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 a) An aeroplane registered in Nepal shall not be operated unless the requirements in respect of emergency and life saving equipment, navigational equipment, instrument approach equipment, flight recorders, oxygen and its dispensing apparatus, flight controls and other equipment specified in this chapter are complied with.

b) 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.

6.1.2 An operator shall carry a certified true copy of the Air Operator Certificate specified in 4.2.1 and a copy of the Operations Specifications relevant to the aeroplane type, issued in conjunction with the certificate. When the certificate and the associated Operations Specifications are issued in a language other than English, an English translation shall be included.


6.1.3 The operator shall include in the operations manual a Minimum Equipment List (MEL), approved by the Director General of CAAN 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.— Appendix 3 contains guidance on the minimum equipment list.
6.1.4 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 maneuvers 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, as specified by Director General, CAAN.

   Medical supplies should comprise;

   1) One or more first aid kits for the use of cabin crew in managing incidents of ill health; and

   2) For aeroplanes required to carry cabin crew as part of the operating crew, one universal precaution kit (two for aeroplanes authorized to carry more than 250 passengers) for the use of cabin crew members in managing incidents of ill health associated with a case of suspected communicable disease, or in the case of illness involving contact with body fluids; and

   3) For aeroplanes authorized to carry more than 100 passengers, on a sector length of more than two hours, a medical kit, for the use of medical doctors or other qualified persons in treating in-flight medical emergencies.

   Note.—Types, number, location and contents of medical supplies are contained in Appendix 4.

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:

   i) the pilot’s compartment; and
ii) 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) i) a seat or berth for each person over an age of two years.
   ii) a seat belt for each seat and restraining belts for each berth; and
   iii) 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;
   iv) a safety harness for seat of each cabin crew who is associated with emergency evacuation duties.

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:
   i) when seat belts are to be fastened;
   ii) when and how oxygen equipment is to be used if the carriage of oxygen is required;
   iii) restrictions on smoking;
   iv) location and use of life jackets or equivalent individual flotation devices where their carriage is required; and
   v) 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 the following documents:

a) the operations manual in parts that pertain to flight operations;

b) the Nepalese Certificate of Registration issued in relation to that aeroplane;

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.

d) the Nepalese Certificate of Airworthiness issued in relation to that aeroplane;

e) the current Maintenance Release issued in relation to that aeroplane;

f) 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;
a) the Mobile Radio Station Licenses issued in relation to the radio equipment installed in the aeroplane;
b) the current licenses held by each member of the flight crew;
c) the aeroplane journey log book or general declaration;
d) if passengers are carried, a list of their names, places of embarkation and intended place of disembarkation;
e) if cargo is carried, bills of loading and manifests relating to that cargo;
f) a copy of the operational flight plan;
g) a copy of the Air Traffic Control flight plan, if applicable;
h) the load sheet relating to the calculation of mass of the aeroplane;
i) the trim sheets relating to the disposition of the load and balance of the aeroplane and;
j) Aeroplane search procedure checklist
   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 and information on the least-risk bomb location specific to the aeroplane.
k) Standard Operating Procedure
l) A certified true copy of the Air Operator Certificate for commercial aeroplanes
m) A certified true copy of validated noise certificate for international operations

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. See figure below.

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.- Crash protected flight recorders comprise four systems: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) and a data link recorder (DLR). Image and data link information may be recorded on either the CVR or the FDR.

Note 2.- Lightweight flight recorders comprise four systems: an aircraft data recording system (ADRS), a cockpit audio recording system (CARS), an airborne image recording system (AIRS) and a data link recording system (DLRS). Image and data link information may be recorded on either the CARS or the ADRS.

Note 3.— Detailed guidance on flight recorders is contained in APPENDIX 8.

6.3.1 FLIGHT DATA RECORDERS AND AIRCRAFT DATA RECORDING SYSTEMS

Note 1.— FDR and AIR performance requirements are as contained in the EUROCAE ED-112, Minimum Operational Performance Specification (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

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

Note 3.— Parameters to be recorded are listed in Tables A8-1 and A8-3 of Appendix 8.

6.3.1.1 Types

6.3.1.1.1 A Type I and IA 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.

6.3.1.2 Operation

Note.— Airborne image recorders (AIRs) classification is defined in 4.1 of Appendix 8.

6.3.1.2.1 All turbine-engined aeroplanes of a maximum certificated take-off mass of 5 700 kg or less for which a type certificate is first issued on or after 1 January 2016 shall be equipped with:

a) a Type II FDR; or

b) a Class C AIR capable of recording flight path and speed parameters displayed to the pilot(s); or

c) an ADRS capable of recording the essential parameters defined in Table A8-3 of Appendix 8.

Note.— Type certificate first issued refers to the date of issuance of the original “Type Certificate” for the aeroplane type, not the date of certification of particular aeroplane variants or derivative models.

6.3.1.2.2 All turbine-engined 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 2016 should be equipped with:

a) a Type II FDR; or

b) a Class C AIR capable of recording flight path and speed parameters displayed to the pilot(s); or

c) an ADRS capable of recording the essential parameters defined in Table A8-3 of Appendix 8.

6.3.1.2.3 All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1989 shall be equipped with a Type I FDR.

6.3.1.2.4 All aeroplanes of a maximum certificated take-off mass of over 5 700 kg, up to and including 27 000 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1989, shall be equipped with a Type II FDR.

6.3.1.2.5 RESERVED
6.3.1.2.6 All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued on or after 1 January 1987 but before 1 January 1989, with a maximum certificated take-off mass of over 5 700 kg, except those in 6.3.1.2.8, shall be equipped with an FDR which shall record time, altitude, airspeed, normal acceleration and heading.

6.3.1.2.7 RESERVED

6.3.1.2.8 All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued on or after 1 January 1987 but before 1 January 1989, with 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.

6.3.1.2.9 All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1 January 1987, with a maximum certificated take-off mass of over 5 700 kg shall be equipped with an FDR which shall record time, altitude, airspeed, normal acceleration and heading.

6.3.1.2.10 RESERVED

6.3.1.2.11 All 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 2005 shall be equipped with a Type IA FDR.

6.3.1.2.12 All aeroplanes which are required to record normal acceleration, lateral acceleration and longitudinal acceleration for which a type certificate is first issued on or after 1 January 2016 and which are required to be fitted with an FDR shall record those parameters at a maximum sampling and recording interval of 0.0625 seconds.

6.3.1.2.13 All aeroplanes which are required to record pilot input and/or control surface position of primary controls (pitch, roll, yaw) for which a type certificate is first issued on or after 1 January 2016 and which are required to be fitted with an FDR shall record those parameters at a maximum sampling and recording interval of 0.125 seconds.

Note.— For aeroplanes with control systems in which movement of a control surface will back drive the pilot’s control, “or” applies. For aeroplanes with control systems in which movement of a control surface will not back drive the pilot’s control, “and” applies. In aeroplanes with independent moveable surfaces, each surface needs to be recorded separately. In aeroplanes with independent pilot input on primary controls, each pilot input on primary controls needs to be recorded separately.
6.3.1.3 Discontinuation

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

6.3.1.3.2 RESERVED

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

6.3.1.3.4 The use of photographic film FDRs shall be discontinued.

6.3.1.3.5 RESERVED.

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

6.3.1.4 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.

6.3.2 COCKPIT VOICE RECORDERS (CVR) AND COCKPIT AUDIO RECORDING SYSTEMS (CARS)

Note 1.— CVR performance requirements are as contained in the EUROCAE ED-112, Minimum Operational Performance Specification (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

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

6.3.2.1 Operation

6.3.2.1.1 All turbine-engined aeroplanes for which a type certificate is first issued on or after 1 January 2016 and required to be operated by more than one pilot shall be equipped with either a CVR or a CARS.

6.3.2.1.2 RESERVED

6.3.2.1.3 All 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 2003, shall be equipped with a CVR capable of retaining the information recorded during at least the last two hours of its operation.
6.3.2.1.4 All 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 1987 shall be equipped with a CVR.

6.3.2.1.5 All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1 January 1987, with 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.

6.3.2.1.6 RESERVED

6.3.2.2 Discontinuation

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

6.3.2.2.2 RESERVED

6.3.2.3 Duration

6.3.2.3.1 All CVRs shall be capable of retaining the information recorded during at least the last 30 minutes of their operation.

6.3.2.3.2 From 1 January 2016, all CVRs shall be capable of retaining the information recorded during at least the last two hours of their operation.

6.3.2.3.3 RESERVED

6.3.3 DATA LINK RECORDERS

Note.—Data link recorders performance requirements are as contained in the EUROCAE ED-112, Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

6.3.3.1 Applicability

6.3.3.1.1 All aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 2016, which utilize any of the data link communications applications listed in 5.1.2 of Appendix 8 and are required to carry a CVR, shall record on a flight recorder the data link communications messages.

6.3.3.1.2 All aeroplanes which are modified on or after 1 January 2016 to install and utilize any of the data link communications applications listed in 5.1.2 of Appendix 8 and are required to carry a CVR shall record on a flight recorder the data link communications messages.
Note 1.— Data link communications are currently conducted by either ATN-based or FANS 1/A-equipped aircraft.

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

6.3.3.2 Duration

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

6.3.3.3 Correlation

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

6.3.4 FLIGHT RECORDERS – GENERAL

6.3.4.1 Construction and installation

All flight recorders shall be constructed, located and installed as per the requirements of the Nepalese Civil Airworthiness Requirements.

6.3.4.2 Flight Recorders – operation

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

6.3.4.2.2 To preserve flight recorder records, flight recorders shall be deactivated upon completion of flight time following an accident or incident. The flight recorders shall not be re-activated before their disposition as determined in accordance with ICAO Annex 13 or as advised by the Director General of CAAN.

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 operations.

Note 2 – The operator’s responsibilities regarding the retention of flight recorders are contained in 11.6.

6.3.4.3 Flight Recorders – continued serviceability

Operational checks and evaluation of recordings from the flight recorder systems shall be conducted to ensure the continued serviceability of the recorders.
6.3.4.4 Flight recorder electronic documentation

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

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

6.3.4.5 Combination recorders

6.3.4.5.1 RESERVED

6.3.4.5.2 All aeroplanes of a maximum certificated take-off mass of over 15 000 kg for which the type certificate is first issued on or after 1 January 2016 and which are required to be equipped with both a CVR and an FDR, shall be equipped with two combination recorders (FDR/CVR). One recorder shall be located as close to the cockpit as practicable and the other recorder located as far aft as practicable.

6.3.4.5.3 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).

Note.— The requirement of 6.3.4.5 may be satisfied by equipping the aeroplanes with two combination recorders (one forward and one aft) or separate devices.

6.3.4.5.4 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).

6.4 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 Director General of CAAN.
6.4.2 VFR flights which are operated as controlled flights shall be equipped in accordance with 6.9 (All Aeroplanes Operated In Accordance With Instrument Flight Rules).

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 Aeroplanes 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 DG, CAAN, 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 ICAO 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 Director General, CAAN as areas in which search and rescue would be especially difficult, shall be equipped with such signaling 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:*

<table>
<thead>
<tr>
<th>Absolute pressure</th>
<th>Meters</th>
<th>Feet</th>
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<tbody>
<tr>
<td>700 hPa</td>
<td>3 000</td>
<td>10 000</td>
</tr>
<tr>
<td>620 hPa</td>
<td>4 000</td>
<td>13 000</td>
</tr>
<tr>
<td>376 hPa</td>
<td>7 600</td>
<td>25 000</td>
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</tbody>
</table>

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 RESERVED

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 4.2.8.2. 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 RESERVED

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 clock indicating the time in hours, minutes and seconds in sweeping hand; or an approved equivalent;

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) for each pilot station, an airspeed indicating system with means of preventing malfunctioning due to either condensation or icing;

e) for each pilot station, a turn and slip indicator;

f) for each pilot station, one attitude indicator (artificial horizon);
g) for each pilot station, one 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) for each pilot station, a rate-of-climb and descent indicator; and

k) a Transponder with Mode C capability.

l) a power failure warning device or vacuum indicator to show the power available for gyroscopic instruments from each power source.

m) an alternate source of static pressure for the altimeter and the airspeed and vertical speed indicators.

n) for single-engine aeroplanes:

(i) two independent electrical power generating sources each of which is able to supply all probable combinations of continuous in-flight electrical loads for required instruments and equipment — where continuous in-flight electrical load includes one that draws current continuously during flight, such as radio equipment, electrically driven instruments and lights but does not include occasional intermittent loads; or

(ii) in addition to the primary electrical power generating source, a standby battery or an alternate source of electric power that is capable of supplying 150% of the electrical loads of all required instruments and equipment necessary for safe emergency operation of the aircraft for at least one hour.

o) for multi-engine aeroplanes, at least two generators or alternators each of which is on a separate engine, of which any combination of one-half of the total number are rated sufficiently to supply the electrical loads of all required instruments and equipment necessary for safe emergency operation of the aeroplane.

p) two independent sources of energy (with means of selecting either) of which at least one is an engine driven pump or generator, each of which is able to drive all required gyroscopic instruments powered by, or to be powered by, that particular source and installed so that failure on one instrument or source, does not interfere with the energy supply to the remaining instruments or the
other energy source. For multi-engine aeroplanes, each engine driven source of energy must be on a different engine.

q) such additional instruments or equipment as may be prescribed by the Director General of CAAN.

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, which includes either the aircraft battery or an independent power pack of the artificial horizon or both, shall be:

(i) automatically operative after the total failure of the main electrical generating system; and
(ii) in the case of dedicated power supply, 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 ALL AEROPLANES OPERATED IN ACCORDANCE WITH INSTRUMENT FLIGHT RULES.

b) the lights required by ICAO 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;

6.11 PRESSURIZED AEROPLANES WHEN CARRYING PASSENGERS -- WEATHER RADAR

Pressurized aeroplanes when carrying passengers shall 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 15000 m (49000 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 DG, CAAN.*

6.13 ALL AEROPLANES COMPLYING WITH THE NOISE CERTIFICATION STANDARDS IN ANNEX 16, VOLUME I

An aeroplane engaged in international air transportation operations, 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 Director General of CAAN.*

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 a) 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 and issued with a Nepalese Certificate of Registration before 12 January 2011, shall be equipped with a ground proximity warning system. However, all aircraft weighing less than 5,700 kg and authorized to carry more than nine passengers and issued with a Nepalese Certificate of Registration before 12 January 2011, need not be equipped with a ground proximity warning system.

b) All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5,700 kg, not installed with GPWS, shall be limited to VFR operation only.

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, meeting the requirements for Class A equipment in (Technical Standard Order) TSO-C151.

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, meeting the requirements for Class A equipment in (Technical Standard Order) TSO-C151.

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 and first issued with a Nepalese Certificate of Registration after 12 January 2011 shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function, meeting the requirements for Class A equipment in (Technical Standard Order) TSO-C151.

6.15.5 All turbine-engined aeroplanes authorized to carry more than five but not more than nine passengers and first issued with a Nepalese Certificate of Registration after 12 January 2011 shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function, meeting the requirements for Class B equipment in (Technical Standard Order) TSO-C151.

6.15.6 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;
   i) gear not locked down;
   ii) 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. – not applicable for aircraft involved in STOL operations.

6.16.2 RESERVED

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 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 RESERVED

6.17.2 Except as provided for in 6.17.3, 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.
6.17.3 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.

6.17.4 Except as provided for in 6.17.5, from 1 July 2008, all aeroplanes authorized to carry 19 passengers or less shall be equipped with at least one ELT of any type.

6.17.5 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.

6.17.6 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.

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 All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15000 kg or authorized to carry more than 30 passengers shall be equipped with an airborne collision avoidance system (ACAS II).

6.18.2 All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5700 kg or authorized to carry more than 19 passengers and first issued with a Nepalese Certificate of Registration after 12 January 2011, shall be equipped with an airborne collision avoidance system (ACAS II).

6.18.3 RESERVED

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 TRANSPONDER

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 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 WINDSHEAR WARNING SYSTEM

6.21.1 All turbo-jet aeroplanes of a maximum certificated take-off mass in excess of 5700 kg or authorized to carry more than nine passengers should be equipped with a forward-looking wind shear warning system.

6.21.2 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 comments and the 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

6.22.1 A single-engined aeroplane shall not be operated under the IFR by a single pilot or at night for commercial operations.
6.23 AEROPLANES EQUIPPED WITH HEAD-UP DISPLAYS (HUD) AND/OR ENHANCED VISION SYSTEMS (EVS)

Where aeroplanes are equipped with HUD and/or EVS, the use of such systems to gain operational benefit shall be approved by the DG, CAAN.

Note.— Guidance on HUD and EVS is contained in Attachment J of the ICAO Annex 6 Part I.