



1. Purpose

To provide guidance when testing ADS-B installations.

2. Purpose

ADS-B supports pilots to directly see nearby aircraft on a cockpit screen therefore improving safety and efficiency. To achieve this, it is necessary for aircraft to transmit their position, altitude, and other flight data, for other aircraft to use. ATC can also use the transmitted information.

3. Background

ADS-B messages are transmitted on the same frequency as the ATC transponder, using the transponder transmitter and antenna. A Mode S transponder, with ADS-B capability, is able to receive position and integrity data from a GPS. For further information on approved ADS-B equipment see [AC 21-45 v2.1 Airworthiness Approval of Airborne Automatic Dependent Surveillance Broadcast Equipment](#).

Mode S transponders are different to older Mode A/C 'classic' transponders because they:

- allow ATC radar to track aircraft that are very close to one another
- include the aircraft callsign (Flight ID) in the transponder's replies, so that ATC can identify the aircraft without four digit codes
- reply to radar interrogation when the aircraft is on the ground (helps keep aircraft safe on the surface at busy airports)
- work better with multilateration technology
- allow ATC radar to get error-free information about aircraft identity and altitude.
- "Classic" transponders have no parity or error checking, but Mode S transponders do

When purchasing transponders, aircraft owners and operators should exercise caution. Not all Mode S transponders have the capability to support ADS-B. Any Mode S transponder purchased for use in Australia should be capable of receiving data from a GPS and transmitting ADS-B messages.

There is no legal requirement to interconnect transponders in VFR aircraft with GPS equipment. However, when replacing a transponder in a VFR aircraft, it is easy and inexpensive to do so; thereby gaining safety and operational benefits of ADS-B, if the aircraft already has a suitable GPS. See [AC 21-36\(1\) - Global Navigation Satellite System \(GNSS\) Equipment: Airworthiness Guidelines for further details on suitable GPS equipment](#).



AIRWORTHINESS BULLETIN

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Automatic Dependent Surveillance Broadcast (ADS-B) is also dependent on other aircraft being equipped with reliable and accurate altitude and position reporting equipment and transponder systems.

Air Services Australia has released some general guidance for installers when validating ADS-B installations with a transponder ramp test set. For further information see <http://www.airservicesaustralia.com/wp-content/uploads/Guidance-for-ADS-B-installation-checks.pdf>.

Prior to carrying out testing, it is important when validating an ADS-B installation to know what standard the transponder is:

- RTCA/DO-260 (TSO-166),
- RTCA/DO-260A (TSO-166A)
- RTCA/DO-260B (TSO-166B).

The equipment standard is used when checking the integrity of an ADS-B system. ADS-B integrity is checked by examining the type code Navigation Uncertainty Category (NUC) in DO-260 equipment or Navigation Integrity Category (NIC) in DO-260A/B equipment. Just because a good NUC/NIC value is transmitted, does not mean that the system is acceptable. The GPS and transponder must work properly together. The NUC/NIC value transmitted by the aircraft must be truthful and it would be dangerous for the transponder to transmit a fixed “good” integrity value because it would then not be advising the receiver/user of the radius of containment value (Rc).

```

MON BDS 6,5 AIR AVAIL BAT 2.5 Hr
BDS=6,5 A/C OP STATUS AIR TYPE =31
DF17 AA=123456 (00432126) COUNT =11
ME=F82AAA2AAA4AAF PERIOD=1.57 s
SUBTYPE=0-AIR VERSION=2-DO-260B
CC FMT =2AAA ARV=1 TS=0 1090=0
UAT=1 TC=2 ADSR=0 TCAS OP=1
OM FMT=0 SDA=0 SAF=0 ATC=1
RA=1 ID= NO
HRZ REF=MAG NORTH NIC-A=0 GVA=2
NIC-BARO=1 SIL SUP=1 SIL=2
NACP=10-EPU < 0.0054 ADSR(56)=1
  
```

RUN TEST PREV TEST PREV TEST RETURN

Figure 1 - DO-260 version number

```

GEN BDS 0,6 AVAIL BAT 2.5 Hr
BDS=0,6 SURFACE POS TYPE:8
DF17 AA:3AC421 (16542041) COUNT=1000
ME=000000000000 PERIOD:10.00 S
LAT: 37 39 00 N LONG: 97 25 48 W
MOVMENT: 2kts T:N/UTC
HDG:230 deg POS: -
NIC= 11 Rc= <7.5 m
  
```

RUN TEST PREV TEST NEXT TEST RETURN

Figure 2 - Radius of Containment value



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5. Enquiries

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