



*International Civil Aviation Organization*

**THE NINTH MEETING OF THE SOUTHEAST ASIA AND BAY OF BENGAL  
SUB-REGIONAL ADS-B IMPLEMENTATION WORKING GROUP  
(SEA/BOB ADS-B WG/9)**

Beijing, China, 30 October - 1 November 2013

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

**5.4) Harmonization of ADS-B Regulations, rules & procedures**

**GPS AVIONICS FAILURE**

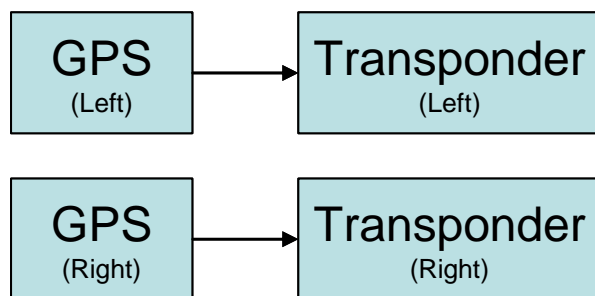
(Presented by Airservices Australia)

**SUMMARY**

This paper discusses the ADS-B impact of GPS avionics failure in Boeing aircraft.

**1. BACKGROUND**

1.1 The ADS-B architecture in Boeing aircraft is as follows :



There are two GPS receivers (MMR or GNSSU). One GPS receiver provides data to the LEFT side transponder, and the other provides data to the RIGHT side transponder.

Prior to deployment of DO260B, there is NO annunciation to the flight crew of ADS-B failure, and NO indication if the transponder fails to receive GPS positional data.

Airbus aircraft currently feed GPS data via the ADIRU and if one GPS fails, the other GPS provides information to the transponders. In future Airbus is expected to adopt an architecture similar to Boeing to reduce latency.

## 2. CONSEQUENCE (BOEING AIRCRAFT)

2.1 If one GPS has failed, one transponder will fail to receive positional data – and hence IF that transponder is selected as the operational transponder, no ADS-B data will be received by ATC.

A Boeing aircraft can dispatch with one GPS receiver faulty.

## 3. PROPOSED MITIGATION 1

3.1 If would be desirable if, when a GPS failure is known by the crew, Boeing procedures required the crew to select the ATC transponder on the “other” side. Without such procedures, crews may depart without transmitting ADS-B.

**Eg:** The LEFT GPS has failed and the crew has selected LEFT transponder for the flight sector. In this case, ADS-B data won't be transmitted.

## 4. PROPOSED MITIGATION 2

- a) ATC procedures could be developed so that when ATC detects an ADS-B anomaly, the crew is requested to select the alternate transponder.
- b) Australia has been using this procedure for some years. The National ATS Procedures Manual (NAPM) says :

9-50-3

### **ADS-B position symbol not displayed**

When ADS-B transmissions from a known ADS-B equipped aircraft are not being received within ADS-B coverage:

- a) inform aircraft that ADS-B transmissions are not being received;
  - b) request pilot change to second transponder if possible; and
  - c) submit an Event Report.
- c) Australian Phraseology is defined in AIP
- "Select secondary transponder"
- d) This procedure provides a recovery in cases of failed GPS, and also has been successful in recovery from various other ADS-B anomalies.

## 5. ACTION BY THE MEETING

5.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matters as appropriate

Further, it is recommended that the Secretariat contact Boeing regarding proposed mitigation 1.

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