implemented.

Chapter 3

3.1.3* 3.2.1 3.2.2	Not implemented.

Chapter 4

4.11.2* 4.16	Not implemented.

Chapter 8

8.1	Not implemented.

SECTION III

Chapter 1

1.1	Not implemented.

Chapter 2

2.6.4	Not implemented.

Chapter 3

3.4*	Not implemented.

*Recommended Practice

Chapter 4

4.3.2.6*	Not implemented.
4.3.2.7*	
4.3.2.8*	
4.9.1.6*	
4.9.5.2*	

*Recommended Practice

SECTION II

Chapter 2

2.2.3.2	Rotors are allowed to be kept running while pilot leaves the helicopter for the purpose of loading and unloading.
2.2.11	Not implemented. Helicopter flights over water only required for emergency flotation system. Will comply when helicopters and equipment are certificated for ditching.
2.3.4.2	No such operations in Swedish waters. Will comply with JAR-OPS 3 in 2002.
2.3.6.2	No additional fuel in per cent. Reserve of 20 minutes. Will comply with JAR-OPS 3 in 2002.
2.3.8	Normal helicopter operations at altitude under 10 000 ft (3 048 m). Will comply with JAR-OPS 3 in 2002.
2.3.8.2	No use for helicopter with pressurized system.
2.4.5	Normal helicopter operations at altitude under 10 000 ft (3 048 m). Will comply with JAR-OPS 3 in 2002.
2.4.6*	No use for emergency descent procedure.
2.6.1 2.6.2	Not applicable.

Chapter 3

3.1.1 3.1.2 3.1.3* 3.1.4 3.1.5*	Sweden does not use ICAO performance codes. One-engine and multi-engine performance are Swedish codes. Operations comply with Helicopter Flight Manual (HFM).
3.2.7.1.2	Take-off. Exposure time. Will exist until 31 December 2009.
3.2.7.3.2	Approach. Exposure time. Will exist until 31 December 2009.

Chapter 4

4.1.2	Only for multi-engines. Will comply with JAR-OPS 3 in 2002.
4.2.4	Will comply with JAR-OPS 3 in 2002.
4.2.4.2	Will comply with JAR-OPS 3 in 2002.
4.4.2	Not required in Sweden. Will comply with JAR-OPS 3, VFR night in 2002.
4.5.2.5	No requirements. Will comply with JAR-OPS 3 in 2002.

*Recommended Practice

4.5.2.7*	Not required in Sweden.
4.8.1 to 4.8.4*	Normal helicopter operations under 10 000 ft (3 048 m) in Sweden. Will comply with JAR-OPS 3 in 2002.
4.11	Sweden requires only one altimeter for VFR night. Will comply with JAR-OPS 3 in 2002.
4.12*	Required for helicopters with seating configuration of more than nine.

Chapter 6

6.2.4	Will comply with JAR-OPS 3 in 2002.

SECTION III

Chapter 2

2.6.2.2	Not authorized in Sweden.
2.7.2 2.7.3*	No use for off-shore alternate.
2.9.1	Normal helicopter operations at altitudes under 10 000 ft (3 048 m).
2.9.2	No use for helicopter with pressurized system.
2.10	Normal helicopter operations at altitude under 10 000 ft (3 048 m).
2.17	Rotors are allowed to be kept running while pilot leaves the helicopter for the purpose of loading and unloading. Difference will exist until 2004.
2.19	Only emergency flotation system. Will comply when certified helicopters and equipment exists.

Chapter 3

3.3 3.4*	In Sweden, one-engine and multi-engine performance comply with procedures in Helicopter Flight Manual (HFM). Code Performance Class 1 – 3 not used in Swedish rules. Differences will exist until implementation of JAR-OPS/General in 2004.

Chapter 4

4.1.4	No requirements. Will exist until implementation of JAR-OPS/General in 2004.
4.3.1	In Sweden there are limits to the category of passenger, temperature and time (5 to 15 minutes).Will exist until implementation of JAR-OPS/General in 2004.
4.3.2.6* 4.3.2.7* 4.3.2.8*	No requirements. Will comply with JAR-OPS/General in 2004.

*Recommended Practice

4.5.1 4.5.2*	No requirements. Will exist until implementation of JAR-OPS/General in 2004.
4.9.1.1 4.9.1.2	FDR is not required. Will comply no later than 1 January 2005.
4.9.1.5 4.9.1.5.1	Will comply no later than 1 January 2005.
4.9.2	No requirement. Will comply no later than 1 January 2005.
4.9.3.2*	No requirement. Will comply no later than 1 January 2005.
4.9.5.1 4.9.5.2*	Over 7 000 kg and over 2 700 kg up to and including 7 000 kg. Will comply no later than 1 January 2005.

*Recommended Practice

SECTIONS I AND II

General

With regard to references to "State of the Operator" (except paragraphs 2.2.6.1 and 2.2.6.2 - Minimum Flight Altitudes), the responsibility for aeroplanes registered in the United Kingdom remains with the United Kingdom unless an agreement is reached with another State under the terms of Chapter 3.

The United Kingdom will continue to use the term "weight" unless the aeroplane is operated in accordance with JAR-OPS, when "mass" will be used.

SECTION I

Chapter 1

Definitions

Approach and landing operations using instrument approach procedures. Subpart E of JAR-OPS 3 (Helicopters) — now the sole United Kingdom code for aerodrome operating minima policy:

a) specifies a minimum RVR that is:

1) 50 m less than the 550 m specified in the ICAO Category I definition;
2) 50 m less than the 350 m specified in the ICAO Category II definition; and

b) does not permit CAT III A, B or C operations.

Cabin crew member. The United Kingdom continues to use the term "cabin attendant" in place of "cabin crew".

Crew member. The United Kingdom definition is based upon the functions that crew members undertake. Although different, the United Kingdom definition is more precise than that of ICAO.

Flight crew member. The United Kingdom definition is based upon the functions that flight crew members undertake. Although different, it is more precise than the ICAO definition. Effectively, both definitions achieve the same result.

Flight time — helicopters. The United Kingdom definition differs only in minor detail, with flight time beginning when the helicopter first moves under its own power, and ending when the rotors are next stopped.

Pilot-in-command. In United Kingdom legislation, "pilot-in-command" in relation to an aircraft means a person who for the time being is in charge of the piloting of the aircraft without being under the direction of any other pilot in the aircraft.

SECTION II

Chapter 1

1.1.6

The United Kingdom does not explicitly require operators to establish an accident prevention and flight safety programme.

Chapter 2

2.1.2

The United Kingdom does not explicitly require operators to specify in their operations manuals this instruction on reporting without delay any inadequacy of facilities that may be observed.

2.2.3.2 The United Kingdom does not require operators to specify this prohibition (on turning rotors under power without a qualified pilot at the controls) in operations manuals.

2.2.5 The United Kingdom does not explicitly require operators to ensure that the design and utilization of checklists shall observe Human Factors principles.

2.2.7.4* The United Kingdom allows meteorology visibility to be converted to RVR. No limiting visibility is prescribed: if a reported RVR is not available, then an approach may be made if the conversion results in an RVR-equivalent value that is not less than the relevant aerodrome operating minima.

2.2.11 The United Kingdom does not require all helicopters operated over water to be certificated for ditching, but makes provision for flotation by other means.

2.3.4.2 The United Kingdom does not require operators to specify in their operations manuals these instructions on the use of suitable off-shore alternates.

2.3.4.3* The United Kingdom does not require operators to specify in their operations manuals this Recommendation on the carriage of fuel rather than payload in adverse weather conditions so as to then use an on-shore alternate.

2.4.7 The United Kingdom does not explicitly require operators to specify in their operations manuals these instructions on the duties and training associated with the employment of flight operations officers/flight dispatchers.

2.5.1 The United Kingdom prescribes duties for the pilot designated by the operator as commander of the aircraft, covering essentially the same requirements as in the ICAO text, but described in a different and more precise manner.

2.6.1
2.6.2 The United Kingdom does not explicitly require operators to specify in their operations manuals these instructions on the duties and training associated with the employment of flight operations officers/flight dispatchers.

Chapter 3

3.1.5* The United Kingdom does not require operators to specify in their operations manual this prohibition on operating Performance Class 3 helicopters from elevated helidecks.

Chapter 4

4.2.4.2 The United Kingdom does not prescribe any requirements relating to the use of break-in markings when applied to helicopters.

4.3.1.4* The United Kingdom does not accept the use of analogue Flight Data Recorders using FM on aircraft new or second hand first brought onto the United Kingdom register after 1 July 1981.

4.3.1.4.1 The United Kingdom does not prohibit this type of equipment.

4.3.1.5 The United Kingdom has not promulgated any requirements for compliance with these Standards (which apply from 1 January 2005) on recording digital communications.

*Recommended Practice

4.3.1.5.1 4.3.1.5.2	The United Kingdom has not promulgated any requirements for compliance with these Standards (which apply from 1 January 2005) on recording digital communications.
4.3.1.7 4.3.1.7.1 4.3.1.7.2 4.3.1.7.3 4.3.1.7.4 4.3.1.7.5 4.3.4.1	Not all of the parameters listed are required by the United Kingdom CAA.
4.3.7.2* 4.3.7.3	The United Kingdom currently requires that the last 30 minutes of operation be retained.
4.7.5 4.7.6	The United Kingdom does not require carriage of automatically activated Emergency Locator Transmitters in public transport helicopters operated over designated land areas.
4.7.7*	The United Kingdom does not require carriage of automatically activated Emergency Locator Transmitters in all public transport helicopters.
4.10.1 i)	The United Kingdom does not require public transport helicopters of maximum total weight not exceeding 5 700 kg to provide a means of indicating outside air temperature.
4.15	The United Kingdom does not require all public transport helicopters to be equipped with a pressure altitude reporting transponder.
4.16	The United Kingdom proscribes the use of hand-held microphones below Flight Level 150 in controlled airspace.

Chapter 6

6.2.4	The United Kingdom does not require operators to observe Human Factors principles in the design and application of the maintenance manual.
6.3	The United Kingdom does not require maintenance organizations to ensure maintenance personnel receive training in knowledge and skills related to human performance.

Chapter 8

8.1 8.2* 8.3* 8.4*	The United Kingdom does not explicitly require operators to specify in their operations manuals these instructions on the duties and training associated with the employment of flight operations officers/flight dispatchers.

*Recommended Practice

SECTION III

Chapter 2

2.6.2.2	The commander of the aircraft must be satisfied before flight that the flight can be safely made, taking into account the weather reports and forecasts and any alternative course of action in case the flight cannot be completed as planned.
2.6.3.1	The requirement to discontinue flight towards the destination is not mandated.
2.7.1	The requirement to specify an alternate aerodrome in IFR flight plan is not mandated.
2.7.2	The criteria for specifying off-shore alternates are not included in United Kingdom regulatory material.
2.9.1 2.9.2 2.10	Oxygen requirements are not mandated.
2.19	The requirement for helicopters on over water flights in 4.3.1 to be certificated for ditching is not mandated.

Chapter 4

4.1.1	The following are not required to be approved: maps, charts and codes; first aid equipment; timepieces; torches; whistles; sea anchors; rocket signals; equipment for mooring, anchoring and manoeuvring on water; paddles; food and water; stoves, cooking utensils, snow shovels, ice saws, sleeping bags, arctic suits; and megaphones.
4.1.3.1 a), b) and c) 1)	The requirements for first-aid kit, fire extinguisher and seats are not mandated for all types of flight.
4.1.4.1 4.1.4.2	The method of marking break-in areas may differ.
4.3.1	The flotation equipment requirements for helicopters on over water flights (more than 10 minutes/beyond forced landing distance from land) is not mandated.
4.3.2.1	The United Kingdom relies on provision of guidance material. The United Kingdom recommendations on life jackets and rafts provide a higher level of safety.
4.3.2.2 4.3.2.3 4.3.2.4 4.3.2.5	The United Kingdom relies on provision of guidance material on carriage and use of life jackets and rafts.
4.4	Signalling and life-saving equipment is not mandated for areas where search and rescue would be especially difficult.
4.5.1	Oxygen requirements are not mandated.
4.9.1.4.1	Use of photographic film flight data recorders has not been prohibited from 1 January 2003.
4.9.1.5	The requirements for recording, correlation and duration of data link communications are not mandated for new helicopters from 1 January 2005.

4.9.1.5.1 The requirements for recording, correlation and duration of data link communications are not mandated for all helicopters from 1 January 2007.

4.9.1.5.2 The requirement to record the content and time of data link messages is not mandated.

4.9.1.7 The parameters for Type IVA flight data recorders are not specified in United Kingdom regulatory material.

4.9.4.1 The requirement for Type IVA flight data recorders in new helicopters over 3 180 kg from 1 January 2005 is not mandated.

4.9.5.1 The requirements for cockpit voice recorders for helicopters with maximum certificated take-off mass over 7 000 kg are not mandated for all C of A categories.

4.9.6.3 The requirement for the cockpit voice recorder in new helicopters from 1 January 2003 to retain the last two hours information is not mandated.

4.10.1 The ELT requirements applicable until 1 January 2005 for over water flights (as 4.3.1) are not mandated.

4.10.2 The automatic ELT/survival ELT requirements for over water flights (as 4.3.1) are not mandated for new helicopters from 1 January 2002.

4.10.3 The automatic ELT/survival ELT requirements for over water flights (as 4.3.1) are not mandated for all helicopters from 1 January 2005.

4.10.4 The ELT requirements applicable until 1 January 2005 for flights over designated land areas (as 4.4) are not mandated.

4.10.5 The automatic ELT requirements for flights over designated land areas (as 4.4) are not mandated for new helicopters from 1 January 2002.

4.10.6 The automatic ELT requirements for flights over designated land areas (as 4.4) are not mandated for all helicopters from 1 January 2005.

4.11.1 Partially implemented. The United Kingdom requires pressure-altitude reporting transponder for flight in designated airspace.

4.11.2* The recommendation that all helicopters should be equipped with a pressure-altitude reporting transponder is not implemented.

Chapter 5

5.1.1 The United Kingdom requires radio communication equipment for IFR flight in controlled and notified airspace.

5.1.4 Radio communication equipment capable of communicating on prescribed frequencies is not mandated for flights over water (4.3) and the designated land areas (4.4).

*Recommended Practice

Chapter 6

6.1.1 The operator is responsible for maintenance.
6.2.1
6.3

APPENDIX

2. The United Kingdom does not explicitly require operators to establish an accident prevention and flight safety programme.

SECTION I

General The United States does not accept any provision of Annexes 2, 6, 10 or 11 or any other Annex as a Standard or Recommended Practice as applicable to State aircraft. In accordance with Article 3 (a) of the *Convention on International Civil Aviation*, the Convention and its Annexes are not applicable to State aircraft. In so far as any provisions of Annexes 2, 6, 10 or 11 address the operation or control of State aircraft, the United States considers such provisions to be in the nature of a special recommendation of the Council, advisory only, and not requiring the filing of differences under Article 38 of the Convention.

SECTION II

Chapter 1

General *Note.— There are no helicopter air carrier operations in the United States. There are, however, commercial and on demand operations.*

1.1.5 The pilot-in-command is not required to have available on board the aeroplane essential information concerning search and rescue services in the area over which the helicopter will be flown.

1.1.6 The United States does not require an operator to establish and maintain an accident prevention and flight safety programme, though regulations pertaining to air carrier and commercial operator certification requires that a sufficient number of personnel be made available to ensure the highest degree of safety in its operations.

Chapter 2

2.1.3 The United States does not require heliports to be continuously available for flight operations during their published hours of operation.

2.2.2.1 Some commuter and on demand operators are not required to have an operations manual.

2.2.3.2 The United States allows a helicopter rotor to be turned under power without a qualified pilot at the controls during certain ground operations.

2.2.4 Helicopter operators are not prohibited from simulating emergency or abnormal situations when passengers or cargo are being carried.

2.2.8.1 Helicopter operators are not required to maintain fuel and oil records showing that the requirements of 2.3.6 have been met.

2.2.8.2 Helicopter operators are not required to keep fuel and oil records for three months, though there is a requirement that load manifests be retained for 30 days.

2.2.11 The United States does not require helicopters flown over water in passenger-carrying operations to be certificated for ditching. Rather, the United States requires only that the helicopter be equipped with flotation devices.

2.3.2 The United States requires that flight preparation forms must be retained for 30 days, not three months.

2.3.3.2 The United States does not require that the operations manual describe the contents and use of the operational flight plan, but does require establishing procedures for locating each flight.

2.3.4.1 b) The United States has no requirement that a point of no return (PNR) be determined.
2.3.4.2

2.3.4.3*	The United States has no provision for the use of on-shore versus off-shore alternate heliports.
2.3.6.2 b)	Fuel reserves for VFR helicopter operations is 20 minutes at normal cruise speed beyond the first point of intended landing.
2.3.6.3.1	The United States does not require IFR helicopter operations to maintain a specific altitude above a destination.
2.3.6.3.2	Fuel reserves for IFR helicopter operations is 30 minutes at normal cruise speed beyond the alternate heliport.
2.3.6.3.3	The United States has no provisions addressing when a suitable alternate is unavailable. If the destination weather so requires, an alternate must be specified and a 30-minute fuel reserve must be carried.
2.3.6.4 d) and e)	The operations manual does not include procedures for loss of pressurization and other contingencies.
2.3.7*	The United States does not prohibit refuelling with passengers on board while the engine is operating.
2.3.8	The United States does not require oxygen at all times for passengers experiencing cabin pressure altitudes above 13 000 ft (620 hPa). Oxygen for all passengers is not required until 15 000 ft (4 572 m).
2.4.4.4	The United States does not require all occupants of seats equipped with combined safety belts and shoulder harnesses to be properly secured during take-off and landing and still be able to properly perform their assigned duties. There is no provision in the United States regulations that permit flight crew members to unfasten a shoulder strap if it interferes with the performance of their duties.
2.6	A flight dispatcher is not required for helicopter operations.

Chapter 3

3.1.1 to 3.1.2 3.1.3* 3.1.4 3.1.5* 3.2.1 3.2.7	The United States does not specify or restrict helicopter operations based on performance class or category (see definition of *Performance Class* in Annex 6, Part III, Section I).
3.2.7 a), c) and d)	The United States does not require the helicopter weight limitations found in 3.2.7 a), c) and d).

Chapter 4

4.1.3	Helicopter operators are not required to provide their operations staff and flight crew with an aircraft operating manual.
4.2.2 a)	First-aid equipment is not required on helicopters.
4.2.2 b)	The United States has no provision that fire extinguishers, when discharged, will not cause dangerous contamination of the air within the helicopter.

*Recommended Practice

4.2.2 c) 3)	The United States has no provision for a safety harness device to prevent interference with flight controls should a pilot become incapacitated.
4.2.3	The United States does not require helicopters to carry operations manuals on board the helicopter. However, current helicopter flight manuals must be available in the helicopter.
4.3	One or more flight recorders are not required on multi-engine, turbine-powered helicopters with a passenger seating configuration of twenty or more seats. Multi-engine, turbine-powered helicopters brought onto the United States register after 1 October 1991, having a passenger seating configuration of ten to nineteen seats, must have one or more flight recorders.
4.3.3.1 4.3.3.2*	Flight data recorders are not required for all aircraft that meet this weight criterion. Only helicopters with ten to nineteen seats that are brought onto the United States register after 11 October 1991 must be equipped with the flight data recorder specified in 4.3.3.1.
4.3.5.1 4.3.5.2	In the United States, the effective data for the FDR/CVR rule is 11 October 1991, and the requirement is based on the number of pilots and/or the number of passenger seats, not weight. The United States does not require main rotor speed to be recorded on the CVR if no FDR is installed.
4.3.6	The United States requires cockpit voice recorders in all multi-engine, turbine-powered rotorcraft with a passenger seating configuration of twenty or more seats, and in all multi-engine, turbine-powered rotorcraft with a passenger seating configuration of six or more and for which two pilots are required by certification of operating rules.
4.4.2	The United States does not require helicopters on VFR flights, when operated as controlled flights, to be equipped in accordance with the requirements for helicopters operated under instrument flight rules.
4.5.1	Helicopters flown over water in passenger-carrying operations are not required to be certificated for ditching, but only to be equipped with flotation devices.
4.5.2.1 b) and c)	Life-saving rafts and pyrotechnic signalling devices are only required for extended over-water operations; that is, with respect to helicopters, an operation over water at a horizontal distance of more than 50 NM from the nearest shoreline and more than 50 NM from an off-shore heliport structure.
4.5.2.3 4.5.2.4	The United States does not specify or restrict helicopter operations based on performance class or category. (See definition of Performance Class in Annex 6, Part III, Section I).
4.5.2.6*	The United States does not require that at least 50 per cent of the life rafts should be deployable by remote control.
4.5.2.7*	The United States does not require that rafts which are not deployable by remote control be equipped with some means of mechanically assisted deployment.
4.5.2.8*	The United States does not require helicopters, for which the individual certificate of airworthiness was first issued before 1 January 1991, to comply with the provisions of 4.5.2.6 and 4.5.2.7 no later than 31 December 1992.
4.6	Helicopters operated over land areas designated as areas in which search and rescue would be especially difficult are not required to be equipped with signalling devices or life-saving equipment. The United States does not designate areas in which search and rescue would be especially difficult and therefore does not require such additional equipment.

*Recommended Practice

4.7 Emergency locator transmitters are not required on helicopters.

4.10.1 The United States does not require all helicopters operated in accordance with instrument flight rules to be equipped with two sensitive pressure altimeters.

4.11.1 c) Only one landing light is required for operations conducted at night for hire.

4.11.2* A trainable light is not required for helicopters.

4.12* Airborne weather radar for all passenger carrying helicopters is not required. The United States only requires helicopters with a seating configuration of ten seats or more to be equipped with airborne thunderstorm detection equipment.

4.15 Pressure-altitude reporting transponders are not required on helicopters when air traffic control authorizes deviations or when not required by airspace classification.

4.16 The United States does not require crew members on flight deck duty to communicate through boom or throat microphones below the transition level/altitude.

Chapter 5

5.2.1 The United States does not require a helicopter to be provided with navigation equipment in accordance with RNP types for navigation within the United States However, the United States does provide information and Operations Specifications for IFR operating requirements when United States operators and aircraft conduct operations in the European Airspace Designated for Basic Area Navigation (RNP-5 and 10).

Chapter 6

6.1 All United States helicopters used in commercial air transport are certified as commuter or on demand operations. Maintenance on United States commuter and on demand helicopters may be performed by either an approved maintenance organization, a certified mechanic, or by persons under the supervision of a certified mechanic.

6.3 The United States does not require an operator's maintenance training programme to include training in knowledge and skills related to human performance.

6.8.2 The United States requires that records of work must be retained until the work is repeated, superseded by other work, or for one year after the work is performed.

Chapter 7

7.1.2 Flight crew members are not required to have a separate license to operate the radio.

7.4.1
7.4.2 The United States recency of experience requirements for pilots do not specify that the experience be in the same type of helicopter as will be used in a particular operation.

7.4.3.2 Helicopters pilots are not required to demonstrate to the operator an adequate knowledge of the specific areas described in 7.4.3.2

*Recommended Practice

7.4.3.3 The United States does not have a requirement that a pilot-in-command for non-scheduled commercial helicopter operations make an actual approach into each heliport of landing on a route while accompanied by a pilot qualified for the heliport.

7.4.4 The United States does not require the second-in-command pilot to demonstrate proficiency twice during a period of one year to either a check pilot of the operator or to a representative of the State of the Operator.

7.5 The United States practice is to require a spare set of correcting lenses only when a flight crew member's defective visual acuity necessitates a limitation on the pilot's medical certificate.

Chapter 8

8.1 The FAA does not require helicopter operators to employ a licensed flight operations officer/flight dispatcher for helicopter operations.

8.2* The FAA has no specific knowledge requirements for a flight operations officer/flight dispatcher used by a helicopter operator.

8.3* The FAA has no specific requirements concerning familiarization with all features of an operation for a flight operations officer/flight dispatcher used by a helicopter operator.

8.4* The FAA has no requirements for the assignment of a flight operations officer/flight dispatcher after 12 consecutive months of absence from such duties.

Chapter 9

9.4.1* The load manifest (the United States equivalent to the journey logbook) does not contain items for time of departure and arrival, nature of flight, incidents, or signature of person in charge.

9.4.2* Entries in the load manifest (the United States equivalent of the journey logbook) are not required to be made in ink or indelible pencil.

9.4.3* The United States requires that load manifest (the United States equivalent of the journey logbook) be held for 30 days, not six months.

9.5 The United States does not require that an operator keep a list of the emergency and survival equipment carried on board any of their helicopters engaged in international air navigation.

Chapter 11

11.1 A checklist containing procedures to be followed in searching for a suspected bomb is not required to be aboard the aircraft. The United States requires that crew members be trained in dealing with explosives that may be on board an aircraft, but this does not necessarily include training on how to search for an explosive.

11.2.1 The United States does not require an operator to establish and maintain a training programme that enables crew members to act in the most appropriate manner to minimize the consequences of acts of unlawful interference.

*Recommended Practice

11.3 The pilot-in-command is not required to submit, without delay, a report of an act of unlawful interference to the designated local authority.

SECTION III

Chapter 1

1.1.5* The pilot-in-command is not required to have available on board the helicopter essential information concerning search and rescue services.

Chapter 2

2.3.1 The pilot-in-command is not required to ensure that crew members and passengers are made familiar, by means of oral briefing or other means, with the location and use of emergency exits, life jackets, oxygen dispensing equipment or other emergency equipment provided for individual use.

2.3.2 The pilot-in-command is not required to 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 e) The pilot-in-command is not specifically required, prior to commencing a flight, to be satisfied that any load carried is safely secured.

2.6.2.1 A destination alternate heliport is not required when the weather at the heliport of intended landing is forecast to have a ceiling of at least 2 000 ft (6 096 m)and a visibility of at least three miles (5 km). In the United States, standard alternate heliport minima are prescribed as 600 ft (183 m) ceiling and two miles (3 km) visibility for precision approaches and as 800 ft (244 m) ceiling and two miles (3 km) visibility for non-precision approaches.

2.6.2.2 The United States allows for meteorological conditions at the estimated time of arrival and for one hour before and after the estimated time of arrival, not two hours.

2.6.2.2 a) The United States allows for a ceiling of 200 ft (61 m) above the minimum for the approach to be flown, not 400 ft (122 m).

2.7.2 The United States has no provision for one-engine inoperative performance capability.

2.7.3* The United States has no provision that off-shore alternates should not be used when it is possible to carry enough fuel to have an on-shore alternate.

2.8.2 b) Fuel reserves for VFR operations are 20 minutes at normal cruise speed.

2.8.3.1 a)
2.8.3.2 b) The United States does not require that a specific altitude above the alternate be maintained.

2.8.3.3 The United States does not permit filing of an IFR flight where a suitable alternate is not available. If the destination weather so requires, an alternate must be specified and a thirty-minutes fuel reserve carried.

2.8.4 d) The United States does not require that the procedures for loss of pressurization, where applicable, or failure of one power-unit while en route, be part of the required fuel and oil computations.

*Recommended Practice

2.9.1 Oxygen supply requirement applies to crew members at altitudes between 12 500 ft (3 810 m) and 14 000 ft (4 267 m). For passengers, the requirement applies above 15 000 ft (4 572 m).

2.9.2 The United States does not require that a flight to be operated with a pressurized helicopter carry a sufficient quantity of stored breathing oxygen 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.

2.10 The United States requirement for use of breathing oxygen by flight crew members applies only to altitudes above 14 000 ft (4 267 m).

2.11 During an emergency, the pilot-in-command is not required to ensure that all persons on board the aircraft are instructed in emergency procedures.

2.14 b) The pilot-in-command is not specifically required to discontinue a flight beyond the nearest suitable aerodrome when flight crew members's capacity to perform functions is significantly reduced by impairment of faculties from causes such as fatigue, sickness, and lack of oxygen.

2.17 The United States does not require that helicopter rotor not be turned under power without a qualified pilot at the controls.

2.18.1* The United States has no provisions regarding aircraft refuelling while passengers are on board or are embarking or disembarking.

2.18.2* The United States has no provisions for ensuring two-way communications when refuelling while passengers are on board or are embarking or disembarking.

2.19 The United States does not require all helicopters on flight over water to be certificated for ditching.

Chapter 3

3.1 The United States has no equivalent to mass/noise operating limitations.

3.3
3.4* The United States does not specify or restrict helicopter operations based on performance class or category (see definition of *Performance Class* in Annex 6, Part III, Section I).

Chapter 4

4.1.3.1 The United States does not require helicopters to be equipped with:

a) a first-aid kit or portable fire extinguishers;

b) seat or berth for each person;

c) current and suitable air navigation charts; or

d) spare electrical fuses for VFR day operations.

4.1.3.2* The United States does not require helicopters to be equipped with ground-air signal codes for search and rescue purposes.

*Recommended Practice

4.1.3.3*	The United States requires only helicopters manufactured after 16 September 1992 to be equipped with a safety belt and shoulder harness for each occupant's seat.
4.2.1 b)	An accurate timepiece is not required for VFR flights.
4.2.2*	The United States does not require helicopters on VFR flights, when operated as controlled flights, to be equipped in accordance with the requirements for helicopters operated under instrument flight rules.
4.3.1	The United States has no provisions for a helicopter to have a permanent or rapidly deployable means of flotation to ensure safe ditching when operating on flights over water.
4.3.2.1 4.3.2.4	The United States does not specify helicopter equipment based on performance class or category (see definition of *Performance Class* in Annex 6, Part III, Section I).
4.3.2.1 b)	Life-saving rafts are not required on helicopters operating on flights over water.
4.3.2.5	The United States does not require that each life jacket and equivalent individual flotation device, when carried in accordance with 4.3, be equipped with a means of electric illumination for the purpose of facilitating the location of persons.
4.3.2.6* 4.3.2.7* 4.3.2.8*	Life-saving rafts are not required on helicopters operating on flights over water.
4.4	Helicopters operated over land areas designated as areas in which search and rescue would be especially difficult are not required to be equipped with signalling devices or life-saving equipment. The United States does not designate areas in which search and rescue would be especially difficult and therefore does not require such additional equipment.
4.6 f)	Only one attitude indicator (artificial horizon) is required for helicopters operated in accordance with the instrument flight rules or when the helicopter cannot be maintained in a desired attitude without reference to one or more flight instruments.
4.7.1 c)	Landing lights are required for night operations only if the helicopter is operated for hire.
4.7.1 f)	Flashlights (electric torches) are not required for night operations.
4.7.2*	Landing lights that are at least trainable in the vertical plane are not required for night operations.
4.9.3.1 4.9.3.2*	The United States does not base requirements for flight data recorders on aircraft weight, but on passenger and engine configuration.
4.9.9	The United States does not have a specific regulation to require operational checks and evaluations of recordings from the flight data recorder and cockpit voice recorder to ensure continued serviceability of the recorders. However, the United States does require this maintenance function to be carried out as part of the instruction for continued airworthiness.

*Recommended Practice

4.10.1 to 4.10.2 4.10.3 4.10.4 4.10.5 4.10.6 4.10.7* 4.10.8	The United States does not require emergency locator transmitters for helicopters.
4.11.2*	Depending on the airspace, the United States exempts general aviation aircraft concerning transponder equipage.
4.12*	The United States does not require crew members on flight deck duty to communicate through boom or throat microphones below the transition level/attitude.

Chapter 5

5.1.1	Except when operating under controlled flight, helicopters are not required to have radio communications equipment for night operations.
5.1.2	The United States does not require that the radio communications equipment specified in 5.1.1 be independent of the other or others to the extent that failure in any one will not result in failure of any other.
5.1.4	Except when operating under controlled flight, helicopters on extended flights over water or on flights over underdeveloped land are not required to have radio communications equipment.
5.2	The United States has no minimum navigation equipment requirement for VFR operations.
5.2.1 c)	The United States has no provision that visual landmarks used in VFR be located at least every 60 NM (110 km).

Chapter 6

6.2.2	The United States requires that records of work must be retained until the work is repeated, superseded by other work, or for one year after the work is performed.

*Recommended Practice