COVER SHEET TO AMENDMENT 31

INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

OPERATION OF AIRCRAFT

ANNEX 6
TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

PART I
INTERNATIONAL COMMERCIAL AIR TRANSPORT — AEROPLANES

EIGHTH EDITION — JULY 2001

INTERNATIONAL CIVIL AVIATION ORGANIZATION

Checklist of Amendments to Annex 6, Part I

	Effective date	*Date of applicability*
Eighth Edition (incorporates Amendments 1 to 26)	16 July 2001	1 November 2001
Amendment 27 (adopted by the Council on 15 March 2002)	15 July 2002	28 November 2002
Amendment 28 (adopted by the Council on 13 March 2003)	14 July 2003	27 November 2003
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Amendment 30 (adopted by the Council on 14 March 2006)	17 July 2006	23 November 2006
Amendment 31 (adopted by the Council on 14 March 2007) Replacement pages (iii), (iv), (vi) to (viii), (xxi), 1-5, 6-3, 6-10, 6-11, 7-1, 7-2, 8-3, 11-1, APP 2-2 and APP 2-3	16 July 2007	22 November 2007 1 July 2008 1 January 2009 1 January 2012

Transmittal note

Amendment 31

to the

International Standards and
Recommended Practices

OPERATION OF AIRCRAFT

(Annex 6, Part I to the Convention on International Civil Aviation)

1. Insert the following new and replacement pages in Annex 6, Part I (Eighth Edition) to incorporate Amendment 31 which becomes applicable on 22 November 2007:

a)	Pages (iii) and (iv)	— Table of Contents
b)	Pages (vi) to (viii)	— Abbreviations and Symbols
c)	Page (xxi)	— Foreword
d)	Page 1-5	— Chapter 1
e)	Pages 6-3, 6-10 and 6-11	— Chapter 6
f)	Pages 7-1 and 7-2	— Chapter 7
g)	Page 8-3	— Chapter 8
h)	Page 11-1	— Chapter 11
i)	Pages APP 2-2 and APP 2-3	— Appendix 2

2. Record the entry of this amendment on page (ii).

16/7/07

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ABBREVIATIONS AND SYMBOLS

(used in this Annex)

Abbreviations

AC	Alternating current
ACAS	Airborne collision avoidance system
ADS	Automatic dependent surveillance
ADS-C	Automatic dependent surveillance — contract
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
ASE	Altimetry system error
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)	Automatic 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
hPa	Hectopascal
IFR	Instrument flight rules
ILS	Instrument landing system

Abbreviations

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	Low pressure compressor speed (two-stage compressor); fan speed (three-stage compressor)
N_2	High pressure compressor speed (two-stage compressor); intermediate pressure compressor speed (three-stage compressor)
N_3	High pressure compressor speed (three stage compressor)
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
RCP	Required communication performance
RNP	Required navigation performance
RVR	Runway visual range
RVSM	Reduced vertical separation minima
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
TLS	Target level of safety
TODA	Take-off distance available
TORA	Take-off run available
TVE	Total vertical error
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

Abbreviations

VOR	VHF omnidirectional radio range
V_{S_0}	Stalling speed or the minimum steady flight speed in the landing configuration
V_{S_1}	Stalling speed or the minimum steady flight speed in a specified configuration
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 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 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

ATM — Air Traffic Management (Doc 4444)

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

TRG — Training (Doc 9868)

Regional Supplementary Procedures (Doc 7030)

Manuals

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 of Procedures for the Establishment of a State's Personnel Licensing System (Doc 9379)

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 Communications Performance (RCP) (Doc 9869)

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

Preparation of an Operations Manual (Doc 9376)

Safety Management Manual (SMM) (Doc 9859)

Safety Oversight Manual (Doc 9734)
Part A — *The Establishment and Management of a State's Safety Oversight System*

Training Manual (Doc 7192)
Part D-3 — *Flight Operations Officers/Flight Dispatchers*

Circulars

Guidance Material on SST Aircraft Operations (Cir 126)

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

Amendment	*Source(s)*	*Subject(s)*	*Adopted Effective Applicable*
30	First meeting of the Surveillance and Conflict Resolution Systems Panel, Second meeting of the Flight Crew Licensing and Training Panel, Fourteenth meeting of the Obstacle Clearance Panel, a proposal by the United States, Council request, Assembly Resolution A35-17, 35th Session of the Assembly, and the Eleventh Air Navigation Conference	a) The carriage of altitude encoders with higher resolution; b) pilot recent experience and proficiency check requirements, cross-crew qualification and cross-crediting of experience, evaluation of competency, threat and error management and the biannual pilot proficiency check; c) pilot awareness of operational requirements determined by procedure design; d) qualifications for flight operations officers/flight dispatchers and the critical elements of a State regulatory system; e) the carriage of a copy of the air operator certificate in aircraft; f) legal guidance for the protection of information from safety data collection and processing systems; and g) safety management provisions and references to new guidance material on the concept of acceptable level of safety.	14 March 2006 17 July 2006 23 November 2006
31	First meeting of the Operational Data Link Panel (OPLINKP/1), First meeting of the Surveillance and Conflict Resolution Systems Panel (SCRSP/1) and Air Navigation Commission study	a) Amendments to Standards to facilitate implementation of the available technology in relation to the use of automatic dependent surveillance — contract (ADS-C) and to the introduction of required communication performance (RCP) in the provision of air traffic services (ATS); b) amendment of existing provisions related to the mandatory carriage requirements of emergency locator transmitters (ELTs) as of 1 July 2008; and c) changes to Standards related to pressure-altitude data sources used by transponders as of 1 January 2009 and 1 January 2012.	14 March 2007 16 July 2007 22 November 2007 1 July 2008 1 January 2009 1 January 2012

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

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

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.

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

Safety programme. An integrated set of regulations and activities aimed at improving safety.

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.

Target level of safety (TLS). A generic term representing the level of risk which is considered acceptable in particular circumstances.

Total vertical error (TVE). The vertical geometric difference between the actual pressure altitude flown by an aircraft and its assigned pressure altitude (flight level).

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 8.

** As defined in Annex 2.

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).

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 — contract (ADS-C), 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 an 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 an 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, are 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.

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 shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

6.15.3 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.

6.15.4 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.

6.15.5 **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 6.15.8 a) and c), warning of unsafe terrain clearance and a forward looking terrain avoidance function.*

6.15.6 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 6.15.8 a) and c), warning of unsafe terrain clearance and a forward looking terrain avoidance function.

6.15.7 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.

6.15.8 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)

Applicable until 30 June 2008

6.17.1 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.

6.17.2 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.

6.17.3 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.

6.17.4 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.

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

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

Applicable from 1 July 2008

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

6.17.8 Except as provided for in 6.17.9, from 1 July 2008, all aeroplanes authorized to carry more than 19 passengers shall be equipped with at least one automatic ELT or two ELTs of any type.

6.17.9 All aeroplanes authorized to carry more than 19 passengers for which the individual certificate of airworthiness is first issued after 1 July 2008 shall be equipped with at least two ELTs, one of which shall be automatic.

6.17.10 Except as provided for in 6.17.11, from 1 July 2008, all aeroplanes authorized to carry 19 passengers or less shall be equipped with at least one ELT of any type.

6.17.11 All aeroplanes authorized to carry 19 passengers or less for which the individual certificate of airworthiness is first issued after 1 July 2008 shall be equipped with at least one automatic ELT.

6.17.12 ELT equipment carried to satisfy the requirements of 6.17.7, 6.17.8, 6.17.9, 6.17.10 and 6.17.11 shall operate in accordance with the relevant provisions of Annex 10, Volume III.

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

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 Requirements for pressure-altitude reporting transponders

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

6.19.2 All aeroplanes for which the individual certificate of airworthiness is first issued after 1 January 2009 shall be equipped with a data source that provides pressure-altitude information with a resolution of 7.62 m (25 ft), or better.

6.19.3 After 1 January 2012, all aeroplanes shall be equipped with a data source that provides pressure-altitude information with a resolution of 7.62 m (25 ft), or better.

6.19.4 **Recommendation.** *The Mode S transponder should be provided with the airborne/on-the-ground status if the aeroplane is equipped with an automatic means of detecting such status.*

Note 1.— These provisions will improve the effectiveness of airborne collision avoidance systems as well as air traffic services that employ Mode S radar. In particular, tracking processes are significantly enhanced with a resolution of 7.62 m (25 ft), or better.

Note 2.— Mode C replies of transponders always report pressure altitude in 30.50 m (100 ft) increments irrespective of the resolution of the data source.

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.*

6.22 All aeroplanes operated by a single pilot under the instrument flight rules (IFR) or at night

For approval in accordance with 4.9.1, all aeroplanes operated by a single pilot under the IFR or at night shall be equipped with:

a) a serviceable autopilot that has at least altitude hold and heading select modes;

b) a headset with a boom microphone or equivalent; and

c) means of displaying charts that enables them to be readable in all ambient light conditions.

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.

7.1.3 For flights in defined portions of airspace or on routes where an RCP type has been prescribed, an aeroplane shall, in addition to the requirements specified in 7.1.1:

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

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

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

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 reduced vertical separation minimum (RVSM) of 300 m (1 000 ft) is applied between FL 290 and FL 410 inclusive, an aeroplane:

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

*In preparation.

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 Prior to granting the RVSM approval required in accordance with 7.2.4 b), the State shall be satisfied that:

a) the vertical navigation performance capability of the aeroplane satisfies the requirements specified in Appendix 4;

b) the operator has instituted appropriate procedures in respect of continued airworthiness (maintenance and repair) practices and programmes; and

c) the operator has instituted appropriate flight crew procedures for operations in RVSM airspace.

Note.— An RVSM approval is valid globally on the understanding that any operating procedures specific to a given region will be stated in the operations manual or appropriate crew guidance.

7.2.6 The State of the Operator, in consultation with the State of Registry if appropriate, shall ensure that, in respect of those aeroplanes mentioned in 7.2.4 , adequate provisions exist for:

a) receiving the reports of height-keeping performance issued by the monitoring agencies established in accordance with Annex 11, 3.3.4.1; and

b) taking immediate corrective action for individual aircraft, or aircraft type groups, identified in such reports as not complying with the height-keeping requirements for operation in airspace where RVSM is applied.

7.2.7 All States that are responsible for airspace where RVSM has been implemented, or have issued RVSM approvals to operators within their State, shall establish provisions and procedures which ensure that appropriate action will be taken in respect of aircraft and operators found to be operating in RVSM airspace without a valid RVSM approval.

Note.— These provisions and procedures need to address both the situation where the aircraft in question is operating without approval in the airspace of the State, and the situation where an operator for which the State has regulatory oversight responsibility is found to be operating without the required approval in the airspace of another State.

7.2.8 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 RVSM is applied 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).*

7.2.9 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.

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.

7.4 Electronic navigation data management

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

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

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

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, 4.2.3 f) and 4.2.4; 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 Safety management

8.7.3.1 States shall establish a safety programme in order to achieve an acceptable level of safety in the maintenance of aircraft.

8.7.3.2 The acceptable level of safety to be achieved shall be established by the State(s) concerned.

Note.— Guidance on safety programmes and on defining acceptable levels of safety is contained in Attachment E to Annex 11 and in the Safety Management Manual (SMM) *(Doc 9859).*

8.7.3.3 **Recommendation.—** *States should require, as part of their safety programme, that a maintenance organization implement a safety management system acceptable to the State that, as a minimum:*

a) identifies safety hazards;

b) ensures that remedial action necessary to maintain an acceptable level of safety is implemented;

c) provides for continuous monitoring and regular assessment of the safety level achieved; and

d) aims to make continuous improvement to the overall level of safety.

8.7.3.4 From 1 January 2009, States shall require, as part of their safety programme, that a maintenance organization implement a safety management system acceptable to the State that, as a minimum:

a) identifies safety hazards;

b) ensures that remedial action necessary to maintain an acceptable level of safety is implemented;

c) provides for continuous monitoring and regular assessment of the safety level achieved; and

d) aims to make continuous improvement to the overall level of safety.

8.7.3.5 A safety management system shall clearly define lines of safety accountability throughout a maintenance organization, including a direct accountability for safety on the part of senior management.

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

8.7.4 Maintenance procedures and quality assurance system

8.7.4.1 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.

8.7.4.2 The maintenance organization shall ensure compliance with 8.7.4.1 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.

8.7.5 Facilities

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

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

8.7.5.3 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.

8.7.6 Personnel

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

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

8.7.6.3 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.

8.7.6.4 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 coordination 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).*

8.7.7 Records

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

8.7.7.2 The records required by 8.7.7.1 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) the date such maintenance was completed;

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

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

CHAPTER 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, 4.2.3 f) and 4.2.4;

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

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) Areas, 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) Areas, 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 loss of pressurization and the failure of one or more power-units 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 Procedures for familiarization with areas, routes and aerodromes.

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, 6.1.4.

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 The maximum crosswind and tailwind components for each aeroplane type operated and the reductions to be applied to these values having regard to gusts, low visibility, runway surface conditions, crew experience, use of autopilot,

abnormal or emergency circumstances, or any other relevant operational factors.

2.2.6 Instructions and data for mass and balance calculations.

2.2.7 Instructions for aircraft loading and securing of load.

2.2.8 Aircraft systems, associated controls and instructions for their use, as required by Chapter 6, 6.1.4.

2.2.9 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.

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

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

2.2.12 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.

2.2.13 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.

2.2.14 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.