

Explanatory Statement

Civil Aviation Act 1988

Civil Aviation Order 20.18 Amendment Order (No. 1) 2009

Legislation

Section 98 of the *Civil Aviation Act 1988* (the **Act**) empowers the Governor-General to make regulations for the Act and the safety of air navigation.

Under subregulation 207 (2) of the *Civil Aviation Regulations 1988* (**CAR 1988**), a person must not use an Australian aircraft in a class of operation if the aircraft is not fitted with the instruments and equipment approved and directed by CASA. In approving or directing, CASA may have regard only to the safety of air navigation.

Under subregulation 5 (1) of CAR 1988, where CASA is empowered to issue certain instruments such as approvals or directions, it may do so in a Civil Aviation Order (**CAO**).

For subregulation 207 (2) of CAR 1988, CASA made CAO 20.18 setting out the approval and directions for aircraft instruments and equipment to meet basic operational requirements.

Background

ADS-B avionics is a new aircraft surveillance system using ground stations to receive radio signals that are transmitted by ADS-B equipped aircraft. Using ADS-B avionics, an aircraft is able to broadcast its identity, position and velocity with a degree of accuracy, integrity and reliability that is at least as good as secondary surveillance radar (**SSR**). However, the installation of ADS-B ground stations is more economical than conventional radar stations. Hence, it provides the potential for a much greater geographical area – ultimately nationwide – to be covered by transmissions for surveillance by air traffic control (**ATC**), thereby enhancing the safety of air navigation.

Airservices Australia trial

Airservices Australia (**AA**) undertook a longstanding operational trial of ADS-B in airspace in the vicinity of Bundaberg, Queensland. The main objective of the trial was to confirm ADS-B performance and assess whether it was at least as good as SSR in accuracy, integrity, availability and reliability.

Both AA and CASA were satisfied that ADS-B avionics are at least as effective as SSR. As a result, AA commenced deployment of 32 ADS-B ground stations across Australia (the ADS-B Upper Airspace Project (**UAP**)) to provide for a continent-wide surveillance service at and above flight level (**FL**) 290, as well as significant coverage to lower levels particularly in the vicinity of those aerodromes where ground stations are installed.

For AA, UAP offered efficiency benefits in relation to airspace capacity and the ability to accommodate preferred routes and levels. However, CASA's interest was the safety of air navigation. CASA concluded that the scheme provided substantial safety benefits stemming from the much broader reach of radar-like surveillance of ADS-B equipped aircraft for air traffic management purposes.

Civil Aviation Order 20.18 Amendment Order (No. 1) 2007 inserted a new subsection 9B and Appendix into CAO 20.18 to establish standards and directions for those aircraft deciding to carry automatic dependent surveillance – broadcast transmitting equipment (**ADS-B**). The equipment must comply with an equipment configuration approved by CASA or as set out in Appendix XI. These ADS-B surveillance services were, therefore, progressively available to any aircraft operator who *voluntarily* equipped their aircraft and trained their crews for ADS-B.

Transition to compulsory arrangements

In August 2007, a *Joint Consultation Paper on Transition to Satellite Technology for Navigation and Surveillance* (the **JCP**) was published by the then Department of Transport and Regional Services, Airservices Australia, and CASA, in co-operation with the Department of Defence.

One of the options considered by the JCP was compulsory fitment of Global Navigation Satellite System (**GNSS**) and ADS-B avionics to Australian and foreign aircraft operating in Australia for a wide range of airspace, to facilitate the transition to navigation and surveillance based on satellite technology.

In the period following publication of the JCP, several significant issues, including some raised by stakeholders in recent months, remained unresolved and created unacceptable uncertainty about possible implementation timeframes. These issues required relevant agencies to rethink the JCP strategy and included the following:

- increasing scope (and cost) of cross industry subsidy for avionics
- potential taxation implications for subsidy recipients
- uncertainty created by global financial turmoil (including movements in the value of the Australian currency and variations to air traffic volumes)
- impact of Commonwealth government budgetary processes and savings measures.

Consideration of these issues in parallel with the JCP responses led to the relevant aviation agencies jointly taking the following decisions, which were finalised in November 2008:

- the proposed accelerated transition (JCP Phase 1) with a “transponder-like” mandate and cross-industry subsidy would not go ahead. Agencies agreed that transition would instead occur gradually over a longer time frame
- the proposed initial mandate would be limited to Upper Airspace
- the timing and scope of future steps would be progressed through normal regulatory processes and would take into account ongoing developments in Europe and the USA, as well as outcomes from consultation on the Government’s Aviation Policy Green Paper
- AA would proceed with the replacement of its enroute radars and navaids as necessary to ensure the integrity of Australia’s ATC system. However, the continued need for some of these facilities would be reviewed in light of the increased use of alternative systems. This decision was taken as the maintenance of the existing infrastructure was becoming increasingly difficult, particularly in relation to availability of spare parts. The risk that AA faced was that vital elements of its enroute facilities would fail irreparably before the finalisation of any fleet mandate under Phase 1 of the JCP, which CASA assessed could take 5 years. The effect of the

replacement of enroute radars and nav aids meant that the transition to satellite technology as proposed in the JCP would no longer be the driver for the JCP Phase 1 aircraft ADS-B equipment fitment mandate for those areas of enroute radar controlled airspace and for enroute navigation. However, that decision would have no effect on the proposed use of ADS-B for upper airspace surveillance for ATC.

The aircraft fitment mandate is for flight in the upper airspace at and above FL 290. The compliance date has been set at 12 December 2013 to allow 5 years for airlines and other operators of turbojet aircraft to comply. At FL 290, ADS-B coverage as planned by AA will extend over the whole of continental Australia outside radar coverage and also over significant areas of oceanic airspace within the Australian Flight Information Region (*FIR*). Radar-like ATC surveillance of virtually all aircraft operations will, therefore, be achieved by and after December 2013. This is a very significant advance in safety.

The benefits that will result from the upper airspace ADS-B fitment will be fourfold:

- greater airspace capacity as a result of the reduction in the ATC separation standard from 50NM laterally and longitudinally to 5NM
- improved safety resulting from radar-like surveillance over the continent
- less holding of aircraft at non-preferred levels thus improving efficiency of operations on flexi-tracks
- reduced fuel burns as a result of less holding at non-preferred levels.

Civil Aviation Order 20.18 Amendment Order (No. 1) 2009 (the *CAO amendment*)

In summary terms, the CAO amendment makes fitment and operation of approved ADS-B avionics equipment mandatory on and from 12 December 2013 for all Australian aircraft operations at or above FL 290 (unless CASA has authorised otherwise). (Approved equipment is that which meets the approved equipment configuration in Appendix XI.)

However, from the commencement of the CAO amendment, if ADS-B is carried voluntarily for operational purposes (in any airspace at any altitude) it must be approved equipment that makes specific flight identification transmissions, and it must be operated continuously (unless authorised otherwise by ATC). Non-approved equipment must be deactivated (except in VMC test flights below FL 290).

The standards for approved equipment configuration in Appendix XI of CAO 20.18 have not changed. However, the Appendix has been redrafted to be in the form of conditions which relevant ADS-B equipment must meet for it to be approved.

The CAO amendment operates in conjunction with simultaneously made amendments to the same effect made to *Civil Aviation Orders 82.1, 82.3 and 82.5*, and a direction under regulation 209 of CAR 1988 to foreign aircraft engaged in private operations. In this way, the ADS-B requirements apply (according to their terms) to all Australian and foreign registered aircraft engaged in private, aerial work, charter or regular public transport operations in Australia.

Details of the CAO Amendment

Details of the amendments are set out in Attachment 1.

Legislative Instruments Act

Under subregulation 5 (1) of CAR 1988, if CAR 1988 empowers CASA to issue instruments such as approvals or directions, CASA may do so in the form of CAOs. Under subsection 98 (5) of the Act, where regulations provide for an instrument to be issued in the form of a CAO, the CAO so made is a legislative instrument. The CAO amendment is, therefore, a legislative instrument subject to tabling and disallowance in the Parliament under sections 38 and 42 of the LIA.

Consultation

Consultation under section 17 of the LIA has been undertaken with interested parties as follows.

The JCP provided the public with a complete explanation of the options for the transition to GNSS and ADS-B. This was, in its form and content, a virtual Notice of Proposed Rule Making (*NPRM*) document which is the normal method used by CASA for formal consultation on regulatory proposals.

A total of 254 responses to the JCP were received. All responses received were considered. The JCP proposal received significant support despite over 20% of responses being form letters from respondents from the recreational and sport aviation sector of the industry which rejected the proposal. Feedback varied from full support of the proposal, to suggestions for change, to rejection of all parts of the proposal.

The CAO amendments were formulated by CASA following its analysis and consideration of the industry responses received to the JCP, including concerns expressed by the general aviation, and sport and recreational aviation, sectors of the industry.

In formulating the final rule, which greatly reduces the scope of the JCP Phase 1 proposal for transition to ADS-B, CASA considers that the issues raised by respondents have been largely addressed and resolved.

Regulation Impact Statement (RIS)

A RIS (reference number OBPR ID 10024) was prepared and submitted to the Office of Best Practice Regulation (*OBPR*) for assessment. OBPR advised that best practice regulation requirements had been met and that the RIS contained an adequate level of analysis.

Commencement and making

The CAO amendment takes effect on the day after it is registered. It has been made by the Director of Aviation Safety, on behalf of CASA, in accordance with subsection 84A (2) of the Act.

[Civil Aviation Order 20.18 Amendment Order (No. 1) 2009]

Details of the CAO amendment

Amendment 1

Amendment 1 inserts a new subsection 9B into CAO 20.18. Subsection 9B contains directions relating to carriage and use of automatic dependent surveillance – broadcast equipment as set out in the following paragraphs.

- 9B.1 Under this paragraph, subsection 9B applies to aircraft engaged in private, aerial work, charter or regular public transport operations.
- 9B.2 Under this paragraph, certain terms are defined as follows:
ADS-B means automatic dependent surveillance – broadcast.
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, combination of 24 bits assigned to an aircraft by CASA or by a relevant RAAO for the purpose of air to ground communications, navigation and surveillance.
approved equipment configuration means an equipment configuration that:
(a) meets the conditions for approval set out in Appendix XI; or
(b) is approved in writing by CASA.
Note Equipment configurations approved by CASA are published in Appendix D of Advisory Circular 21-45.
ATSO means Australian Technical Standard Order of CASA.
EASA means the European Aviation Safety Agency.
ETSO means European Technical Standard Order of the EASA.
FAA means the Federal Aviation Administration of the United States.
FL 290 means flight level 290. A note indicates that the concept of flight level 290 is defined in subregulation 2 (1) of CAR 1988.
RAAO means a recreational aviation administration organisation that is recognised by CASA.
TSO means Technical Standard Order of the FAA.
- 9B.3 Under this paragraph, if an aircraft carries ADS-B transmitting equipment for operational use in Australian territory, the equipment must comply with an approved equipment configuration as defined above. This is to ensure that the message protocols used to transmit the aircraft data to ATC are standardised in a form that can be used by ATC for surveillance.
- 9B.4 Under this paragraph, if an aircraft carries ADS-B transmitting equipment for operational use in Australian territory, the equipment must transmit:
(a) a flight identification that corresponds exactly to the aircraft identification mentioned on the flight notification filed with ATC for the flight; or
(b) if no flight notification is filed for the flight — a flight identification that is:
(i) for an aircraft registered on the Australian Civil Aircraft Register and operating wholly within Australian territory — the aircraft's registration mark; or
(ii) for an Australian aircraft registered by a RAAO — in accordance with the organisation's operations manual; or
(c) another flight identification directed or approved by ATC.

This requirement is to ensure that the flight identification transmitted by aircraft exactly matches with the flight plan submitted to ATC for the flight.

- 9B.5 Under this paragraph, if an aircraft carries ADS-B transmitting equipment that complies with an approved equipment configuration, the equipment must be operated continuously during the flight in all airspace at all altitudes unless the pilot is directed or approved otherwise by ATC. This requirement is to ensure that equipped aircraft can be seen by ATC wherever they fly.
- 9B.6 Under this paragraph, if an aircraft carries ADS-B transmitting equipment which does not comply with an approved equipment configuration, the equipment must be deactivated before the aircraft flies in Australian territory. This requirement is to ensure that any non-standard equipment is not used in Australian territory. Such use could result in the transmission of incorrect data to ATC with possible safety implications.
- 9B.7 This paragraph provides, however, that the equipment need not be deactivated if the aircraft is undertaking an ADS-B test flight in VMC in airspace below FL 290. This provision allows pilots to undertake test flights of newly installed ADS-B equipment on aircraft.
- 9B.8 Under this paragraph, on and after 12 December 2013, if an aircraft operates at or above FL 290, it must carry serviceable ADS-B transmitting equipment that complies with an approved equipment configuration. This provision is the mandate for aircraft flight in upper airspace.

A following Note is intended to assist readers of the CAO amendment. It indicates that on and after 12 December 2013, an aircraft must carry and continuously operate compliant ADS-B transmitting equipment in accordance with paragraph 9B.8. Apart from this, there is no obligation to carry compliant ADS-B transmitting equipment. However, taking into account the effect of subsection 9B.5 above, if compliant ADS-B transmitting equipment is in fact carried, whether voluntarily or in accordance with the obligation under 9B.8, it must be operated continuously in all airspace, at all altitudes.

- 9B.9 Finally, under this paragraph it is stated that paragraph 9B.8 does not apply to an aircraft if the aircraft owner, operator or pilot has written authorisation from CASA for the operation of the aircraft without the equipment. This provision allows CASA to authorise flights of unequipped aircraft in extenuating circumstances if safety is not jeopardised.

Amendment 2

Amendment 2 remakes in amended form Appendix XI stating as conditions of approval for ADS-B equipment the existing standards which continue to apply. Each clause in the Appendix, therefore, contains a condition as follows.

- 1 Under this clause, an equipment configuration is approved only if it meets all of the conditions set out in Appendix XI. As noted above, this is to ensure that the message protocols used to transmit the aircraft data to ATC are standardised in a form that can be used by ATC for surveillance.

- 2 Under this clause, it is a condition of approval that the ADS-B transmitting equipment must be of a type that is:
 - (a) authorised:
 - (i) by the FAA in accordance with TSO-C166 as in force on 20 September 2004 or a later version as in force from time to time; or
 - (ii) by CASA in accordance with ATSO-C1004 as in force on 2 October 2003 or a later version as in force from time to time; or
 - (iii) by CASA in accordance with ATSO-C1005 as in force on 22 December 2004 or a later version as in force from time to time; or
 - (b) otherwise authorised by CASA for this purpose.

- 3 Under this clause, it is a condition of approval that, on and after 28 June 2012, the geographical position transmitted by the ADS-B transmitting equipment must be determined by:
 - (a) a GNSS receiver of a type that is authorised by the FAA in accordance with TSO-C145a or TSO-C146a as in force on 19 September 2002 or a later version as in force from time to time; or
 - (b) another system authorised by CASA for this purpose.

- 4 Under this clause, it is a condition of approval that the pressure altitude transmitted by the ADS-B transmitting equipment must be determined by:
 - (a) a barometric encoder of a type that is authorised by:
 - (i) the FAA in accordance with TSO-C88a as in force on 18 August 1983 or a later version as in force from time to time; or
 - (ii) the EASA in accordance with ETSO-C88a as in force on 24 October 2003 or a later version as in force from time to time; or
 - (b) another system authorised by CASA for this purpose.

- 5 Under this clause, it is a condition of approval that, unless otherwise approved in writing by CASA, the ADS-B transmitting equipment must:
 - (a) allow the pilot to activate and deactivate it during flight; and
 - (b) transmit the current aircraft address.

A Note indicates that the requirement in paragraph 5 (a) above about the pilot's ability to activate etc is met if the ADS-B transmitting equipment has a cockpit control that enables the pilot to turn the ADS-B transmissions on and off.