Aircraft avionics mandates to support the future ATM system in Australia

UPDATE ON CASA RULEMAKING IN THE LAST YEAR
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:
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
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 navaids.
- Other benefits - include fuel savings, environmental, ATM safety and efficiency
Reduction of Ground based Navaids to a back-up network – year 2016

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<th>NDB</th>
<th>VOR</th>
<th>DME</th>
<th>Total</th>
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<tr>
<td>All Navaids</td>
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<td>89</td>
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<td>The Backup Network from year 2016</td>
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<th>Non Backup Navaids – to be decommissioned from February 2016</th>
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<td></td>
<td>156</td>
<td>40</td>
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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)

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:
Republished ADS-B booklet – advice for pilots
Australian aircraft avionics mandates

- Questions?
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END