

International Civil Aviation Organization



**AUTOMATIC DEPENDENT
SURVEILLANCE – BROADCAST SEMINAR
AND FOURTEENTH MEETING OF
AUTOMATIC DEPENDENT
SURVEILLANCE – BROADCAST (ADS-B)
STUDY AND IMPLEMENTATION TASK
FORCE (ADS-B SITF/14)**



Christchurch, New Zealand, 14 – 17 April 2015

Agenda Item 4: Review States' activities and interregional issues on implementation of ADS-B and multilateration

BOEING 787 ADS-B DEFICIENCY

(Presented by Australia)

SUMMARY

This paper presents describes an ADS-B problem experienced with Boeing 787 aircraft.

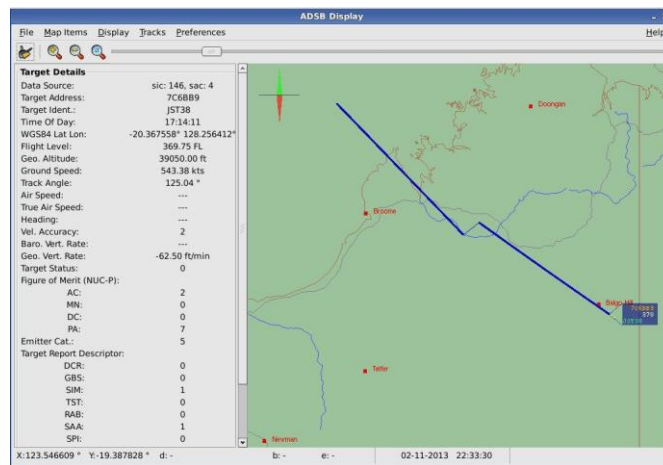
1. INTRODUCTION

1.1 The paper describes an ADS-B deficiency that afflicts Boeing 787 aircraft with DO260A ADS-B.

2. HISTORY

2.1 On 29th October 2014, an Australian registered B787 aircraft was observed by ATC to be transmitting inaccurate ADS-B positional data whilst declaring the data as high integrity.

2.2 In this case, following a heading change, the ADS-B data appeared to be extrapolated along the previous heading until it auto-corrected. The correction was observed as a “jump” shown below. The aircraft is flying from the north-west towards the south-east.

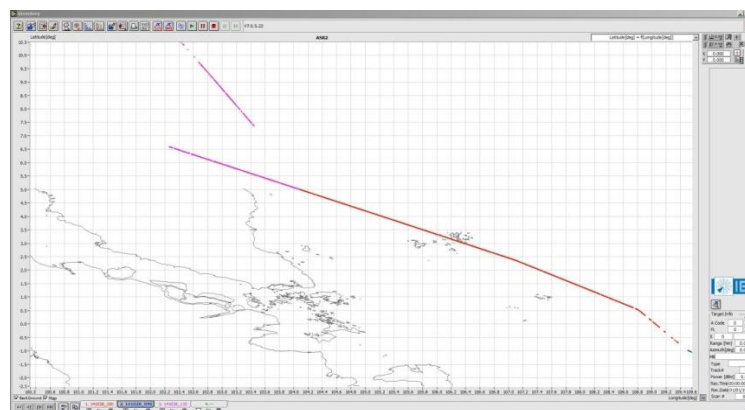


2.3 ATC was alerted by the ATC automation because it detected that the ADS-B reports were at variance with the flight planned route (Route Adherence Monitoring alert).

2.4 Boeing were contacted the same day and immediately established a reaction team to investigate.

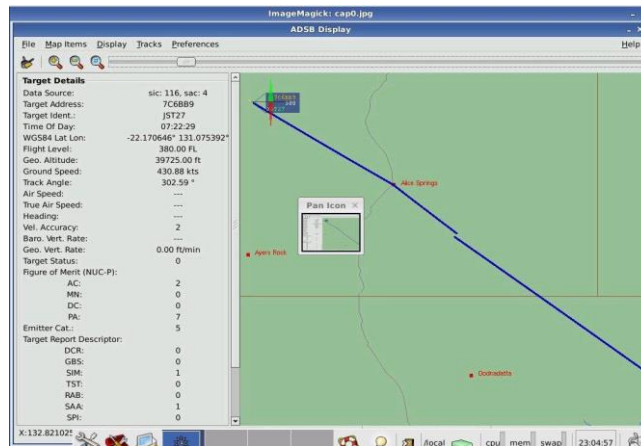
2.5 Co-ordination with the airlines took place, and the avionics were swapped and then changed out.

2.6 Airservices subsequently became aware of similar incidents, both for this particular aircraft, and for other B787 aircraft operating internationally including Singapore, USA, Canada and Europe. Data was collected from a number of Asia Pacific ANSPs supporting the investigation.



Trajectory provided by CAAS Singapore

2.7 Investigation of historical data of B787 aircraft was undertaken by Airservices Australia and additional “jumps” from the same B787 aircraft were identified.



2.8 Airservices coordinated ADS-B data capture and this was forwarded to Boeing. Boeing undertook work to replicate the error in factory.

2.9 Work was undertaken to identify and obtain recorded data for a European B787 whilst operating in Canada, and three cases were identified in United States airspace (FAA registered and Foreign registered) by the FAA’s ADS-B compliance monitoring system.

2.10 Formal safety work was undertaken by Airservices as described in a separate working paper. This resulted in Airservices NOT blacklisting the aircraft because the risks of doing so outweighed the risks of continuing the ATC service.

3. **Current status**

3.1 In February Boeing announced that the root cause had been identified in the Surveillance processor relating to the way in which latitude and longitude data were packaged for delivery to the transponder function. When the latitude and longitude information was split across different data packets, the transponder function did not process the position data, and instead commenced extrapolating the position – until the position data was again contained within a single message packet. Geometric level was similarly affected and did not update during these periods of extrapolation.

3.2 A software fix was required. However a software change triggers significant re-certification work and could not be undertaken quickly. Airline customers of Boeing were informed by fleet digest publication (ref. 787-FTD-34-15001).

3.3 The solution proposed by Boeing is to retrofit new software as soon as DO260B Surveillance processor software is available for the B787. The DO260B software proved to be not subject to the root cause defect (even though it had been developed prior to the issue being fully understood by Boeing). The certification work for this software had already commenced. The release of this new software is expected to occur in August 2015.

3.4 It is expected that Boeing will release the DO260B software as a free upgrade to those customers with the faulty DO260A equipment.

4. Action by the meeting

4.1 The meeting is invited to:

- a) note the actions performed by many participants worldwide that helped to collect data and solve the problem;
- b) note that avionics software fixes take some time;
- c) note the responsiveness of Boeing to investigate the issue; and
- d) discuss any relevant matters as appropriate.

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