

Aircraft avionics mandates to support the future ATM system in Australia

UPDATE ON CASA RULEMAKING IN THE LAST YEAR



Australian Government
Civil Aviation Safety Authority

www.casa.gov.au

SP/5

safe skies for all

Civil Aviation regulatory structure in Australia

Minister and Department of Infrastructure and Transport

**Civil Aviation Safety Regulations
issued by
Civil Aviation Safety Authority
(CASA)**
Aviation Safety Regulator
(Federal Government Agency)

ANSP
Airservices Australia
(Govt. Business Agency)
ATC/ATM; CNS; ARFFS
Regulated by CASA under
CASR Parts 171, 172,
139H, 173,175

Airlines Sector
•International
•Domestic
•Regional
regulated by CASA issued
Air Operator Certificates

General Aviation
and
Recreational Aircraft
sectors

Technologies for the future

Australian ATM - to year 2020

- The Australian ANSP Airservices Australia is rolling out its technologies for the future ATM:
- GNSS primary means navigation for Performance Based Navigation (PBN) and ADS-B position source, with a reduced network of ground based navigation aids for back-up to the GNSS
 - About half the existing 400+ navaids to be retained through to the 2020s - mainly VOR and NDB
- Mode S SSR in the major city terminal areas
- ADS-B & Multilateration for Advanced Surface Movement Guidance and Control System (A-SMGCS) at 4 the major international aerodromes
- ADS-B surveillance in controlled airspace across the continent (plus Mode S SSR in high density en-route airspace on east coast)

Aircraft mandates necessary for the future Australian ATM

- GNSS primary means navigation –equipment mandates required for PBN and ADS-B
 - PBN NAV specs - include RNP 10, 4, Basic RNP 1, RNP APP, RNP AR, Baro-VNAV
- Mode S transponders (with ADS-B capability) to gradually replace Mode A/C transponders
- ADS-B mandates for aircraft undertaking IFR flight in controlled airspace

NFRM No 1105AS

published September 2012

- SATNAV GNSS equipage requirement for PBN
- Mode S/ADS-B transponders;
- Applicable to Australian aircraft only- not foreign aircraft – although ADS-B requirements may be made applicable to foreign aircraft at later stage

CASA website:

http://www.casa.gov.au/scripts/nc.dll?WCMS:PWA::pc=PC_100162

GNSS Navigation Equipment mandates

- **New passenger transport aircraft (or retrofit GNSS installations in existing aircraft) - registered ON/AFTER 6 February 2014**
 - 2 x TSO-C145 or -C146 or -C196 (or later versions) GNSS; or
 - 1 x TSO-C145 or -C146 or -C196 GNSS + ADF or VOR; or
 - A GNSS system approved by CASA as capable of achieving RNP in accordance with CAO 20.91.
- **Existing passenger transport aircraft (registered before 6 February 2014) - ON/AFTER 4 February 2016**
 - 2 x TSO-C145 or -C146 or -C196 GNSS; or
 - 1 x TSO-C129 or -C145 or -C146 or -C196 GNSS + ADF or VOR; or
 - A GNSS system approved by CASA as capable of achieving RNP in accordance with CAO 20.91

General Aviation aircraft operating under the IFR

- TSO-C145 or -C146 or -C196 GNSS; or
- TSO-C129 + ADF or VOR receiver

Mode S transponder mandates

- **Requirement for Mode S transponder (with ADS-B capability)**
 - Forward fitment new aircraft operating Class A, B, C, E and >10000FT in Class G
 - from 6 Feb 2014
 - All aircraft operating at Sydney, Melbourne, Brisbane, Perth:
 - from 4 Feb 2016
- All transponder replacements in existing aircraft
 - from 6 Feb 2014

Aircraft ADS-B mandates

- **Aircraft operating at/above FL290 (Class A airspace)**
 - Date of effect - 12 December 2013
 - Applicable to Australian and foreign registered aircraft
- **New aircraft operating under the IFR**
 - Date of effect – aircraft registered on/after 6 February 2014
- **Existing aircraft operating under the IFR**
 - Date of effect - 2 February 2017
- **Aircraft operating under the IFR within controlled airspace 500NM Perth (for FIFO to the aerodromes at the mining locations) - Date of effect - 4 February 2016**

Fly-in- Fly-out operations to Western Australia Mining Aerodromes



MK photography 2007

Cost of the GNSS/ADS-B mandates for the existing Australian fleet of IFR aircraft

- Approximately 4300 existing aircraft - cost estimated at \$130M GNSS and ADS-B for installations not already completed
- Benefit estimated at \$120M+ mostly savings by reduction of existing ground nav aids.
- Other benefits - include fuel savings, environmental, ATM safety and efficiency

Reduction of Ground based Nav aids to a back-up network – year 2016

Existing Nav aids	NDB	VOR	DME	Total
All Nav aids	269	89	66	424
Nav aids to be retained				
The Backup Network from year 2016	112	49	54	215
Non Backup Nav aids – to be decommissioned from February 2016	156	40	12	208

ADS-B requirement for surface vehicles at the A-SMGCS aerodromes Sydney, Melbourne, Brisbane and Perth

Vehicles operating on the manoeuvring area of major aerodromes having Advanced Surface Movement Guidance and Control System must be fitted with ADS-B transmitters (CASR Part 139 Regulation – see NFRM 0910AS April 2012)

CASA website:

http://www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_100879



Summary of basic benefits of the Australian future ATM system/avionics mandates

- Improved safety and ATM efficiency with Mode S and ADS-B surveillance
- Flight path optimisation with GNSS PBN (costs, fuel, emissions, noise)
- Increased air traffic density through accurate GNSS navigation and surveillance
- Reduction in CFIT and runway overrun through higher accuracy and integrity of GNSS PBN guidance
- Surface movement guidance and surveillance in low visibility (ADS-B surveillance)
- Minimised aircraft noise and optimised noise abatement flight paths (PBN based SIDs and STARs) with GNSS PBN
- No position reporting in ADS-B airspace
- Improved Search and Rescue detection and location (ADS-B surveillance)

AC 21-45 – updated February 2012

Provides guidance and advice on the airworthiness approval for the installation of aircraft ADS-B equipment (GNSS+ADS-B transponder combinations)

Link to CASA website:

http://www.casa.gov.au/wcmswr/_assets/main/rules/1998casr/021/021c45.pdf



Advisory Circular

AC 21-45(1)

FEBRUARY 2012

AIRWORTHINESS APPROVAL OF AIRBORNE AUTOMATIC DEPENDENT SURVEILLANCE BROADCAST EQUIPMENT

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1. REFERENCES

1 A list of ADS-B documentation references is included in Appendix A of this Advisory Circular (AC).

2. PURPOSE

This AC is intended to define the airborne component of the 1090 Megahertz Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) data link use in Australia, and provide guidance and advice for the airworthiness approval for the installation of the aircraft equipment proposed to support that use.

3. STATUS OF THIS AC

This is the second issue of this AC and replaces AC 21-45(0) issued in April 2007.

Advisory Circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the Regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.

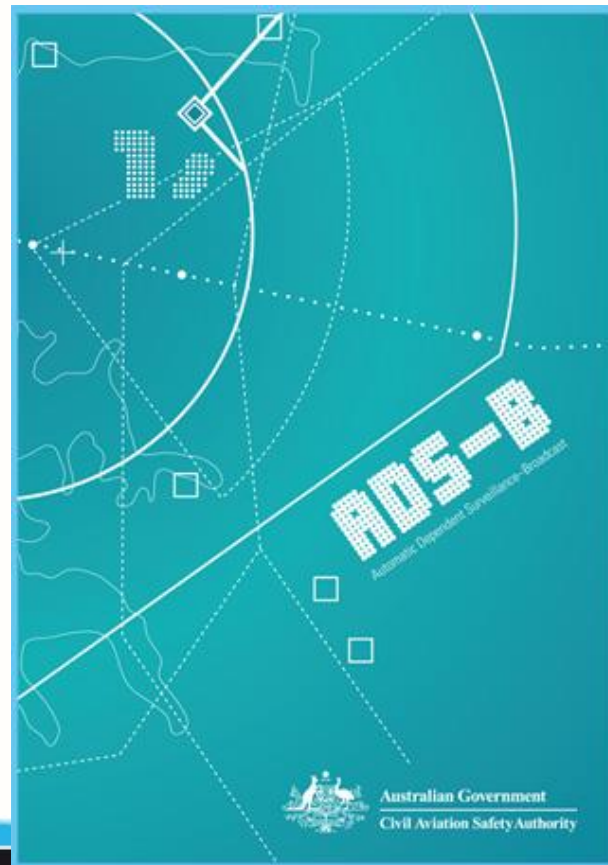
Where an AC is referred to in a 'Note' below the regulation, the AC remains as guidance material.

ACs should always be read in conjunction with the referenced regulations.

This AC has been approved for release by the Executive Manager Standards Development and Future Technology Division.

Republished ADS-B booklet – advice for pilots

http://www.casa.gov.au/wcmswr/_assets/main/pilots/download/ads-b.pdf



Australian aircraft avionics mandates

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END