Civil Aviation Order 20.18 (Aircraft equipment — basic operational requirements) Instrument 2014 (as *amended*)

made under regulations 207 and 232A of the *Civil Aviation Regulations 1988* and subsection 33 (3) of the *Acts Interpretation Act 1901*.

This compilation was prepared on 15 June 2020 taking into account amendments up to *Civil Aviation Order 20.18 Amendment Instrument 2020 (No. 1)*. It is a compilation of the *Civil Aviation Order 20.18 (Aircraft equipment — basic operational requirements) Instrument 2014* as amended and in force on 11 June 2020.

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Compilation No. 5.

1A Name of instrument

1A.1 This instrument is the *Civil Aviation Order 20.18* (*Aircraft equipment — basic operational requirements) Instrument 2014*.

1A.2 This instrument may be cited as *Civil Aviation Order 20.18*.

1A.3 A reference in an instrument to section 20.18 of the Civil Aviation Orders is taken to be a reference to this instrument.

1 Application

This Order applies to all Australian registered aircraft.

Note Particular attention is drawn to the fact that this Order does not include requirements for oxygen equipment, radio apparatus or emergency equipment which are specified in Civil Aviation Orders 20.4 and 20.11, respectively.

2 Definitions

2.1 In this Order, unless a contrary intention appears:

aerial work includes flight training conducted by a Part 141 operator or a Part 142 operator.

CAR 1988 means the *Civil Aviation Regulations 1988*.

CASR 1998 means the *Civil Aviation Safety Regulations 1998*.

minimum equipment list means a list that provides for the operation of aircraft with permissible unserviceabilities, subject to compliance with such conditions, if any, as CASA directs under subregulation 37 (2) of CAR 1988.

permissible unserviceability means any defect or damage that CASA has approved under subregulation 37 (1) of CAR 1988 as a permissible unserviceability.

TAWS-B+ system means a terrain awareness and warning system that is equipped with a visual display and complies with the requirements for Class B equipment expressed in (E)TSO-C151, (E)TSO-C151a or (E)TSO-C151b.

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2.2 In this Order, a reference to an (E)TSO, a TSO or an ETSO, as defined in subsections 9B and 9D, with an empty bracket at the end of the reference, includes the (E)TSO, TSO or ETSO in a version that contains a number within the bracket.

3 Instrumentation for flight under the Visual Flight Rules (the V.F.R.)

RPT aeroplanes and large charter aeroplanes

3.1 An aeroplane engaged in:

(a) a regular public transport (***RPT***) operation; or

(b) a charter operation that has maximum take-off weight exceeding 5 700 kg — a charter operation;

may only be operated under the V.F.R. if it is equipped with the following:

(c) the instruments specified in Appendix II;

(d) any other instruments and indicators specified in the aeroplane's flight manual.

Note ***V.F.R.*** and ***flight manual*** are defined in subregulation 2 (1) of CAR 1988.

Helicopters

3.2 Subject to paragraph 3A.1, a helicopter may only be operated under the V.F.R. by day if it is equipped with the following:

(a) the instruments specified in Appendix VI;

(b) any other instruments and indicators specified in the helicopter's flight manual.

3.2A A helicopter may only be operated under the V.F.R. at night if:

(a) it is equipped with the instruments specified in Appendix VIII; and

(b) it is equipped with any other instruments and indicators specified in the helicopter's flight manual;

(c) for flights under V.F.R. at night which involve flights over land or water where the helicopter's attitude cannot be maintained by the use of visual external surface cues as a result of lights on the ground or celestial illumination:

(i) the helicopter is equipped in accordance with subparagraph 4.2 (d) of this Order; or

(ii) the helicopter is operated by a qualified 2 pilot crew, each with access to flight controls.

Hot air balloons and hot air airships

3.3 Subject to paragraph 3A.2, a hot air balloon and a hot air airship may only be operated under the V.F.R. if the balloon or airship is equipped with the following:

(a) the instruments specified in Appendix X;

(b) any other instruments and indicators specified in the flight manual of the balloon or airship.

Other aircraft in private, aerial work or charter operations

3.4 Subject to paragraph 3A.3, an aircraft:

(a) engaged in a private, aerial work or charter operation; and

(b) not mentioned in paragraphs 3.1 to 3.3;

may only be operated under the V.F.R. if it is equipped with the following:

(c) the instruments specified in Appendix I;

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(d) any other instruments and indicators specified in the aircraft's flight manual.

3A Operations to which flight and navigation equipment requirements do not apply

3A.1 Paragraph 3.2 does not apply to a helicopter that operates under the V.F.R., and for which an experimental certificate has been issued under paragraph 21.191 (g) or (h) of CASR 1998, if equipment is carried that provides a pilot with the same information that would be obtained by compliance with the requirements of Appendix VI for operations by day, or Appendix VIII if approved for operations by night.

3A.2 Paragraph 3.3 does not apply to a balloon that operates by day under the V.F.R.:

(a) being an aircraft for which a current certificate of airworthiness as a light sport aircraft (***LSA***) has been issued; or

(b) being an aircraft for which an experimental certificate has been issued under paragraph 21.191 (g), (h) or (j), or an LSA for which an experimental certificate has been issued under paragraph 21.191 (k), of CASR 1998;

if equipment is carried that provides a pilot with the same information that would be obtained by compliance with the requirements of Appendix X.

3A.3 Paragraph 3.4 does not apply to any other aircraft that operates under the V.F.R.:

(a) being an aircraft for which a current certificate of airworthiness as an LSA has been issued; or

(b) being an aircraft for which an experimental certificate has been issued under paragraph 21.191 (g), (h) or (j) or an LSA for which an experimental certificate has been issued under paragraph 21.191 (k), of CASR 1998;

if equipment is carried that provides a pilot with the same information that would be obtained by compliance with the requirements of Appendix I for operations by day, or Appendix IV if approved for operations by night.

3A.4 An aircraft referred to in paragraphs 3A.1 to 3A.3 that is approved to operate at night and is equipped with an Electronic Flight Information System (***EFIS***), or other means of electronically displaying the required information, must be provided with a battery-powered back-up, or another form of instrumentation independent of the aircraft electrical system, that is approved by an authorised person as suitable, in the case of a failure of the aircraft electrical system, for the purpose of enabling the pilot to divert to and use a safe landing site.

3A.5 If an aircraft equipped as required under paragraph 3A.4 has a battery-powered back-up to an EFIS, the back-up must be of sufficient capacity to power the EFIS panel or other display for 90 minutes and must be fully charged before the commencement of a flight at night.

3A.6 Subject to paragraph 3A.7, an Australian registered aircraft may be operated without compliance with the flight and navigation equipment requirements in subsections 3 and 4 of this Order if it can show compliance with an equivalent level of safety, as determined by the type certificating authority for the aircraft, taking into consideration its intended operation.

3A.7 The type certificating authority for the aircraft must be a recognised authority.

3A.8 In paragraph 3A.7:

recognised authority means an authority of a country listed in regulation 21.012 of CASR 1998.

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4 Equipment for flight under the Instrument Flight Rules (the *I.F.R.*)

4.1 Subject to subsection 3A, an aeroplane must not be operated under the I.F.R. unless it is equipped with:

(a) the flight and navigation instruments specified in Appendixes II, III and IV to this Order, as applicable; and

(b) any other instruments or indicators specified in the aeroplane flight manual; and

(c) the minimum lighting equipment specified in Appendix V to this Order; and

(e) in the case of single pilot RPT operations, earphones for the pilot with boom or throat microphone and a press to transmit control on the control column. The earphones and microphone must be compatible with the radio installation in the aeroplane and must be used by the pilot during flight.

4.1A Subject to paragraphs 4.1B and 4.1C, an aeroplane engaged:

(a) in RPT operations; or

(b) in charter operations; or

(c) in aerial work operations as an air ambulance or for a flying doctor service;

must not be operated under the I.F.R. unless it is equipped with a serviceable automatic pilot approved by CASA that has the following capabilities:

(d) a capability of operating the flight controls to maintain flight and manoeuvre the aeroplane about the roll and pitch axis;

(e) an automatic heading capability;

(f) an altitude hold capability.

Note For the purpose of meeting the requirements of subparagraph 4.1A (d), an automatic pilot is taken to have the capability of manoeuvring the aeroplane about the pitch axis if it does so solely to restore the selected altitude after a disturbance.

4.1B In spite of paragraph 4.1A, an aeroplane referred to in that paragraph that is not equipped with an automatic pilot in accordance with that paragraph may be operated under the I.F.R., if the aeroplane:

(a) is equipped with fully functioning dual controls; and

(b) has 2 control seats, with 1 control seat occupied by the pilot in command of the aeroplane and the other by a pilot who is authorised under Part 61 of CASR 1998 to conduct the flight.

4.1C If the automatic pilot fitted to an aeroplane engaged:

(a) in charter operations; or

(b) in aerial work operations as an air ambulance or for a flying doctor service;

loses a capability referred to in paragraph 4.1A, the aeroplane may, if the pilot is satisfied that it is safe to do so, be operated under the I.F.R. by a single pilot at any time within the period of 3 days commencing on the day on which the automatic pilot loses the capability.

4.1D Paragraphs 4.1A, 4.1B and 4.1C apply in addition to, and not in derogation of, paragraph 4.1.

4.2 Subject to subsection 3A, a helicopter must not be operated under the I.F.R. unless it is equipped with:

(a) the flight and navigation instruments specified in Appendixes VII, VIII or IX to this Order, as applicable; and

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(b) any other instruments, indicators or equipment specified in the helicopter flight manual; and

(c) the minimum lighting equipment specified in Appendix V to this section; and

(d) an approved automatic pilot or automatic stabilisation system.

Note Because of considerable variation in the individual stability characteristics of different helicopter types and in the associated automatic pilot and automatic stabilisation systems approved by the certification authority in the country of certification, it is not possible to detail precise specifications for this equipment. This consideration also applies to the flight crew complement. Accordingly, each application for approval to conduct I.F.R. category operations will be individually assessed on the basis of the specific helicopter type and its associated automatic pilot or autostabilisation equipment and the proposed operating environment.

5 Windshield clear vision equipment

5.1 An aircraft with a flight compartment windshield may only be operated under the V.F.R. or the I.F.R. if it has a means of clearing heavy outside precipitation from the windshield at a rate which ensures an unobstructed view for each pilot.

Note ***I.F.R.*** is defined in subregulation 2 (1) of CAR 1988.

5.2 Paragraph 5.1 does not apply for:

(a) an aeroplane with an MTOW less than 5 700 kg; or

(b) a helicopter with an MTOW less than 2 750 kg maximum;

if the windshield design satisfies CASA that moderate rain will not impair the pilot's view for take-off, landing or normal flight.

6 Recording equipment

6.1 An aircraft of maximum take-off weight:

(a) in excess of 5 700 kg and which is:

(i) turbine-powered; or

(ii) of a type first certificated in its country of manufacture on or after 1 July 1965;

must not be flown (except in agricultural operations) unless it is equipped with an approved flight data recorder and an approved cockpit voice recorder system;

(b) less than, or equal to, 5 700 kg and which is:

(i) pressurised; and

(ii) turbine-powered by more than 1 engine; and

(iii) of a type certificated in its country of manufacture for operation with more than 11 places; and

(iv) issued with its initial Australian Certificate of airworthiness after 1 January 1988;

must not be flown unless it is equipped with an approved cockpit voice recorder system.

6.1A Paragraph 6.1 does not apply to an aircraft for which there is in force an airworthiness certificate in the agricultural category or the restricted category.

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6.2 The flight data recorder and cockpit voice recorder systems installed in an aircraft under this Order:

(a) must comply with the requirements of Civil Aviation Orders 103.19 and 103.20, respectively; and

(b) will be considered for approval when CASA has equipment available allowing replay of the recordings.

6.3 Where an aircraft is required to be so equipped by this Order, the flight data recorder system must be operated continuously from the moment when the aircraft commences to taxi under its own power for the purpose of flight until the conclusion of taxiing after landing.

6.4 Where an aircraft is required to be so equipped by this Order, the cockpit voice recorder system must be operated continuously from the start of the use of the check list before starting engines for the purpose of flight until completion of the final check list at the termination of the flight.

6.5 Where an aircraft is required to be so equipped by this Order, the operator must ensure that:

(a) the flight data recorder retains its last 25 hours of recording; and

(b) the cockpit voice recorder retains its last 30 minutes of recording; and

(c) data from the last 2 occasions on which the flight data recorder system was calibrated from which the accuracy of the system can be determined are preserved.

6.6 The operator of an aircraft which is required by this Order to be equipped with recorders must take action to ensure that during ground maintenance periods the recorders are not activated unless the maintenance is associated with the flight data recording equipment or with the aircraft engines.

6.7 An aircraft required to be fitted with a flight data recorder system and/or a cockpit voice recorder system may operate with an unserviceable recorder system for a period of 21 days commencing on the day on which the system was determined to be unserviceable providing that:

(a) the aircraft does not depart from an aerodrome where staff and equipment are available to replace the unserviceable units; and

(b) where the aircraft is required to be fitted with both a flight data recorder and cockpit voice recorder system, 1 system is serviceable; and

(c) the aircraft is not operating training or test flights.

7 Assigned altitude indicator and altitude alerting system

7.1 Piston-engined aircraft and unpressurised turbine-engined aircraft operating above 15 000 feet in controlled airspace under the I.F.R. (except night V.M.C.) must be equipped with an altitude alerting system.

7.2 Pressurised turbine-engined aircraft operating in controlled airspace under the I.F.R. (except night V.M.C.) must be equipped with an altitude alerting system.

7.3 Unless equipped with an altitude alerting system, an aircraft operating in controlled airspace under the I.F.R. (except night V.M.C.) must be equipped with an assigned altitude indicator.

7.4 An altitude alerting system or an assigned altitude indicator must be so designed and located that:

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(a) it can be readily adjusted for setting from each pilot seat; and

(b) the assigned altitude/flight level display is clearly discernible by day and night to all operating flight crew members whose duties involve altitude/flight level assignment monitoring; and

(c) altitude/flight levels may be pre-selected unambiguously in increments commensurate with levels at which the aircraft may be operated.

7.5 The assigned altitude indicator must be demonstrated to the satisfaction of CASA.

7.6 The altitude alerting system must be demonstrated to the satisfaction of CASA and be capable of:

(a) alerting the pilot upon approaching or departing from a pre-selected level in both climb and descent by aural and/or visual signals in sufficient time to establish level flight at the pre-selected level, except that altitude alerting systems in aircraft first registered in Australia before 1 January 1983 need not alert the pilot when departing from a pre-selected altitude; and

(b) providing the required signals from sea level to the highest operating altitude approved for the aircraft in which it is installed; and

(c) being tested without separate equipment to determine proper operation of the alerting signals; and

(d) accepting necessary barometric pressure settings in millibars if the system or device operates on barometric pressure.

8 Radiation indicator

All aeroplanes intended to be operated above 49 000 feet must 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 must be readily visible to a flight crew member.

9 Ground proximity warning system

9.1C A turbine-engined aeroplane that:

(a) has a maximum take-off weight of more than 15 000 kg or is carrying 10 or more passengers; and

(b) is engaged in RPT, or charter, operations;

must not be operated under the I.F.R. unless it is fitted with:

(c) an approved GPWS that has a predictive terrain hazard warning function; or

(d) if paragraph 9.1CA applies — a GPWS that meets the requirements of Civil Aviation Order 108.36 (a **CAO 108.36 GPWS**); or

(e) if the aeroplane has a maximum take-off weight of 5 700 kg or less, but is carrying 10 or more passengers — a TAWS-B+ system.

9.1CA Up to the end of June 2005, an aeroplane may be fitted with a CAO 108.36 GPWS:

(a) if, immediately before 1 January 2001, paragraph 9.1 applied to the aeroplane; or

(b) if the aeroplane first becomes an Australian aeroplane on or after 1 January 2001 (unless it is an aircraft in respect of which an undertaking has been given under paragraph 5.3 of Civil Aviation Order 82.1 or paragraph 10.3 of Civil Aviation Order 82.3 or 82.5, as in force immediately before 1 January 2001); or

(c) if:

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(i) immediately before 1 January 2001, paragraph 9.1 did not apply to the aeroplane because of paragraph 9.1A; and

(ii) the holder of the AOC authorising the operation of the aeroplane (the AOC holder) provides satisfactory evidence to CASA, in accordance with paragraph 9.1CB, that it is not possible to fit the aeroplane with an approved GPWS that has a predictive terrain hazard warning function.

9.1CB For the purposes of sub-subparagraph 9.1CA (c) (ii), evidence is taken to be satisfactory only if it is:

(a) a statement, in writing, to the AOC holder from the manufacturer of an approved GPWS that has a predictive terrain hazard warning function; or

(b) a statutory declaration by the AOC holder;

to the effect that the FAA's list of supplemental type certificates does not include any reference to a supplemental type certificate relating to the fitting of an aeroplane of the same type with an approved GPWS that has that function.

9.1D For the purposes of this subsection:

(a) a GPWS has a ***predictive terrain hazard warning function*** if it employs an aircraft navigation system and a terrain database to compute a display of terrain along, and in the vicinity of, the flight path of an airborne aeroplane in order to provide the flight crew of the aeroplane with a warning of any terrain that may endanger the aeroplane if its flight path were to remain unchanged; and

(b) the GPWS is taken to be approved only if it meets:

(i) the requirements set out in FAA notice N 8110.64 as in force on 15 August 1999; or

(ii) the standard for the Class A Terrain Awareness Warning System specified in TSO C-151, TSO C-151a or TSO C-151b.

9.2 A GPWS must be demonstrated to the satisfaction of CASA to be capable of providing automatically a timely and distinctive warning to the flight crew when the aeroplane is in potentially hazardous proximity to the earth's surface.

9.3 Except as provided in paragraph 9.4, an aeroplane required to be fitted with a GPWS must not commence a flight with that equipment unserviceable.

9.4 An aeroplane required to be fitted with a GPWS must not depart with that equipment unserviceable from an aerodrome where facilities are available to repair or replace the GPWS and in no case must an aeroplane be operated with its GPWS unserviceable for a period exceeding 24 hours from the time the equipment was determined to be unserviceable.

9B Directions relating to carriage and use of automatic dependent surveillance – broadcast equipment

9B.1 This subsection applies to aircraft engaged in private, aerial work, charter or RPT operations in Australian territory.

9B.2 In subsections 9B, 9BA, 9C and 9E, and in Appendices XI, XII, XIII and XIV:

14 CFR 91.225 means regulation 91.225 of the United States Title 14 Code of Federal Regulations (CFR) titled *Automatic Dependent Surveillance-Broadcast (ADS-B) Out equipment and use,* as in force from time to time.

ADS-B means automatic dependent surveillance – broadcast.

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ADS-B test flight means a flight to prove ADS-B transmitting equipment that is newly installed on the aircraft undertaking the flight.

aircraft address means a unique code of 24 binary bits assigned to an aircraft by:

(a) CASA when the aircraft is registered on the Australian Civil Aircraft Register; or

(b) the relevant RAAO for the aircraft when the aircraft is placed on its aircraft register.

AMSL means above mean sea level.

approved equipment configuration for ADS-B transmitting equipment means an equipment configuration that:

(a) meets the conditions for approval set out in Appendix XI, XII, XIII or XIV, as applicable under the Application provisions of the Appendix; or

(b) is approved in writing by CASA.

ATC means air traffic control.

CASR means the *Civil Aviation Safety Regulations 1998.*

certain light sport, experimental and other aircraft means any of the following:

(a) a light sport aircraft for which a special certificate of airworthiness has been issued and is in force under regulation 21.186 of CASR;

(b) a light sport aircraft for which an experimental certificate has been issued and is in force under paragraph 21.191 (j) or (k) of CASR;

(c) any other aircraft for which an experimental certificate has been issued and is in force under paragraph 21.191 (g) or (h) of CASR;

(d) an aircraft for which an experimental certificate has been issued and is in force under subregulation 21.190 (1) of CASR;

(e) an aircraft to which any of the following Civil Aviation Orders (CAOs) applies: CAO 95.4, 95.4.1, 95.8, 95.10, 95.12, 95.12.1, 95.32, 95.53, 95.54 or 95.55;

(f) a Part 103 aircraft within the meaning of regulation 103.005 of CASR.

Note Part 103 of CASR commences on 25 March 2021 (see regulation 2 of the *Civil Aviation Legislation Amendment (Parts 103, 105 and 131) Regulations 2019)*. Paragraph (f) is permitted by subsection 98 (5D) of the *Civil Aviation Act 1998*.

Class A TABS means TABS functionality relating to transponder function, altitude source function, and ADS-B OUT function, in accordance with (E)TSO-C199, as in force from time to time.

Class B TABS means TABS functionality relating to position source function, in accordance with (E)TSO-C199, as in force from time to time.

Class B TABS position source device means a device with a Class B TABS functionality.

EASA means the European Aviation Safety Agency.

EASA AMC 20-24 means Annex II to ED Decision 2008/004/R titled *Certification Considerations for the Enhanced ATS in Non-Radar Areas using ADS-B Surveillance (ADS-B-NRA) Application via 1090 MHz Extended Squitter*, dated 2 May 2008, of EASA, or a later version as in force from time to time.

EASA CS-ACNS means Annex I to ED Decision 2013/031/R *titled Certification Specifications and Acceptable Means of Compliance for Airborne Communications, Navigation and Surveillance CS-ACNS*, dated 17 December 2013, or a later version as in force from time to time.

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EHS DAPs means enhanced surveillance downlink of aircraft parameters.

(E)TSO means FAA Technical Standard Order and/or European Technical Standard Order.

ETSO means European Technical Standard Order of the EASA.

FAA means the Federal Aviation Administration of the United States.

FDE means Fault Detection and Exclusion, a feature of a GNSS receiver that excludes faulty satellites from position computation.

FL 290 means flight level 290.

Note Flight level 290 is defined in subregulation 2 (1) of CAR 1988.

GNSS means the Global Navigation Satellite System installed in an aircraft to continually compute the position of the aircraft by use of the GPS.

GPS means the Global Positioning System.

HPL means the Horizontal Protection Level of the GNSS position of an aircraft as an output of the GNSS receiver or system.

IFR has the same meaning as I.F.R. and stands for instrument flight rules.

integrated TABS device means a device with integrated Class A TABS and Class B TABS functionality.

Mode A is a transponder function that transmits a 4-digit octal identification code for an aircraft when interrogated by an SSR, the code having been assigned to the aircraft by ATC for the relevant flight sector.

Mode A code is the 4-digit octal identification code transmitted by a Mode A transponder function.

Mode C is a transponder function that transmits a 4-digit octal code for an aircraft's pressure altitude when interrogated by an SSR.

Mode C code is the 4-digit octal identification code transmitted by a Mode C transponder function.

Mode S is a monopulse radar interrogation technique that improves the accuracy of the azimuth and range information of an aircraft, and uses a unique aircraft address to selectively call individual aircraft.

NAA has the same meaning as in regulation 1.4 of CASR 1998.

Note "***NAA***, for a country other than Australia, means:

(a) the national airworthiness authority of the country; or

(b) EASA, in relation to any function or task that EASA carries out on behalf of the country.".

NACp means Navigation Accuracy Category for Position as specified in paragraph 2.2.3.2.7.1.3.8 of RTCA/DO-260B.

NIC means Navigation Integrity Category as specified in paragraph 2.2.3.2.3.3 of RTCA/DO-260B.

NUCp means Navigation Uncertainty Category – Position as specified in paragraph 2.2.8.1.5 of RTCA/DO-260.

RAAO means a recreational aviation administration organisation that is recognised by CASA.

RTCA/DO-229D means document RTCA/DO-229D titled *Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment*, dated 13 December 2006, of the RTCA Inc. of Washington D.C. USA (***RTCA Inc.***).

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RTCA/DO-260 means RTCA Inc. document RTCA/DO-260 titled *Minimum Operational Performance Standards for 1090 MHz Automatic Dependent Surveillance – Broadcast*, dated 13 September 2000.

RTCA/DO-260B means RTCA Inc. document RTCA DO-260B titled *Minimum Operational Performance Standards for 1090 MHz Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) and Traffic Information Services – Broadcast (TIS-B),* dated 2 December 2009, unless a later version as in force from time to time is expressly referred to.

SA means Selective Availability, and is a function of the GPS that has the effect of degrading the accuracy of the computed GPS position of a GNSS-equipped aircraft.

SDA means System Design Assurance as specified in section 2.2.3.2.7.2.4.6 of RTCA/DO-260B.

SIL means Source Integrity Level as specified in paragraph 2.2.3.2.7.1.3.10 of RTCA/DO-260B.

SSR means a secondary surveillance radar system that is used by ATC to detect an aircraft equipped with a radar transponder.

TABS means traffic awareness beacon system.

TSO means Technical Standard Order of the FAA.

UK CAP 1391 means Civil Aviation Authority of the United Kingdom document number CAP 1391 titled *Electronic conspicuity devices*, 2nd edition, dated April 2018, or a later edition as in force from time to time.

VFR has the same meaning as V.F.R. and stands for visual flight rules.

9B.3 Subject to paragraph 9B.12, if an aircraft carries ADS-B transmitting equipment for operational use in Australian territory:

(a) the equipment must comply with an approved equipment configuration under Appendix XI, XII, XIII or XIV in accordance with the Application provisions of the Appendix; and

(b) for Appendix XIV, any administrative standard included in the Appendix must be complied with.

9B.4 When serviceable ADS-B transmitting equipment is operated in Australian territory, the equipment must transmit:

(a) the current aircraft address; and

(b) a flight identification that:

(i) corresponds exactly to the aircraft identification mentioned on the flight notification filed with ATC for the flight; or

(ii) if a flight notification is not filed for the flight — is:

(A) for an aircraft registered on the Australian Civil Aircraft Register and operating wholly within Australian territory — the aircraft's registration mark; or

(B) for an Australian aircraft registered by a RAAO — in accordance with the organisation's operations manual; or

(iii) is directed or approved by ATC.

9B.5 If an aircraft in flight carries serviceable ADS-B transmitting equipment, the equipment must be operated:

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(a) for equipment that complies with an approved equipment configuration set out in Appendix XI — continuously during the flight in all airspace and at all altitudes, unless the pilot is directed or approved otherwise by ATC; and

(b) for equipment that complies with the approved equipment configuration set out in Appendix XII, XIII, or XIV — continuously during the flight, within the airspace and within the altitude limits specified for the flight in the applicable Appendix, unless the pilot is directed or approved otherwise by ATC.

9B.6 Subject to paragraph 9B.7, if an aircraft carries ADS-B transmitting equipment which does not comply with an approved equipment configuration, the aircraft must not fly in Australian territory unless the equipment is:

(a) deactivated; or

(b) set to transmit only a value of zero for the NUCp, NACp, NIC or SIL.

Note It is considered equivalent to deactivation if NUCp, NACp, NIC or SIL is set to continually transmit only a value of zero.

9B.7 The ADS-B transmitting equipment need not be deactivated for paragraph 9B.6 if the aircraft is undertaking an ADS-B test flight in VMC in airspace below FL290.

9B.8 An aircraft that is operated:

(a) in an IFR operation; or

(a) in any operation at or above FL290;

must carry serviceable ADS-B transmitting equipment that complies with the approved equipment configuration set out in Appendix XI.

9B.9 If an aircraft is operated in a VFR operation below FL290:

(a) it may carry serviceable ADS-B transmitting equipment (the ***equipment***); and

(b) if it carries the equipment — the equipment must comply with the approved equipment configuration set out in Appendix XI, XII, XIII or XIV.

9B.10 Paragraph 9B.8 does not apply to an aircraft if:

(a) the aircraft owner, operator or pilot has written authorisation from CASA for the operation of the aircraft without the ADS-B transmitting equipment; or

(b) the equipment is unserviceable for a flight, and each of the following applies:

(i) the flight takes place within 3 days of the discovery of the unserviceability;

(ii) at least 1 of the following applies for the flight:

(A) flight with unserviceable equipment has been approved by CASA, in writing, subject to such conditions as CASA specifies;

(B) the unserviceability is a permissible unserviceability set out in the minimum equipment list for the aircraft and any applicable conditions of a direction under subregulation 37 (2) of CAR 1988 have been complied with;

(iii) before it commences, ATC clears the flight despite the unserviceability.

9B.11 Unless otherwise approved in writing by CASA, ADS-B transmitting equipment carried on an aircraft must allow the pilot to activate and deactivate transmission during flight.

Note This requirement is met if the ADS-B transmitting equipment has a cockpit control that enables the pilot to turn ADS-B transmissions on and off.

9B.12 A requirement under Appendix XI, XII, or XIII that an approved equipment configuration for ADS-B transmitting equipment be authorised in accordance with a

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specific TSO or ETSO does not apply to the ADS-B transmitting equipment carried on certain light sport, experimental and other aircraft provided that:

(a) the equipment configuration that is carried provides the pilot, other aircraft and ATC with the same transponder and surveillance capability as would be provided if the equipment were expressly authorised in accordance with the specific TSO or ETSO; and

(b) the pilot or the operator has a statement of conformance (however described) from the equipment manufacturer stating the particular standard or standards of the TSO or ETSO with which the equipment conforms.

9BA Instructions — SSR transponder equipment

9BA.1 For subregulation 174A (1) of CAR, this subsection specifies the SSR transponder equipment that must be carried on certain aircraft before they undertake a VFR flight.

9BA.2 Unless this subsection provides otherwise, an aircraft must carry serviceable SSR transponder equipment in accordance with subsection 9E.

9BA.3 A serviceable Mode A and Mode C SSR transponder must be carried on an aircraft that:

(a) was manufactured before 6 February 2014; and

(b) has not been modified by having its transponder installation replaced on or after that date; and

(c) operates under the VFR and within ATC radar coverage, in Class A airspace below FL290, in Class B airspace, or in Class C airspace.

Note Carriage of a Mode A and Mode C transponder does not remove the requirement to obtain CASA approval to operate in Class A airspace: see subregulation 99AA (3) of CAR.

9BA.4 Paragraph 9BA.3 does not apply if the aircraft carries serviceable Mode S transponder that meets the standards set out in subparagraph 9E.2 (c)

9BA.5 A serviceable Mode A and Mode C SSR transponder must be carried on an aircraft that:

(a) was manufactured before 6 February 2014; and

(b) has not been modified by having its transponder installation replaced on or after that date; and

(c) has an engine-driven electrical system capable of continuously powering a transponder; and

(d) operates under the VFR in Class E airspace, or above 10 000 ft AMSL in Class G airspace.

9BA.6 Paragraph 9BA.5 does not apply if the aircraft carries:

(a) a serviceable Mode S transponder that meets the standards set out in subparagraph 9E.2 (c); or

(b) a serviceable integrated TABS device that meets the standards set out in Appendix XIII.

9BA.7 This paragraph repeals instrument CASA 316/98.

9C Standards for Mode S transponder equipment

9C.1 This subsection applies to an aircraft engaged in private, aerial work, charter or RPT operations.

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9C.2 If the aircraft carries Mode S transponder equipment (the ***equipment***), the equipment must meet the standards set out in this subsection.

9C.3 The equipment must be of a type that is authorised by:

(a) the FAA, in accordance with TSO-C112( ) as in force on 5 February 1986, or a later version as in force from time to time; or

(b) EASA, in accordance with ETSO-C112a as in force on 24 October 2003, or a later version as in force from time to time; or

(c) CASA, in accordance with an instrument of approval of the type.

Note CASA Advisory Circular 21-46 provides guidelines on Mode S transponder equipment.

9C.4 The aircraft address entered into the equipment must exactly correspond to the aircraft address assigned to the aircraft by CASA or the relevant RAAO.

9C.5 The equipment must transmit each of the following when interrogated on the manoeuvring area of an aerodrome or in flight:

(a) the aircraft address;

(b) the Mode A code;

(c) the Mode C code;

(d) subject to paragraph 9C.7, the aircraft flight identification in accordance with paragraph 9C.6.

9C.6 The aircraft flight identification must:

(a) if a flight notification is filed with ATC for the flight — correspond exactly with the aircraft identification mentioned on the flight notification; or

(b) if no flight notification is filed with ATC for the flight:

(i) for an aircraft registered on the Australian Civil Aircraft Register — be the aircraft registration mark; or

(ii) for an Australian aircraft registered by a RAAO — be in accordance with the RAAO's operations manual; or

(c) be another flight identification directed or approved for use by ATC.

9C.7 Mode S transponder transmission of the aircraft flight identification is optional for any aircraft that was manufactured before 9 February 2012 (an ***older aircraft***). However, if an older aircraft is equipped to transmit, and transmits, an aircraft flight identification then that aircraft flight identification must be in accordance with paragraph 9C.6.

9C.8 If the equipment transmits any Mode S EHS DAPs, the transmitted DAPs must comply with the standards set out in paragraph 3.1.2.10.5.2.3 and Table 3-10 of Volume IV, Surveillance and Collision Avoidance Systems, of Annex 10 of the Chicago Convention.

Note 1 Paragraph 3.1.2.10.5.2.3 includes 3.1.2.10.5.2.3.1, 3.1.2.10.5.2.3.2 and 3.1.2.10.5.2.3.3.

Note 2 Australian Mode S SSR are EHS DAPs-capable, and operational use of EHS DAPs is to be introduced in Australia. Implementation of Mode S EHS DAPs transmissions that are not in accordance with the ICAO standards may be misleading to ATC. Operators need to ensure that correct parameters are being transmitted.

9C.9 If the equipment is carried in an aircraft manufactured on or after 9 February 2012:

(a) having a certificated maximum take-off weight above 5 700 kg; or

(b) that is capable of normal operation at a maximum cruising true air speed above 250 knots;

the equipment's receiving and transmitting antennae must:

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(c) be located in the upper and lower fuselage; and

(d) operate in diversity, as specified in paragraphs 3.1.2.10.4 to 3.1.2.10.4.5 (inclusive) of Volume IV, Surveillance and Collision Avoidance Systems, of Annex 10 of the Chicago Convention.

Note Paragraph 3.1.2.10.4.2.1 is recommendatory only.

9C.10 Subject to paragraph 9C.11, if Mode S transponder equipment incorporates ADS-B functionality, the equipment must comply with the applicable approved equipment configuration required under subsection 9B for ADS-B transmitting equipment.

9C.11 For paragraphs 9C.3 and 9C.10, a requirement that the equipment be authorised in accordance with a specific TSO or ETSO does not apply to Mode S transponder equipment carried on certain light sport, experimental and other aircraft provided that:

(a) the equipment configuration that is carried provides the pilot, other aircraft and ATC with the same transponder and surveillance capability as would be provided if the equipment were expressly authorised in accordance with the specific TSO or ETSO; and

(b) the pilot or the operator has a statement of conformance (however described) from the equipment manufacturer stating the particular standard or standards of the TSO or ETSO with which the equipment conforms.

9D Directions for mandatory GNSS equipment for I.F.R. flight

Note This subsection provides for minimum equipage for GNSS navigation. Some operations under RNP may require additional equipment under CAO 20.91.

Definitions

9D.1 In this subsection:

ADF equipment means automatic direction finding equipment.

CAO means Civil Aviation Order.

EASA means the European Aviation Safety Agency.

(E)TSO means FAA Technical Standard Order and/or European Technical Standard Order.

ETSO means European Technical Standard Order of EASA.

FAA means the Federal Aviation Administration of the United States of America.

GNSS means the Global Navigation Satellite System.

paragraph 9D.9 standards means the standard set out in paragraph 9D.9 for GNSS navigation equipment.

paragraph 9D.10 standards means the standard set out in paragraph 9D.10 for GNSS navigation equipment.

paragraph 9D.11 standards means the standard set out in paragraph 9.11 for GNSS navigation equipment.

paragraph 9D.12 standards means the standard set out in paragraph 9D.12 for ADF and VOR equipment.

recognised country means a country listed in the Table in Appendix 1 of CAO 100.16.

RNP means required navigation performance.

TSO means Technical Standard Order of the FAA.

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VOR navigation receiver means very high frequency (VHF) omni-range navigation receiver.

9D.2 Subject to paragraph 9D.1, in this subsection words and phrases have the same meaning as in subsection 9B.

GNSS navigation for RPT operations and charter operations under the I.F.R.

9D.3 An aircraft:

(a) that is manufactured on or after 6 February 2014; and

(b) that is engaged in RPT operations or charter operations under the I.F.R.;

must carry at least all of the serviceable equipment mentioned in 1 of the following subparagraphs:

(c) at least 2 independent GNSS navigation equipments that meet paragraph 9D.9 standards;

(d) at least:

(i) a single GNSS equipment that meets paragraph 9D.9 standards; and

(ii) an ADF or a VOR navigation receiver that meets paragraph 9D.12 standards;

(e) a multi-sensor navigation system that includes GNSS and inertial integration and is approved by CASA as providing an alternate means of compliance to the requirements of paragraph 9D.9.

9D.4 An aircraft:

(a) that is manufactured before 6 February 2014; and

(b) that is engaged in RPT operations or charter operations under the I.F.R.;

must carry at least all of the serviceable equipment mentioned in subparagraph 9D.3 (c), (d) or (e) if GNSS equipment is installed on the aircraft on or after 6 February 2014.

9D.5 On and after 4 February 2016, an aircraft:

(a) that is manufactured before 6 February 2014; and

(b) that is engaged in RPT operations or charter operations under the I.F.R.;

must carry at least all of the serviceable equipment mentioned in 1 of the following subparagraphs:

(c) at least 2 independent GNSS navigation equipments that meet paragraph 9D.9 standards;

(d) at least:

(i) a single GNSS equipment that meets paragraph 9D.10 standards; and

(ii) an ADF or a VOR navigation receiver that meets paragraph 9D.12 standards;

(e) a multi-sensor navigation system that includes GNSS and inertial integration and is approved by CASA as providing an alternate means of compliance to the requirements of paragraph 9D.9.

GNSS navigation for aerial work operations and private operations under the I.F.R.

9D.6 An aircraft:

(a) that is manufactured on or after 6 February 2014; and

(b) that is engaged in aerial work operations or private operations under the I.F.R.;

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must carry at least 1 serviceable GNSS navigation equipment that meets paragraph 9D.9 standards.

9D.7 An aircraft:

(a) that is manufactured before 6 February 2014; and

(b) that is engaged in aerial work operations or private operations under the I.F.R.;

must carry at least 1 serviceable GNSS navigation equipment that meets paragraph 9D.9 standards, if GNSS equipment is installed on the aircraft on or after 6 February 2014.

9D.8 On and after 4 February 2016, an aircraft:

(a) that is manufactured before 6 February 2014; and

(b) that is engaged in aerial work operations or private operations under the I.F.R.;

must carry at least all of the serviceable equipment mentioned in 1 of the following subparagraphs:

(c) at least 1 serviceable GNSS navigation equipment that meets paragraph 9D.9 standards;

(d) at least:

(i) a single GNSS equipment that meets paragraph 9D.11 standards; and

(ii) an ADF or a VOR navigation receiver that meets paragraph 9D.12 standards;

(e) a multi-sensor navigation system that includes GNSS and inertial integration and is approved by CASA as providing an alternate means of compliance to the requirements of paragraph 9D.9.

Standards for GNSS navigation equipment, and ADF and VOR equipment

Paragraph 9D.9 standards

9D.9 For the paragraph 9D.9 standards, GNSS equipment must be of a type that is authorised in accordance with 1 of the following (E)TSOs, or a later version of the (E)TSO as in force from time to time:

(a) (E)TSO-C145( );

(b) (E)TSO-C146( );

(c) (E)TSO-C196a.

Paragraph 9D.10 standards

9D.10 For the paragraph 9D.10 standards, GNSS equipment must be of a type that is authorised in accordance with 1 of the following (E)TSOs, or a later version of the (E)TSO as in force from time to time:

(a) (E)TSO-C129( );

(b) (E)TSO-C145( );

(c) (E)TSO-C146( );

(d) (E)TSO-C196a.

Note 1 GNSS equipment in accordance with (E)TSO-C129( ) is unlikely to support ADS-B position source equipment requirements.

Note 2 If GNSS equipment in accordance with (E)TSO-C129( ) is used, the requirement for navigation to an alternate aerodrome must be met by using ADF or VOR navigation.

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Paragraph 9D.11 standards

9D.11 For the paragraph 9D.11 standards, GNSS equipment must be of a type that is authorised in accordance with (E)TSO-C129( ), or a later version of the (E)TSO as in force from time to time.

Note 1 GNSS equipment in accordance with (E)TSO-C129( ) is unlikely to support ADS-B position source equipment requirements.

Note 2 If GNSS equipment in accordance with (E)TSO-C129( ) is used, the requirement for navigation to an alternate aerodrome must be met by using ADF or VOR navigation.

Paragraph 9D.12 standards

9D.12 For the paragraph 9D.12 standards, ADF equipment and VOR navigation receivers must be of a type that is certified by 1 of the following:

(a) the FAA;

(b) EASA;

(c) NAA of a recognised country.

9E Carriage of Mode S transponder equipment

9E.1 This subsection applies to an aircraft engaged in private, aerial work, charter or RPT operations.

9E.2 Subject to paragraph 9E.3, an aircraft:

(a) that is:

(i) manufactured on or after 6 February 2014; or

(ii) modified by having its transponder installation replaced on or after 6 February 2014; and

(b) that is operated:

(i) in Class A, B, C or E airspace; or

(ii) above 10 000 feet above mean sea level in Class G airspace;

must carry:

(c) a serviceable Mode S transponder that meets the standards:

(i) for Mode S transponder equipment — in subsection 9C; and

(ii) for ADS-B transmission using an approved equipment configuration set out in Appendix XI — in a clause or clauses of Appendix XI as follows:

(A) clauses 2 and 5 of Part B; or

(B) clause 7 of Part C; or

(C) clause 8 of Part C; and

(iii) for ADS-B transmission using an approved equipment configuration set out in Appendix XII — in clauses 1 and 4 in Part B of Appendix XII; or

Note The requirement is for aircraft to be fitted with a Mode S transponder with ADS-B OUT capability. That does not mean that ADS-B OUT transmission is also required under this paragraph. It means that, with the later connection of compatible GNSS position source equipment, ADS-B OUT can be transmitted as well as Mode S SSR responses.

(d) for an aircraft that is operated under the VFR:

(i) in Class E airspace; or

(ii) above 10 000 feet AMSL in Class G airspace;

a serviceable integrated TABS device that meets the standards in Appendix XIII.

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Note An aircraft operated under the VFR in Class E airspace or above 10 000 ft AMSL in Class G airspace has the option of complying with either subparagraph (c) or (d).

An aircraft operated under the VFR or the IFR in Class A, B, or C airspace has no option but to comply with subparagraph (c).

An aircraft operated under the IFR in Class E airspace or above 10 000 ft AMSL in Class G airspace has no option but to comply with subparagraph (c).

9E.3 Paragraph 9E.2 does not apply to an aircraft:

(a) operating in Class E airspace; or

(b) operating above 10 000 feet above mean sea level in Class G airspace;

if the aircraft does not have:

(c) an engine; or

(d) sufficient engine-driven electrical power generation capacity to power a Mode S transponder.

9E.4 An aircraft operating at Brisbane, Sydney, Melbourne, or Perth aerodrome must carry a serviceable Mode S transponder that meets the standards of:

(a) subsection 9C; and

(b) the following clause or clauses of Appendix XI:

(i) clauses 2 and 5 of Part B; or

(ii) clause 7 of Part C; or

(iii) clause 8 of Part C.

Note 1 A Mode A/C transponder does not meet this requirement.

Note 2 ADS-B OUT transmission is not mandatory but the Mode S transponder must be ADS-B capable.

9E.5 Paragraphs 9E.2 and 9E.4 do not apply to an aircraft for a flight if the Mode S transponder equipment is unserviceable for the flight, and each of the following applies:

(a) the flight takes place within 3 days of the discovery of the unserviceability;

(b) at least 1 of the following applies for the flight:

(i) flight with unserviceable equipment has been approved by CASA, in writing, subject to such conditions as CASA specifies;

(ii) the unserviceability is a permissible unserviceability set out in the minimum equipment list for the aircraft, and any applicable conditions under subregulation 37 (2) of CAR 1988 have been complied with;

(c) ATC clears the flight despite the unserviceability.

10 Serviceability

10.1 In the case of a charter or RPT aircraft, all instruments and equipment that it carries, or is fitted with, under subregulation 207 (2) of CAR 1988 must be serviceable before take-off, unless:

(a) flight with unserviceable instruments or equipment has been approved by CASA, subject to such conditions as CASA specifies; or

(b) the unserviceability is a permissible unserviceability set out in the minimum equipment list for the aircraft and any applicable conditions under subregulation 37 (2) of CAR 1988 have been complied with; or

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(c) CASA has approved the flight with the unserviceable instrument or equipment and any applicable conditions that CASA has specified, in writing, have been complied with; or

(d) the unserviceable instrument or equipment is a passenger convenience item only and does not affect the airworthiness of the aircraft.

Note Equipment referred to in paragraph 10.1 includes oxygen and protective breathing equipment, emergency lifesaving equipment, seats, seat belts and safety equipment that are required to meet an applicable standard, and other instruments and equipment required to be carried or fitted under this Order.

10.1A A private or aerial work aircraft must not be operated:

(a) under the V.F.R., unless:

(i) all instruments and equipment required to be fitted to the aircraft under subsection 3 are serviceable before take-off; or

(ii) CASA has approved the flight with the unserviceable instrument or equipment and any applicable conditions that CASA has specified, in writing, have been complied with; or

(b) under the I.F.R., unless:

(i) all instruments and equipment required to be fitted to the aircraft under subsection 4 are serviceable before take-off; or

(ii) CASA has approved the flight with the unserviceable instrument or equipment and any applicable conditions that CASA has specified, in writing, have been complied with.

10.2 Where flight is conducted with unserviceable instruments or equipment under the provisions of paragraph 10.1 or 10.1A, the unserviceable instruments or equipment must be prominently placarded "UNSERVICEABLE" or removed from the aircraft.

Note Where an instrument or piece of equipment performs more than 1 function, it is permissible to placard as unserviceable only the function(s) which are unserviceable.

10.3 The holder of an AOC authorising an RPT operation must:

(a) have a minimum equipment list or lists for the aircraft used to conduct those operations; and

(b) include each list in the operations manual for the aircraft to which that list applies.

10.4 The holder of an AOC authorising charter operations:

(a) may have a minimum equipment list or lists for the aircraft used to conduct those operations; and

(b) must include each list in the operations manual for the aircraft to which that list applies.

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Appendix I

Instruments required for flight under the V.F.R.

(Limited to aircraft specified in subsection 3, paragraph 3.1)

1 The flight and navigational instruments required for flights under the V.F.R. are:

(a) an airspeed indicating system; and

(b) an altimeter, with a readily adjustable pressure datum setting scale graduated in millibars; and

(c) (i) a direct reading magnetic compass; or

(ii) a remote indicating compass and a standby direct reading magnetic compass; and

(d) an accurate timepiece indicating the time in hours, minutes and seconds. This may be carried on the person of the pilot or navigator.

2 In addition to the instruments required under clause 1, aircraft, other than helicopters, engaged in charter, or aerial work, operations and operating under the V.F.R., must be equipped with:

(a) a turn and slip indicator (agricultural aeroplanes may be equipped with a slip indicator only); and

(b) an outside air temperature indicator when operating from an aerodrome at which ambient air temperature is not available from ground-based instruments.

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Appendix II

Instruments required for:

(i) aeroplanes engaged in RPT operations; and

(ii) aeroplanes engaged in charter operations which have a maximum take-off weight greater than 5 700 kg

1 The flight and navigation instruments required are:

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

(b) 2 sensitive pressure altimeters; and

(c) (i) a direct reading magnetic compass; or

(ii) a remote indicating compass and a standby direct reading magnetic compass; and

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

(e) a rate of climb and descent indicator (vertical speed indicator); and

(f) an outside air temperature indicator; and

(g) 2 attitude indicators (artificial horizons); and

(h) a heading indicator (directional gyroscope or equivalent approved by CASA); and

(i) a turn and slip indicator except that only a slip indicator is required when a third attitude indicator usable through flight attitudes of 360 degrees of pitch and roll is installed in accordance with paragraph (k) of this Appendix; and

(j) a means of indicating whether the power supply to those instruments requiring power is working satisfactorily; and

(k) in turbo-jet aeroplanes having a maximum take-off weight greater than 5 700 kg and in turbo-prop aeroplanes having a maximum take-off weight greater than 18 000 kg a third attitude indicator which:

(i) is powered from a source independent of the electrical generating system; and

(ii) continues to provide reliable indications for a minimum of 30 minutes after total failure of the electrical generating system; and

(iii) is operative without selection after total failure of the electrical generating system; and

(iv) is located on the instrument panel in a position which will make it plainly visible to, and usable by, any pilot at his station; and

(v) is appropriately lighted during all phases of operation; and

(l) in turbo-jet aeroplanes with operating limitations expressed in terms of Mach number, a Mach number indicator (Machmeter).

2 (a) For aeroplanes above 5 700 kg maximum take-off weight, the instruments used by the pilot in command and which are specified in paragraphs 1 (a), (b), (e) and (l) of this Appendix must be capable of being connected either to a normal or an alternate static source but not both sources simultaneously. Alternatively, the aeroplane may be fitted with 2 independent static sources each consisting of a balanced pair of flush static ports of which 1 is used for the instruments specified

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above. Instruments and equipment other than flight instruments provided for use by the pilot in command, must not be connected to the normal static system that operates the instruments of the pilot in command;

(b) for aeroplanes not above 5 700 kg maximum take-off weight, the instruments specified in paragraphs 1 (a), (b), (e) and (l) of this Appendix must be capable of being connected to either a normal or alternate static source but not both sources simultaneously. Alternatively, the aeroplane may be fitted with a balanced pair of flush static ports.

3 The instruments specified in paragraphs 1 (g), (h) and (i) of this Appendix must have duplicated sources of power supply.

4 CASA may, having regard to the type of aeroplane, approve an attitude indicator incorporated in an automatic pilot system being 1 of the 2 attitude indicators required by paragraph 1 (g) of this Appendix.

5 A gyro-magnetic type of remote indicating compass installed to meet the requirements of paragraph 1 (c) (ii) of this Appendix may also be considered to meet the requirement for a heading indicator specified in paragraph 1 (h) of this Appendix, provided that it has a duplicated power supply.

6 For V.F.R. flight, the following instruments may be unserviceable:

(a) the attitude indicator required by paragraph 1 (k);

(b) 1 of the attitude indicators required by paragraph 1 (g) provided that the attitude indicator required by paragraph 1 (k) is serviceable or an attitude indicator has been provided to meet the requirements of paragraph 1 (i) and is serviceable;

(c) the turn and slip indicator or slip indicator and attitude indicator required by paragraph 1 (i).

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Appendix III

Instruments required for aeroplanes with a maximum take-off weight not greater than 5 700 kg engaged in charter operations under the I.F.R. (except night V.M.C.) excluding freight only charter operations

1 The flight and navigation instruments required are:

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

(b) 2 sensitive pressure altimeters; and

(c) (i) a direct reading magnetic compass; or

(ii) a remote indicating compass and a standby direct reading magnetic compass; and

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

(e) a rate of climb and descent indicator (vertical speed indicator); and

(f) an outside air temperature indicator; and

(g) 2 attitude indicators (artificial horizons); and

(h) a heading indicator (directional gyroscope or equivalent approved by CASA); and

(i) a turn and slip indicator except that only a slip indicator is required when a third attitude indicator usable through flight attitude of 360 degrees pitch and roll is installed; and

(j) a means of indicating whether the power supply to the gyroscopic instruments is working satisfactorily; and

(k) in turbo-jet aeroplanes with operating limitations expressed in terms of Mach number, a Mach number indicator (Machmeter).

2 The instruments specified in paragraphs 1 (a), (b), (e) and (k) of this Appendix must be capable of being connected to either a normal or alternate static source but not both sources simultaneously. Alternatively, they may be connected to a balanced pair of flush static ports.

3 The instruments specified in paragraphs 1 (g), (h) and (i) of this Appendix must have duplicated sources of power supply.

4 CASA may, having regard to the type of aeroplane, approve an attitude indicator incorporated in an automatic pilot system as being 1 of the 2 attitude indicators required by paragraph 1 (g) of this Appendix.

5 A gyro-magnetic type of remote indicating compass installed to meet the requirements of subparagraph 1 (c) (ii) of this Appendix may also be considered to meet the requirement for a heading indicator specified in paragraph 1 (h) of this Appendix, provided it has a duplicated power supply.

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Appendix IV

Instruments required for aeroplanes engaged in:

(i) aerial work and private operations under the I.F.R. (including night V.M.C.); and

(ii) charter operations under night V.M.C; and

(iii) I.F.R. freight only charter operations in aeroplanes with maximum take-off weight not greater than 5 700 kg.

1 The flight and navigational instruments required are:

(a) an airspeed indicating system; and

(b) a sensitive pressure altimeter; and

(c) (i) direct reading magnetic compass; or

(ii) a remote indicating compass and a standby direct reading magnetic compass; and

(d) an accurate timepiece indicating the time in hours, minutes and seconds, except that this may be omitted if it is carried on the person of the pilot or navigator; and

(e) a rate of climb and descent indicator (vertical speed indicator) for other than night V.M.C. flights; and

(f) an outside air temperature indicator; and

(g) an attitude indicator (artificial horizon); and

(h) a heading indicator (directional gyroscope); and

(i) a turn and slip indicator except that only a slip indicator is required when a second attitude indicator usable through flight attitudes of 360 degrees of pitch and roll is installed; and

(j) means of indicating whether the power supply to the gyroscopic instruments is working satisfactorily; and

(k) except for aeroplanes engaged in night V.M.C. flights, means of preventing malfunctioning due to either condensation or icing of at least 1 airspeed indicating system.

2 The instruments specified in paragraphs 1 (a), (b), (e) and (k) of this Appendix must be capable of being connected to either a normal or an alternate static source but not both sources simultaneously. Alternatively, they may be connected to a balanced pair of flush static ports.

3 Except for aeroplanes engaged in night V.M.C. private and aerial work operations the instruments specified in paragraphs 1 (g), (h) and (i) of this Appendix must have duplicated sources of power supply unless the turn and slip indicator or the second attitude indicator specified in paragraph 1 (i) has a source of power independent of the power operating other gyroscopic instruments.

4 A gyro-magnetic type of remote indicating compass installed to meet the requirements of subparagraph 1 (c) (ii) of this Appendix may be considered also to meet the requirement for a heading indicator specified in paragraph 1 (h) of this Appendix, provided that such installation complies with the power supply requirements of clause 3 of this Appendix.

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Appendix V

Electric lighting equipment flight under the I.F.R. at night (including night V.M.C.)

The electric lighting equipment is:

1 Instrument illumination

Illumination for all instruments and equipment, used by the flight crew, that are essential for the safe operation of the aircraft. The illumination must be such that:

(a) all illuminated items are easily readable or discernible, as applicable; and

(b) its direct or reflected rays are shielded from the pilot's eyes; and

(c) its power supply is so arranged that in the event of the failure of the normal source of power, an alternative source is immediately available; and

(d) it emanates from fixed installations.

2 Intensity control

Means of controlling the intensity of the illumination of instrument lights, unless it can be demonstrated that non-dimmed instrument lights are satisfactory under all conditions of flight likely to be encountered.

3 Landing lights

2 landing lights except that, in accordance with the provisions of regulation 308 of CAR 1988, aircraft engaged in private and aerial work operations and charter operations not carrying passengers for hire and reward are exempted from this requirement provided that 1 landing light is fitted.

Note A single lamp having 2 separately energised filaments may be approved as meeting the requirement for 2 landing lights.

4 Passenger compartment lights

Lights in all passenger compartments.

5 Pilots' compartment lights

Means of lighting the pilots' compartment to provide illumination adequate for the study of maps and the reading of flight documents.

6 Position and anti-collision lights

Equipment for displaying the lights prescribed in regulation 196 of CAR 1988.

Note In accordance of the provision of subregulation 195 (1) of CAR 1988, position and anti-collision lights must be displayed at night and in conditions of poor visibility.

7 Emergency lighting

Emergency lighting and a shock-proof electric torch for each crew member at the crew member station.

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Appendix VI

Instruments required for V.F.R. operations — helicopters

1 The flight and navigational instruments required are:

(a) an airspeed indicating system; and

(b) a pressure altimeter with a readily adjustable pressure datum setting scale graduated in millibars; and

(c) (i) a direct reading magnetic compass; or

(ii) a remote indicating magnetic compass and a standby direct reading magnetic compass; and

(d) an accurate timepiece indicating hours, minutes and seconds. This may be carried on the person of the pilot or navigator.

2 In addition to the instruments required under clause 1, helicopters engaged in RPT, charter, or aerial work, operations and operating under the V.F.R. must be equipped with:

(a) a slip indicator; and

(b) an outside air temperature indicator when operating from or to a location at which ambient air temperature is not available from ground-based instruments.

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Appendix VII

Instruments required for I.F.R. operations in helicopters (except night V.M.C.)

1 The flight and navigational instruments required in a helicopter which is required to be operated by 2 pilots are:

(a) 2 airspeed indicators together with 1 airspeed indicating system with means of preventing malfunction due to either condensation or icing; and

(b) 2 sensitive pressure altimeters; and

(c) (i) a direct reading magnetic compass; or

(ii) a remote indicating compass and a standby direct reading magnetic compass; and

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

(e) 2 instantaneous vertical speed indicators; and

(f) an outside air temperature indicator; and

(g) 2 attitude indicators (artificial horizons) having a 5 inch dial presentation and a standby attitude indicator positioned so as to be usable by the pilot in command and plainly visible by both pilots by day and by night; and

(h) a heading indicator (directional gyroscope); and

(i) 2 slip indicators; and

(j) provision to indicate whether the power supply to the gyroscopic instruments is working satisfactorily.

2 The minimum flight and navigation instruments required in a helicopter which is operated by a single pilot are:

(a) an airspeed indicating system with means of preventing malfunction due to either condensation or icing; and

(b) 2 sensitive pressure altimeters; and

(c) (i) a direct reading magnetic compass; or

(ii) a remote indicating compass and a standby direct reading magnetic compass; and

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

(e) instantaneous vertical speed indicator; and

(f) an outside air temperature indicator; and

(g) an attitude indicator having a 5 inch dial presentation and a standby attitude indicator positioned so as to be usable by the pilot; and

(h) a heading indicator (directional gyroscope); and

(i) a slip indicator; and

(j) provision to indicate whether the power supply to the gyroscopic instruments is working satisfactorily.

3 The instruments specified in paragraphs 1 (a), (b) and (e) and 2 (a), (b) and (e) of this Appendix must be capable of being connected to more than 1 static source or must be connected to a balanced pair of flush static ports. Instruments and equipment other than mandatory flight instruments must not be connected to the static system that operates the instruments used by the pilot in command.

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4 The instruments specified in paragraphs 1 (h) and 2 (h) must have a duplicated source of power supply.

5 The 5 inch dial attitude indicators specified in paragraphs 1 (g) and 2 (g) must have duplicate sources of power supply. The standby attitude indicator must have a power source independent of the electrical generating system and must operate independent of any other attitude indicating system installed.

6 The standby attitude indicator installation specified in paragraphs 1 (g) and 2 (g) must be one in which:

(a) the indicator complies with US Technical Standard Order C4c or equivalent specification acceptable to CASA; and

(b) the indicator and its lighting will continue to operate for 30 minutes following the failure of the electrical power generating system without any action by the flight crew; and

(c) the position size and lighting of the instrument display allows its use from the pilot in command's operating station by day and by night; and

(d) the operation is independent of other attitude indicator installations.

7 CASA may, having regard to the type of helicopter, approve an attitude indicator incorporated in an automatic pilot system as being 1 of the 2 attitude indicators required by paragraph 1 (g) of this Appendix.

8 A gyro-magnetic type of remote indicating compass installed to meet the requirements of subparagraph 1 (c) (ii) and 2 (c) (ii) of this Appendix may be considered also to meet the requirement for a heading indicator specified in paragraph 1 (h) or 2 (h) of this Appendix, provided that such installation complies with the power supply requirements of clause 4 of this Appendix.

9 CASA may, having regard to the type of helicopter, and the flight presentation, response and acuity standard of the instrument concerned, approve the use of attitude indicators which have a dial presentation of less than 5 inches, in lieu of the indicators specified at paragraphs 1 (g), 2 (g) and 5 of this Appendix.

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Appendix VIII

Instruments required for night V.M.C. flight in helicopters except while engaged in agricultural operations

1 The flight and navigational instruments required are:

(a) an airspeed indicating system; and

(b) a sensitive pressure altimeter; and

(c) (i) a direct reading magnetic compass; or

(ii) a remote indicating compass and a standby direct reading magnetic compass; and

(d) an accurate timepiece indicating the time in hours, minutes and seconds. This may be carried on the person of the pilot or navigator; and

(e) an outside air temperature indicator; and

(f) an attitude indicator (artificial horizon); and

(i) standby attitude indicator; or

(ii) turn indicator; and

(g) a heading indicator (directional gyroscope); and

(h) a slip indicator; and

(i) a vertical speed indicator; and

(j) means of indicating whether the power supply to the gyroscopic instruments is working satisfactorily.

2 For operations onto vessels or platforms at sea by night an instantaneous vertical speed indicator is required in place of the vertical speed indicator specified at paragraph 1 (i) of this Appendix.

3 The attitude indicator and standby attitude indicator or turn indicator as specified in paragraph 1 (f) of this Appendix, must have separate and independent power sources.

4 A gyro-magnetic type of remote indicating compass installed to meet the requirements of subparagraph 1 (c) (ii) of this Appendix may be considered also to meet the requirement for a heading indicator specified in paragraph 1 (g) of this Appendix, provided that such installation complies with the power supply requirements of clause 3 of this Appendix.

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Appendix IX

Instruments required for helicopters engaged in night V.M.C. agricultural operations

The flight and navigational instruments required are:

(a) an airspeed indicating system; and

(b) a sensitive pressure altimeter; and

(c) (i) a direct reading magnetic compass; or

(ii) a remote indicating compass and a standby direct reading magnetic compass; and

(d) an accurate timepiece indicating the time in hours, minutes and seconds. This may be carried on the person of the pilot or navigator; and

(e) an outside air temperature indicator; and

(f) an attitude indicator (artificial horizon); and

(g) a vertical speed indicator; and

(h) a slip indicator; and

(i) a means of indicating whether the power supply to the gyroscopic instrument is working satisfactorily.

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Appendix X

Instruments required for manned free balloons and hot air airships for flight by day under the V.F.R.

The flight and navigational instruments required for flight under the V.F.R. by day are:

(a) an altimeter, with a readily adjustable pressure datum setting scale graduated in hectopascals; and

(b) a timepiece, which may be carried on the person of the pilot, that is accurate to, and readable to, the nearest minute for the duration of the flight; and

(c) a vertical speed indicator; and

(d) in the case of a hot air airship that has a maximum permissible forward airspeed less than that attainable with the engine(s) operating at full power, an instrument capable of indicating when the maximum speed is reached; and

(e) in the case of a hot manned free balloon or hot air airship, an envelope temperature indicator; and

(f) in the case of a hot air manned free balloon or a hot air airship, a free air temperature indicator or an air temperature indicator that provides readings convertible to free air temperature; and

(g) in the case of a pressurised hot air airship, an internal pressure indicator.

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Appendix XI — Approved equipment configuration — ADS-B transmitting equipment — IFR and VFR flight

Part A — ADS-B transmitting equipment — approval and application

Approved equipment configuration — IFR and VFR flight

1 Subject to this Part, an equipment configuration for ADS-B transmitting equipment is approved if it complies with the standards specified in Part B or Part C of this Appendix.

Application

2 ADS-B transmitting equipment carried on an aircraft in an IFR flight has an approved equipment configuration if, and only if, it complies with the standards in Part B or Part C of this Appendix.

Note No other Appendix applies to the equipment in an IFR flight.

3 ADS-B transmitting equipment carried on an aircraft in any operation at or above FL290 has an approved equipment configuration if, and only if, it complies with the standards in Part B or Part C of this Appendix.

Note No other Appendix applies to the equipment in an operation above FL290.

4 ADS-B transmitting equipment carried on an aircraft, in a flight that is not an IFR flight or any flight at or above FL290, has an approved equipment configuration if it complies with the standards in Part B or Part C of this Appendix.

Note For example, ADS-B transmitting equipment carried on an aircraft in a VFR flight below FL290 would have an approved equipment configuration if it complied with the standards in Part B or Part C of this Appendix. However, another Appendix may apply to the equipment in the VFR flight.

Part B

ADS-B transmitting equipment — standard for approval

2 ADS-B transmitting equipment must be of a type that:

(a) is authorised in accordance with (E)TSO-C166, or a later version as in force from time to time; or

(b) meets the following requirements:

(i) the type must be accepted by CASA as meeting the specifications in RTCA/DO-260 dated 13 September 2000, or a later version as in force from time to time; and

(ii) the type must utilise HPL at all times HPL is available; or

(c) is otherwise authorised, in writing, by CASA for the purposes of subsection 9B of this Civil Aviation Order as being equivalent to one of the foregoing types.

GNSS position source equipment — standard for aircraft manufactured on or after 8 December 2016

3 For an aircraft manufactured on or after 8 December 2016, the geographical position transmitted by the ADS-B transmitting equipment must be determined by:

(a) a GNSS receiver of a type that is authorised in accordance with (E)TSO-C145a or (E)TSO-C146a, or a later version as in force from time to time; or

(b) a GNSS receiver of a type that is authorised in accordance with (E)TSO-C196a, or a later version as in force from time to time; or

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(c) a GNSS receiver or system which meets the following requirements:

(i) is certified by an NAA for use in flight under the I.F.R.;

(ii) has included in its specification and operation the following:

(A) FDE, computed in accordance with the definition at paragraph 1.7.3 of RTCA/DO-229D;

(B) the output function HPL, computed in accordance with the definition at paragraph 1.7.2 of RTCA/DO-229D;

(C) functionality that, for the purpose of HPL computation, accounts for the absence of the SA of the GPS in accordance with paragraph 1.8.1.1 of RTCA/DO-229D; or

(d) another equivalent system authorised in writing by CASA.

Note The following GNSS receivers meet the requirements of clause 3, namely, those certified to (E)TSO-C145a or (E)TSO-C146a, or later versions, or those manufactured to comply with (E)TSO-C196a.

GNSS position source equipment — standard for aircraft manufactured before 8 December 2016

4 For an aircraft manufactured before 8 December 2016, the geographical position transmitted by the ADS-B transmitting equipment must be determined by:

(a) a GNSS receiver or system that complies with the requirements of clause 3, other than sub-subparagraph 3 (c) (ii) (C) which is optional; or

(b) an equivalent GNSS receiver or system that has been approved in writing by CASA.

Note The following GNSS receivers meet the requirements of clause 4, namely, those certified to (E)TSO-C145a or (E)TSO-C146a, or later versions, or those manufactured to comply with (E)TSO-C196a. Some later versions of GNSS receivers certified to (E)TSO-C129 may also meet the requirements, i.e. those having FDE and HPL features incorporated.

Altitude source equipment — standard

5 The pressure altitude transmitted by the ADS-B transmitting equipment must be determined by:

(a) a barometric encoder of a type that is authorised in accordance with (E)TSO-C88a, or a later version as in force from time to time; or

(b) another equivalent system authorised in writing by CASA.

Part C

Alternative approved equipment configuration — standard for aircraft manufactured on or after 8 December 2016

7 For an aircraft manufactured on or after 8 December 2016, an equipment configuration is approved if:

(a) it has been approved or accepted by:

(i) the NAA of a recognised country, as meeting the standards of EASA AMC 20-24 or EASA CS-ACNS; or

(ii) the FAA, as meeting the standards of 14 CFR 91.225 for 1090 Megahertz (MHz) Extended Squitter ADS-B; and

(b) the aircraft flight manual attests to the approval or acceptance; and

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(c) the GNSS receiver or system complies with the requirements of clause 3 in Part B.

Alternative approved equipment configuration — standard for aircraft manufactured before 8 December 2016

8 For an aircraft manufactured before 8 December 2016, an equipment configuration is approved if:

(a) it has been approved or accepted by:

(i) EASA as meeting the standards of EASA AMC 20-24; or

(ii) the FAA as meeting the standards of 14 CFR 91.225 for 1090 Megahertz (MHz) Extended Squitter ADS-B; and

(b) the aircraft flight manual attests to the approval or acceptance; and

(c) the GNSS receiver or system complies with the requirements of clause 4 in Part B.

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Appendix XII — Approved equipment configuration — Mode S transponder with Class B TABS position source device — VFR flight below FL290 only

Part A — ADS-B transmitting equipment — approval and application

Approved equipment configuration — Mode S transponder with Class B TABS position source device

1 Subject to this Part, an equipment configuration for ADS-B transmitting equipment is approved if it is a Mode S transponder with Class B TABS position source device that complies with the standards specified in Part B of this Appendix.

Application

2 A Mode S transponder with Class B TABS position source device carried on an aircraft has an approved equipment configuration if it complies with:

(a) the standards in Part B of this Appendix; and

(b) the conditions set out in clauses 3 and 4.

Note Another Appendix may apply to the equipment in a VFR flight.

3 For paragraph 2 (b), a Mode S transponder with Class B TABS position source device may only be operated in VFR flight below FL290.

4 For paragraph 2 (b), if a Mode S transponder with Class B TABS position source device transmits a SIL value of less than 2, the aircraft must not enter controlled airspace in which:

(a) aircraft are required to carry serviceable ADS-B transmitting equipment that complies with an approved equipment configuration in accordance with Appendix XI; or

(b) VFR aircraft are required to carry ADS-B transmitting equipment.

Note Carriage of a Mode S transponder with Class B TABS position source device does not remove the requirement to obtain ATC clearance to operate in Class B or C airspace. Nor does it remove the requirement to obtain CASA approval to operate in Class A airspace – see subregulation 99AA (3) of CAR.

Part B — Standards for a Mode S transponder with Class B TABS position source device

Mode S transponder — standard

1 The Mode S transponder must be of a type that:

(a) is authorised in accordance with (E)TSO-C166B, as in force from time to time; or

(b) approved in writing by CASA as meeting the specifications in RTCA/DO-260B, whether dated 2 December 2009, or a later version as in force from time to time; or

(c) is authorised in writing by CASA as being equivalent to a device mentioned in paragraph (a) or (b).

2 When required to be operated, the Mode S transponder must transmit NACp, NIC, SIL and SDA values in accordance with the authorised capability of the GNSS position source.

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GNSS position source equipment

3 The geographical position transmitted by the Mode S transponder must be determined by:

(a) a Class B TABS position source device that is authorised in accordance with (E)TSO-C199, as in force from time to time; or

(b) another source that is authorised in writing by CASA as being equivalent to a source mentioned in paragraph (a).

Altitude source equipment — standard

4 The pressure altitude transmitted by the Mode S transponder must be determined by:

(a) a barometric encoder of a type that is authorised in accordance with (E)TSO-C88a, as in force from time to time; or

(b) another system that is authorised in writing by CASA as being equivalent to a barometric encoder mentioned in paragraph (a).

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Appendix XIII — Approved equipment configuration — Integrated TABS device — VFR flight below FL290 only

Part A — ADS-B transmitting equipment — approval and application

Approved equipment configuration — integrated TABS device

1 Subject to this Part, an equipment configuration for ADS-B transmitting equipment is approved if it is an integrated TABS device that complies with the standards specified in Part B of this Appendix.

Application

2 An integrated TABS device carried on an aircraft has an approved equipment configuration if it complies with:

(a) the standards in Part B of this Appendix; and

(b) the conditions set out in clause 3.

Note Another Appendix may apply to the equipment in a VFR flight.

3 For paragraph 2 (b) an integrated TABS device may only be operated in transmitting mode:

(a) in VFR flight below FL290; and

(b) in Class D, Class E or Class G airspace.

Note An integrated TABS device is not a substitute for mandatory carriage of a transponder in relevant airspace, except in Class E airspace, or in Class G airspace above 10 000 ft: see subparagraph 9E.2 (d); see also subparagraph 9BA.6 (b).

Part B — Standards for an integrated TABS device

1 An integrated TABS device must meet the technical specifications in (E)TSO-C199, as in force from time to time, that are for a device with integrated Class A TABS and Class B TABS functionality.

2 An integrated TABS device must transmit a SIL value of 1.

3 Subject to clause 4, an integrated TABS device must be authorised by the relevant NAA of the equipment manufacturer as meeting the standards mentioned in clauses 1 and 2.

4 Clause 3 does not apply to an integrated TABS device carried on certain light sport, experimental and other aircraft provided that the TABS device that is carried:

(a) provides the pilot, other aircraft and ATC with the same transponder and surveillance capability as would be provided if an integrated TABS device were expressly authorised by the relevant NAA; and

(b) the pilot has a statement of compliance (or however described) from the equipment manufacturer certifying that the equipment otherwise meets the standards mentioned in clauses 1 and 2.

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Appendix XIV — Approved equipment configuration — EC device — VFR flight below FL290 only

Part A — ADS-B transmitting equipment — approval and application

Approved equipment configuration — EC device

1 Subject to this Part, an equipment configuration for ADS-B transmitting equipment is approved if it is an electronic conspicuity device (an ***EC device***) that complies with the standards specified in Part B of this Appendix.

Note Only EC devices that meet all of the requirements of this Appendix are EC devices for the purposes of this Appendix.

Application

2 An EC device carried on an aircraft has an approved equipment configuration if it complies with:

(a) the standards in Part B of this Appendix; and

(b) the conditions set out in clause 3.

Note Another Appendix may apply to the equipment in a VFR flight.

3 For paragraph 2 (b), an EC device must not be operated in transmitting mode:

(a) in VFR flight at or above FL290; or

(b) concurrently with a Mode S transponder that is also transmitting ADS-B.

Note An EC device may be operated concurrently with a Mode A/C, or a Mode S transponder (other than one that is transmitting ADS-B) but it is not a substitute for mandatory carriage of a transponder in relevant airspace.

Part B — Standards for an EC device

1 Subject to clauses 3 and 4, an EC device must meet the technical specifications in UK CAP 1391.

2 An EC device must use a Class B TABS position source that complies with the performance standards specified in (E)TSO-C199, as in force from time to time.

3 An EC device must:

(a) be capable of transmitting a SIL value of 1, in accordance with the standards in UK CAP 1391 for an EC device that uses a Class B TABS position source; and

(b) transmit that SIL value of 1.

4 Despite the standards in UK CAP 1391, an EC device must:

(a) meet the requirements described in paragraph 2.2.3.2.7.2.4.6 of RTCA/DO-260B for transmitting an SDA of 1; and

(b) transmit an SDA value of 1.

5 An EC device must use a barometric encoder for altitude information.

6 An EC device must be mounted in accordance with the manufacturer's instructions.

7 An EC device, when mounted in accordance with the manufacturer's instructions, must not:

(a) interfere with aircraft controls; or

(b) otherwise affect the safe operation of the aircraft.

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8 The following administrative standards for an EC device must be complied with:

Note See Subparagraph 9B.3 (b).

(a) an EC device must have a statement of compliance (however described) from the EC device manufacturer certifying that the device meets the requirements mentioned in clauses 1 to 5 (***a declaration of capability and conformance to the requirements in clauses 1 to 5*** or ***a declaration***);

(b) the pilot in command of an aircraft that uses an EC device must carry the declaration, or a copy of it, on board the aircraft;

(c) an EC device model must not be operated in a transmit mode anywhere in Australia unless it is listed on the CASA website as an EC device model for which the manufacturer has made a valid declaration;

(d) the manufacturer of an EC model may apply in writing to CASA:

(i) for a statement that CASA considers that the manufacturer has made a valid declaration of capability and conformance to clauses 1 to 5 of Part B of Appendix XIV of Civil Aviation Order 20.18; and

(ii) for inclusion of the EC device model on the CASA website.

(e) CASA may remove an EC device model from the CASA website if:

(i) the manufacturer requests its removal in writing; or

(ii) if CASA is satisfied that removal is required in the interests of aviation safety.

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Notes to *Civil Aviation Order 20.18 (Aircraft equipment — basic operational requirements) Instrument 2014*

The Civil Aviation Order (in force under the *Civil Aviation Regulations 1988*) as shown in this compilation comprises *Civil Aviation Order 20.18 (Aircraft equipment — basic operational requirements) Instrument 2014* amended as indicated in the Tables below.

Table of Orders

Year and number	Date of registration on FRLI/FRL	Date of commencement	Application, saving or transitional provisions
CAO 20.18 Instrument 2014	17 December 2014 (F2014L01743)	17 December 2014 (s. 1B)	—
CAO 20.18 Am Instrument 2015 (No. 1)	FRLI 17 March 2015 (F2015L00311)	18 March 2015 (s. 2).	s. 4 (see Table A)
CAO 20.18 Am Instrument 2015 (No. 2)	FRLI 29 April 2015 (F2015L00605)	S. 2: 29 April 2015 Remainder: 1 January 2016	—
CAO 20.18 Am Instrument 2016 (No. 2)	FRL 15 December 2016 (F2016L01961)	16 December 2016 (s. 2).	—
Civil Aviation Legislation Amdt & Repeal (ATSOs) Instrument 2017	FRL 30 November 2017 (F2017L01553)	30 November 2017 (s. 2)	—
CAO 20.18 Am Instrument 2020 (No. 1)	FRL 11 June 2018 (F2020L00693)	11 June 2020 (s. 2)	—

Table of Amendments

ad. = added or inserted am. = amended rep. = repealed rs. = repealed and substituted

Provision affected	How affected
subs. 1B	rep. *Legislation Act 2003*, s. 48D
subs. 1C	rep. *Legislation Act 2003*, s. 48C
subs.3	am. F2015L00605
subs. 4	am. F2015L00605
subs. 9	am. F2020L00693
subs. 9B	am. F2016L01961, F2017L01553, F2020L00693
subs. 9BA	ad. F2020L00693
subs. 9C	am. F2016L01961, F2020L00693
subs. 9D	am. F2016L01961
subs. 9E	am. F2016L01961, F2020L00693
Appendix XI	am. F2017L01553, F2020L00693
Appendix XII	ad. F2020L00693
Appendix XIII	ad. F2020L00693

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Table of Amendments

ad. = added or inserted am. = amended rep. = repealed rs. = repealed and substituted

Provision affected	How affected
Appendix XIV	ad. F2020L00693

Table A

Civil Aviation Order 20.18 Amendment Instrument 2015 (No. 1) (F2015L00311)

4 Transitional application — helicopter V.F.R. operations at night

The amendments to Civil Aviation Order 20.18 in Schedule 1 of this instrument do not apply until 1 January 2016.

The amendments referred to in the **Transitional application — helicopter V.F.R. operations at night** provision are set out below:

Amendments

[1] Paragraph 3.2

after

the V.F.R.

insert

by day

[2] After paragraph 3.2

Insert

3.2A A helicopter may only be operated under the V.F.R. at night if:

(a) it is equipped with the instruments specified in Appendix VIII; and

(b) it is equipped with any other instruments and indicators specified in the helicopter's flight manual;

(c) for flights under V.F.R. at night which involve flights over land or water where the helicopter's attitude cannot be maintained by the use of visual external surface cues as a result of lights on the ground or celestial illumination:

(i) the helicopter is equipped in accordance with subparagraph 4.2 (d) of this Order; or

(ii) the helicopter is operated by a qualified 2 pilot crew, each with access to flight controls.

[3] Subparagraph 4.2 (d)

substitute

(d) an approved automatic pilot or automatic stabilisation system.

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