

**Twenty Fifth Meeting of the
Informal South Pacific ATS Co-ordinating Group (ISPACG/25)**

Honolulu, Hawaii, USA, 24-25 March 2011

Agenda Item 4: Review Open Action Items (AI 17-5)

Australian ADS-B update

Presented by Airservices Australia

SUMMARY

This working paper provides an update on Australian ADS-B activities.

1. INTRODUCTION

1.1 This working paper provides an update on Australian ADS-B related activity since ISPACG/24.

2. DISCUSSION

2.1 The 12 months since ISPACG/24 has seen a continued expansion in the use of ADS-B by Airservices Australia:

- Continued provision of ATS surveillance services between identified aircraft across Australia;
- Commencement of ADS-B data sharing with Indonesia;
- The operational deployment of the Lord Howe Island ADS-B site.

2.2 Australia-wide ATS surveillance

2.2.1 As reported at ISPACG/24, Australia commenced using ADS-B for the provision of ATS surveillance services in Dec 2009. This was in airspace where procedural separation services had previously been applied.

2.2.2 As well as the application of ATS surveillance separation (5NM) between identified aircraft, in this airspace ADS-B is used to provide:

- Short term conflict warnings with respect to other ADS-B equipped aircraft;
- Route and altitude conformance monitoring;
- Radar-like assistance to ADS-B equipped aircraft in emergencies;

- Traffic advisory services between ADS-B equipped aircraft;
- Increased situational awareness for non-routine occurrences (e.g. diversions)

2.3 ADS-B data sharing with Indonesia

2.3.1 In February 2011, the sharing of ADS-B data received by a number of ADS-B sites in Australia and Indonesia commenced, in accordance with a “data sharing” agreement between the two countries.

2.3.2 ADS-B data from the following 8 sites is currently being exchanged between Australia and Indonesia:

Indonesian data received by Australia			Australian data received by Indonesia		
ICAO designation	Name	Location	ICAO designation	Name	Location
WADD	Kintamani	081224S 1151948E	YBRM	Broome	175717S 1221401E
WAKK	Merauke	083037S 1402439E	YDGN	Doongan	152249S 1261838E
WAPI	Saumlaki	075921S 1311809E	YPGV	Gove	121606S 1364915E
WATT	Kupang	101003S 1234014E	YTUD	Thursday Island	103437S 1421339E

2.3.4 The projected ADS-B coverage from these sites is shown below.

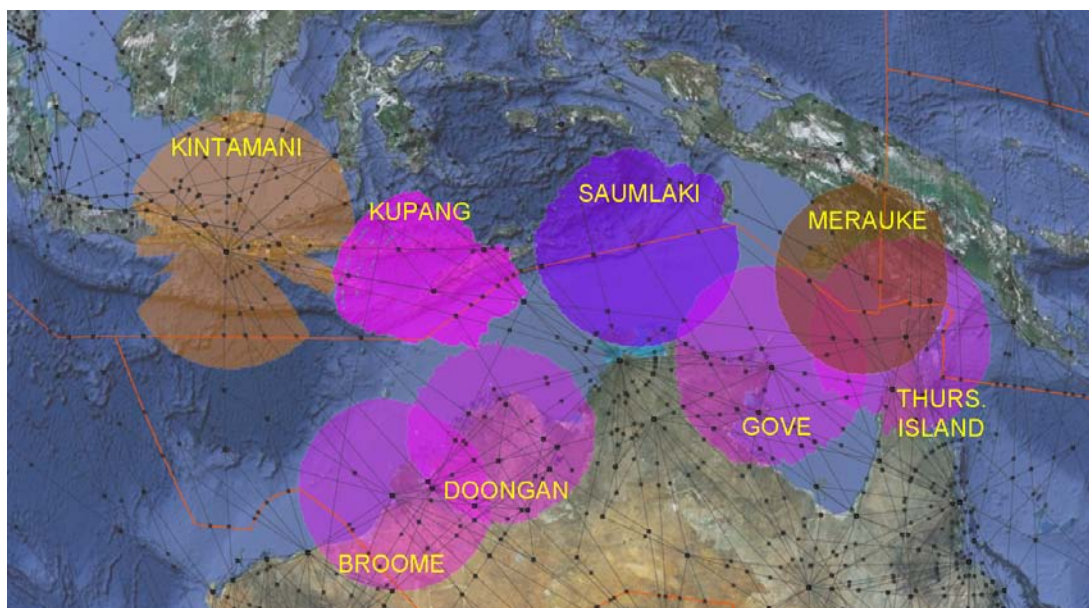


Figure 1. Expected coverage from the shared Australian/Indonesian ADS-B sites

2.3.5 The ADS-B data from these sites is displayed in TAAATS as a Class 2 (low quality) ADS-B symbol, and therefore does not permit the application of a 5NM separation minima by Australian controllers. It does however, significantly increase controller situational awareness of inbound traffic, as well as permitting the detection of possible inbound coordination discrepancies (i.e. incorrect level/estimate), or a non-coordinated weather deviation.

2.3.6 Indonesia is also displaying ADS-B data to its controllers. However until all Indonesian controllers are appropriately trained in the use of ADS-B, this data is currently not used for separation.

2.4 Lord Howe Island ADS-B

2.4.1 Attendees at ISPACG/24 (Brisbane 2010) may recall that the LHI ADS-B site had commenced receiving ADS-B data during the period of the meeting.

2.4.2 The LHI ADS-B/VHF site was finally commissioned on 23rd March 2010. From this date, ATS surveillance separation minima (i.e. 5NM) could be applied between identified aircraft.

2.4.3 While the availability of surveillance and direct communications has significantly increased the capacity of controller to facilitate weather deviations and changes of level in this airspace, a number of disadvantages have been encountered:

- The surveillance and communication coverage is not what was predicted, especially to the south east and north west of LHI;
- Significant increase in controller workload, especially in the early days when controllers were still ‘finding their feet’ with the new functionality and associated procedures;
- Flight crews not being used to listening out on VHF in this airspace;
- A number of flight crews not being familiar with international phraseologies associated with ADS-B;
- Rogue avionics, providing intermittent erroneous positional information.

2.4.4 LHI ADS-B/VHF coverage

2.4.4.1 There were always expected to be gaps in coverage associated with the ADS-B and VHF sites located on LHI, due to the proximity of Mt Lidgbird & Mt Gower on the south-eastern end of the island. The original expected coverage was determined by a prediction tool which had previously been reasonably accurate, and is shown in Figure 2.

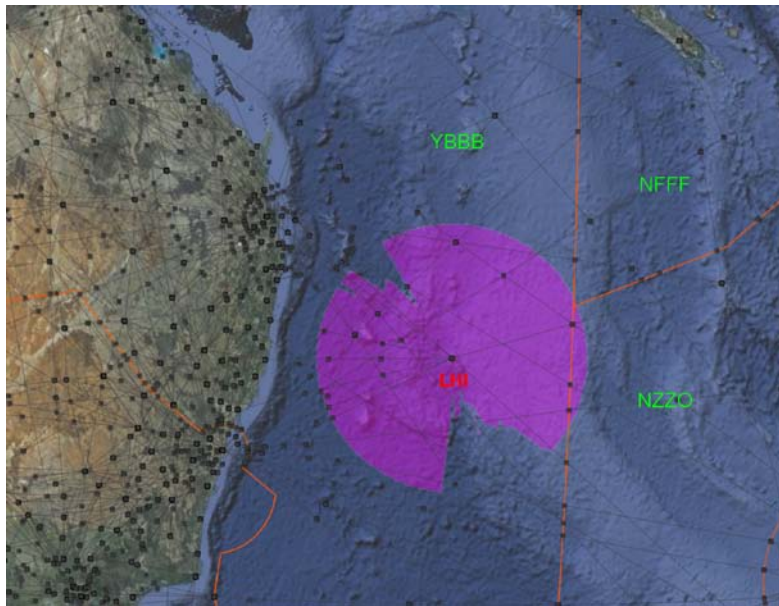


Figure 2. Original predicted coverage of the LHI ADS-B site

2.4.4.2 Problems were encountered during the ADS-B site selection process, the site having to be approved by the Lord Howe Island Board. The matter was further complicated due to Lord Howe Island's World Heritage listing.

2.4.4.3 This prevented the use of an optimal site, the final one being made available was on the side – rather than the top – of a hill. In addition it was discovered that the original predictions were in error due to an (incorrect) assumption made when the prediction tool was originally used.

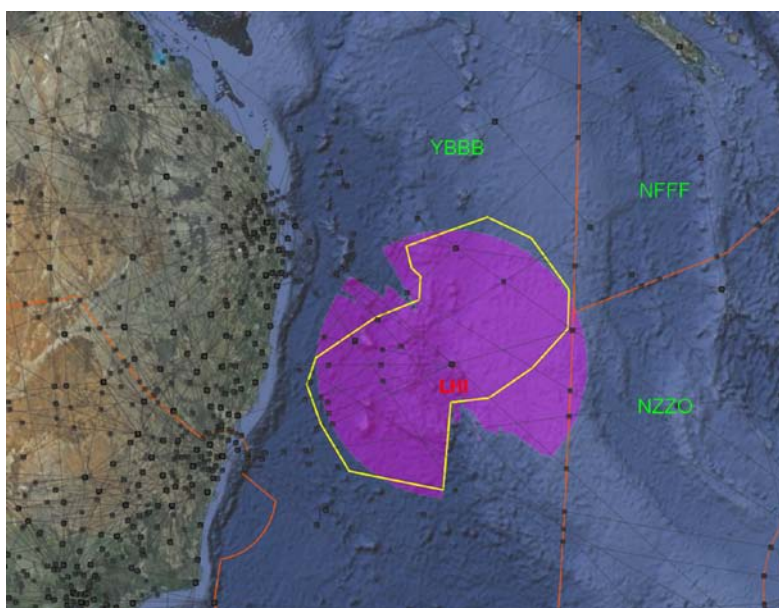


Figure 2. Actual coverage of the LHI ADS-B site (yellow line)

2.4.4.4 A number of suggestions have been put forward to improve coverage but to date, no formal process to progress any improvements has been approved.

2.5 Approved Airframes

2.5.1 As of 2nd March 2011, 1382 airframes are ADS-B approved and receiving the operational and safety benefits associated with ADS-B surveillance. This is an increase of 146 from the 1236 ADS-B approved airframes reported at ISPACG/24

2.6 Incorrect entry of Flight Identification

2.6.1 A problem that is still being encountered is the incorrect entry of Flight Identification into the FMS/MCDU. In a similar way to the FANS-1/A logon, this identification must exactly match the aircraft identification contained in the ATS flight plan.

2.6.2 While the occurrence of this problem is reducing, reports of errors are still being received.

2.6.3 An additional problem that was identified while trying to correct Flight Identification problems is that some flight crews do not appear to be aware that ADS-B and ADS-C are different technologies. Attempts by ATC to correct Flight Id problems often result in new logons, ADS-C disconnections, CPDLC disconnections, comments that “ADS is armed” etc.

2.7 Avionics problems

2.7.1 A small number of airframes have been detected transmitting erroneous positional data. Investigations indicate that the problem is associated with the installation of the ADS-B equipment into the aircraft. These airframes have been removed from the Airservices Australia ADS-B filter table, preventing this information from incorrectly being displayed to the controller.

2.7.2 This reduces available efficiencies when there is a mix of these aircraft with ADS-B-approved aircraft. While priority is generally assigned to the ADS-B-equipped aircraft, this is not always possible due to other traffic considerations.

2.8 Phraseology problems

2.8.1 The phraseology used in Australia to notify flight crews that radar and/or ADS-B services are terminated is IDENTIFICATION TERMINATED. This is in accordance with ICAO procedures, the following phraseology being extracted from Doc 4444:

12.4.1.10 TERMINATION OF RADAR AND/OR ADS-B SERVICE

- a) RADAR SERVICE (*or* IDENTIFICATION) TERMINATED [DUE (*reason*)] (*instructions*);
- b) WILL SHORTLY LOSE IDENTIFICATION (*appropriate instructions or information*);
- c) IDENTIFICATION LOST [*reasons*] (*instructions*).

2.8.2 A problem that has been encountered with some flight crews is that on receipt of this transmission, they turn off VHF and help themselves to a transfer to HF or CPDLC. Quite often the controller is unaware of this until the flight crew fail to respond to subsequent transmissions.

2.9 Display scale

2.9.1 Many of the sectors that obtained the maximum benefit through the implementation of ADS-B were procedural sectors that typically operated on a relatively large screen range.

2.9.2 The implementation of ADS-B meant that separation between identified aircraft could potentially be reduced to 5NM, which is not practical on the normal scale that these sectors are using. While it is possible to “zoom” in on the aircraft in question, it is not practical to do this for extended periods.

2.9.3 Additional windows (Supplementary Air Situation Displays) have been integrated into TAAATS software, designed to permit controllers to monitor traffic that is in close proximity. These windows are based on the “moving map” concept, and remain centered on a designated aircraft.

2.9.4 Because the functionality associated with these windows is different to our primary situation displays, these windows are currently not available for use until additional safety assessments and training have been completed.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) Note the continued expansion of the use of ADS-B in Australia
- b) Take action to ensure that flight crews are familiar with the ICAO phraseologies currently in use
- c) Take action to ensure that flight crews are familiar with the requirement to correctly enter their Flight Identification (and know how to do it!)