International Civil Aviation Organization

FIFTH MEETING OF THE SOUTHEAST ASIA SUB-REGIONAL ADS-B IMPLEMENTATION WORKING GROUP (SEA ADS-B WG/5)

Jakarta, Indonesia, 21 – 22 January 2010

Agenda Item 5: **Review of sub-regional implementation plan**

Harmonization of ADS-B regulations, rules and procedures

REVISED AUSTRALIAN STANDARDS FOR AIRCRAFT ADS-B AVIONICS

(Presented by Civil Aviation Safety Authority Australia)

SUMMARY

The purpose of this IP is to inform SEA ADS-B WG/5 that the Civil Aviation Safety Authority (CASA) Australia has recently issued legislative amendments which revise the specification of technical standards for aircraft ADS-B equipment configurations.

1. INTRODUCTION

1.1 CASA Australia has amended its legislation that specifies the standards for aircraft ADS-B equipment configurations for use in Australia. The main issue taken into consideration was the Selective Availability Aware (SA Aware) capability of the GNSS equipment. That feature provides increased availability of the integrity of the GNSS derived aircraft position that is transmitted to ATC, as discussed at ADS-B SITF Meetings.

1.2 The previous Australian rule required SA Aware in the aircraft GNSS system after June 2012. Most airline aircraft, other than those manufactured in the last 4-5 years, do not have that feature. The amendment now permits aircraft manufactured before June 2012 to retain existing equipment not having the SA Aware feature. The result is significant cost savings in not replacing existing equipment. However, aircraft manufactured after 28 June 2012 will be required to be fitted with GNSS equipment having SA Aware. The GNSS integrity features of Fault Detection and Exclusion (FDE) and the output of Horizontal Protection Limit (HPL) are retained for all aircraft.

1.3 The revised rules are applicable to Australian aircraft and foreign aircraft operating in Australia. Existing airline aircraft having FDE and HPL technology in their GNSS systems are not affected. This includes most existing airline aircraft used on international services.

1.4 The existing date of 12 December 2013 after which all aircraft operating in airspace at and above FL290 must have ADS-B equipment is not affected by the amendments.

2. Explanation

2.1 The amendments are to the technical standards that CASA initially specified in 2006. The GNSS equipment provides the aircraft positional data and its integrity level that is interfaced to,

and transmitted by the ADS-B transmitting equipment. CASA has taken account of recent representations and information from a number of sources (airline aircraft manufacturers, airlines, IATA, as well as information presented at ICAO APAC APANPIRG Meetings (the ADS-B SITF/8 Meeting held in Hanoi in May 2009; the CNS/MET SG/13 held in Bangkok in July 2009; and the APANPIRG Meeting in September) concerning:

- the proposed retention of certain airline aircraft types that were previously planned to be retired by airlines prior to mid-2012 (brought about by the world economic down-turn), coupled with the delays in delivery of new technology aircraft;

- the situation regarding the availability and timing of retrofit kits from aircraft manufacturers to equip current airline aircraft with certified GNSS and ADS-B equipment installations meeting the existing Australian standards;

- the amount of time necessary for airlines to install the retrofit kits to their aircraft (mainly B747-400; A-330; B767; B737-400) during major maintenance;

- the outcome of ICAO APAC technical meetings; and

- the advent of a new standard for GNSS equipment (TSO-C196) issued by the FAA, and the relevant CASA Australian Technical Standards (ATSOs 1004 and 1005) have been brought up to date. These have been included in the amendment.

2.2 As this change has an affect on air traffic surveillance by ATC, the proposal was co-ordinated with Airservices Australia. Safety outcomes will not be affected as Airservices is planning to make changes to the current NUC and NIC integrity level thresholds of aircraft ADS-B transmissions for display on ATC screens.

2.3 The revision will not impose any additional requirements on aircraft operators. For many existing aircraft, there will be significant cost savings in that operators will not have to modify GNSS installations with expensive retrofit modifications (that are not presently available and would have to be produced and certified by aircraft manufacturers.)

3. RECOMMENDATION

3.1 SEA ADS-B WG/5 is invited to note that revised Australian standards for ADS-B avionics have been issued and took effect on 22 December 2009.

3.2 A copy of the amendment to the Australian ADS-B rule is attached for the information of the WG.

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Attachment to SEA ADS-B WG/5-IP/2

Civil Aviation Order 20.18 Amendment Order (No. 3) 2009

1 Name of instrument

This instrument is the *Civil Aviation Order 20.18 Amendment Order (No. 3) 2009*.

2 Commencement

This instrument commences on the day after it is registered.

3 Amendment of Civil Aviation Order 20.18

Schedule 1 amends Civil Aviation Order 20.18.

Schedule 1 Amendment

[1] Paragraph 9B.2, definitions

insert

EASA AMC 20-24 means EASA document AMC 20-24 titled *Certification Considerations for Enhanced ATS in Non-Radar Areas using ADS-B Surveillance (ADS-B-NRA) via 1090 MHZ Extended Squitter*, dated 2 May 2008.

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

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.

NAA has the same meaning as in regulation 1.4 of the *Civil Aviation Safety Regulations 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."

NIC means Navigation Integrity Category as specified in paragraph 2.2.3.2.7.2.6 of RTCA/DO-260A.

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

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.***).

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-260A means RTCA Inc. document RTCA/DO-260A titled *Minimum Operational Performance Standards for 1090 MHz Automatic Dependent Surveillance – Broadcast (ADS-B) and Traffic Information Services – Broadcast (TIS-B)*, dated 10 April 2003.

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.

[2] Paragraph 9B.6

substitute

9B.6 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 or NIC.

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

[3] Appendix XI

substitute

Appendix XI
Part A

Approved equipment configuration

1 An equipment configuration is approved if it complies with the standards specified in Part B or Part C of this Appendix.

Part B

ADS-B transmitting equipment — standard for approval

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

(a) is authorised by:

(i) 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) CASA, in writing, in accordance with:

(A) ATSO-C1004a as in force on 16 December 2009, or a later version as in force from time to time; or

(B) ATSO-C1005a as in force on 16 December 2009, 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 28 June 2012

3 For an aircraft manufactured on or 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) a GNSS receiver of a type that is authorised by the FAA in accordance with TSO-C196 as in force on 9 September 2009, or a later version as in force from time to time; or

(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 TSO-C145a or TSO-C146a, or later versions, or those manufactured to comply with TSO-C196.

GNSS position source equipment — standard for aircraft manufactured before 28 June 2012

4 For an aircraft manufactured before 28 June 2012, 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 TSO-C145a or TSO-C146a, or later versions, or those manufactured to comply with TSO-C196. Some later versions of GNSS receivers certified to 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 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) 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 equivalent system authorised in writing by CASA.

Aircraft address — standard

6 Unless otherwise approved in writing by CASA, the ADS-B transmitting equipment must:

(a) transmit the current aircraft address; and

(b) allow the pilot to activate and deactivate transmission during flight.

Note The requirement in paragraph 6 (b) 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.

Part C

Alternative approved equipment configuration — standard for aircraft manufactured on or after 28 June 2012

7 For an aircraft manufactured on or after 28 June 2012, an equipment configuration is approved if:

(a) it has been certified by EASA as meeting the standards of EASA AMC 20-24; and

(b) the aircraft flight manual attests to the certification; and

(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 28 June 2012

8 For an aircraft manufactured before 28 June 2012, an equipment configuration is approved if:

(a) it has been certified by EASA as meeting the standards of EASA AMC 20-24; and

(b) the aircraft flight manual attests to the certification; and

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