International Civil Aviation Organization

Automatic Dependent Surveillance – Broadcast (ADS-B)

Study and Implementation Task Force

Brisbane, Australia, 24-26 March 2003

Agenda Item 2: **Review of ADS-B Activities**
g) Potential near term applications of ADS-B in Asia Pacific

Agenda Item 4: **Cost Benefit Studies**
a) Develop methodology for presentation of cost / benefit analysis

ADS-B POTENTIAL FOR ASIA PACIFIC

SUMMARY

ADS-B has the potential to significantly increase ATM surveillance capabilities within the Asia Pacific Region.

(Presented by Australia)

1. Background

1.1 ADS-B offers the potential for the Asia Pacific region to significantly increase Air Traffic Management (ATM) surveillance capabilities at a relatively low cost.

2. ATC surveillance using ADS-B

2.1 Figures 1 and 3 in Appendix A show an approximation of current ATC surveillance radar coverage based upon data extracted from FASID. The indicated "coverage" are simply 200 and 250 nautical mile circles – a range that can reasonably be expected for aircraft between 30,000 feet and 39,000 feet.

2.2 Figures 2 and 4 show possible examples of ATC ADS-B coverage that could be achieved at a relatively low cost. The examples show a 200 nautical mile coverage circle and a 250 nautical mile circle (dashed line in the figures). ATC coverage in excess of 250 nautical miles has already been demonstrated at Australia's ADS-B ground station, results which are directly applicable to many Asia Pacific environments.

2.3 It is estimated that an ADS-B ground station could be deployed for less than 15% of the cost of radars. An indicative cost for deployment of a high quality duplicated ADS-B ground station is between $US 300,000 and $US 600,000 each, including project management and data communications back to an ATC centre. Additionally, options also exist to achieve similar results at an even lower cost.

2.4 Figure 2 provides an example of possible ADS-B coverage in South East Asia using 33 new ADS-B sites. The estimated cost could be expected to be less than $US 20 million.

2.5 Figure 4 provides an example of possible ADS-B coverage in the South Pacific using 21 new ADS-B sites. The estimated cost could be expected to be less than $US 13 million.

2.6 It is assumed that States would be willing to share data in regions where coverage was provided across a FIR boundary.

3. Benefits

3.1 If ADS-B sites were installed, ATC systems throughout the region would have access to highly accurate surveillance data. This data could be used for the provision of radar like separation services provided that the appropriate ATC systems were enhanced to support ADS-B data. Data feeds from ADS-B could use the Eurocontrol Category 21 Asterix data format. ADS-B coverage would, of course, be applicable only for appropriately equipped aircraft.

3.2 The benefits that could be obtained for equipped aircraft in areas of coverage include:

a) Improvements in safety
- Short Term Conflict Alert
- Danger Area Infringement Warning
- Cleared Level Adherence Monitoring
- Route Adherence Monitoring
- Minimum Safe Altitude Monitoring

b) Improvements in FIR crossing coordination
- Improved situational awareness
- Ability to detect coordination failures eg: discrepancies between an aircraft's actual and coordinated level

c) Improvements in efficiency
- Potentially the ability to use ADS-B radar like separation standards in lieu of existing procedural standards
- Increase probability of states being able to offer user preferred routes.

4. Fitment

4.1 ADS-B technical standards are now well enough developed for countries to consider deployment of ADS-B technology. ICAO SARPS exist for Mode S extended squitter, RTCA standards exist, ARINC Formfit standards exist, Eurocae standards exist and Eurocae TSOs exist. Some British Airways Boeing aircraft have already been equipped.

4.2 To realise the benefits that ADS-B offers, avionics need to be appropriately equipped as soon as possible.

5. Action by the meeting

5.1 The meeting is invited to note the potential benefits and low costs of ATC surveillance that may be provided by ADS-B technology. These benefits are likely to only be realisable once sufficient aircraft equip with ADS-B technology.

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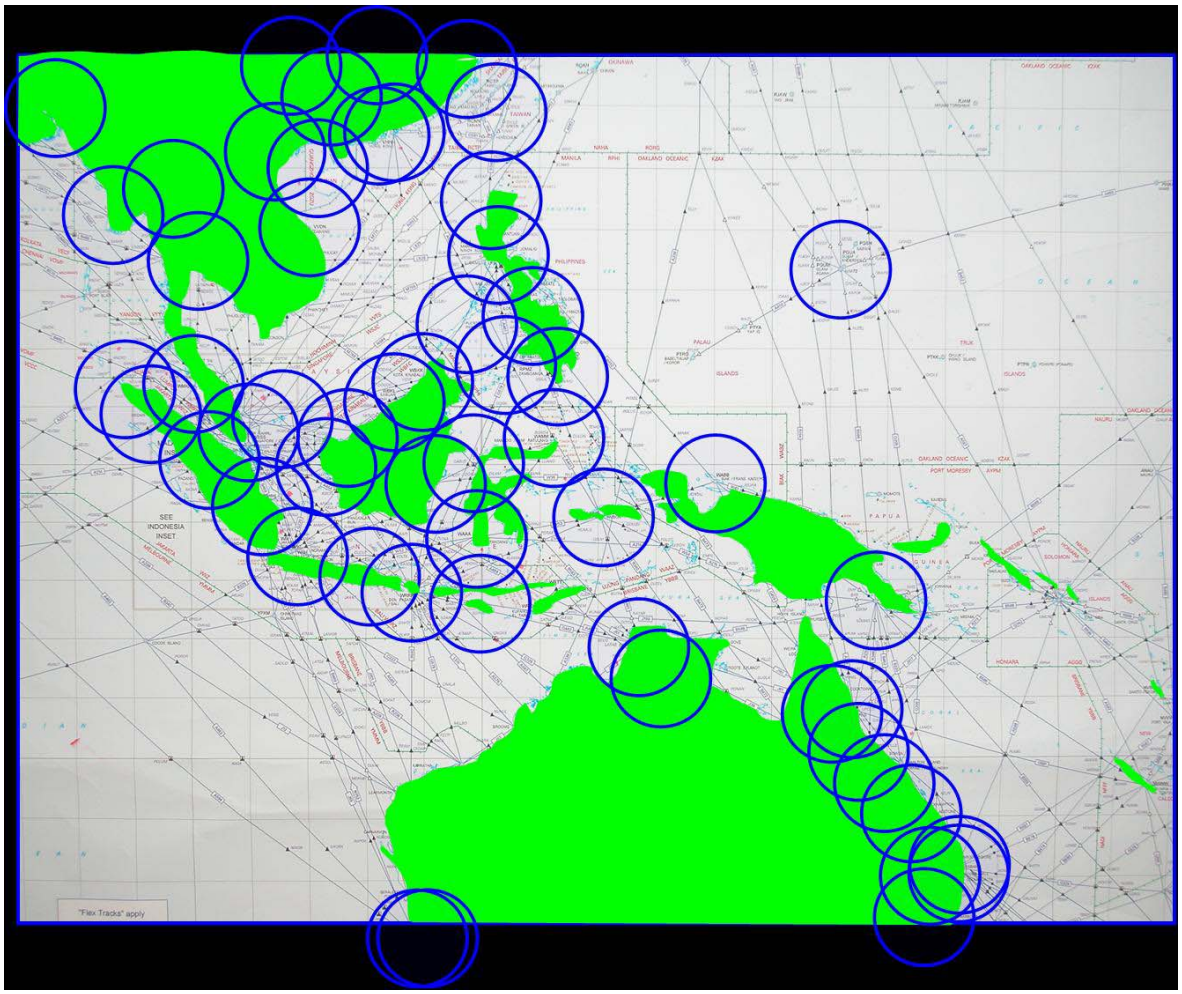

Figure 1: Approximation of existing radar coverage in SE Asia

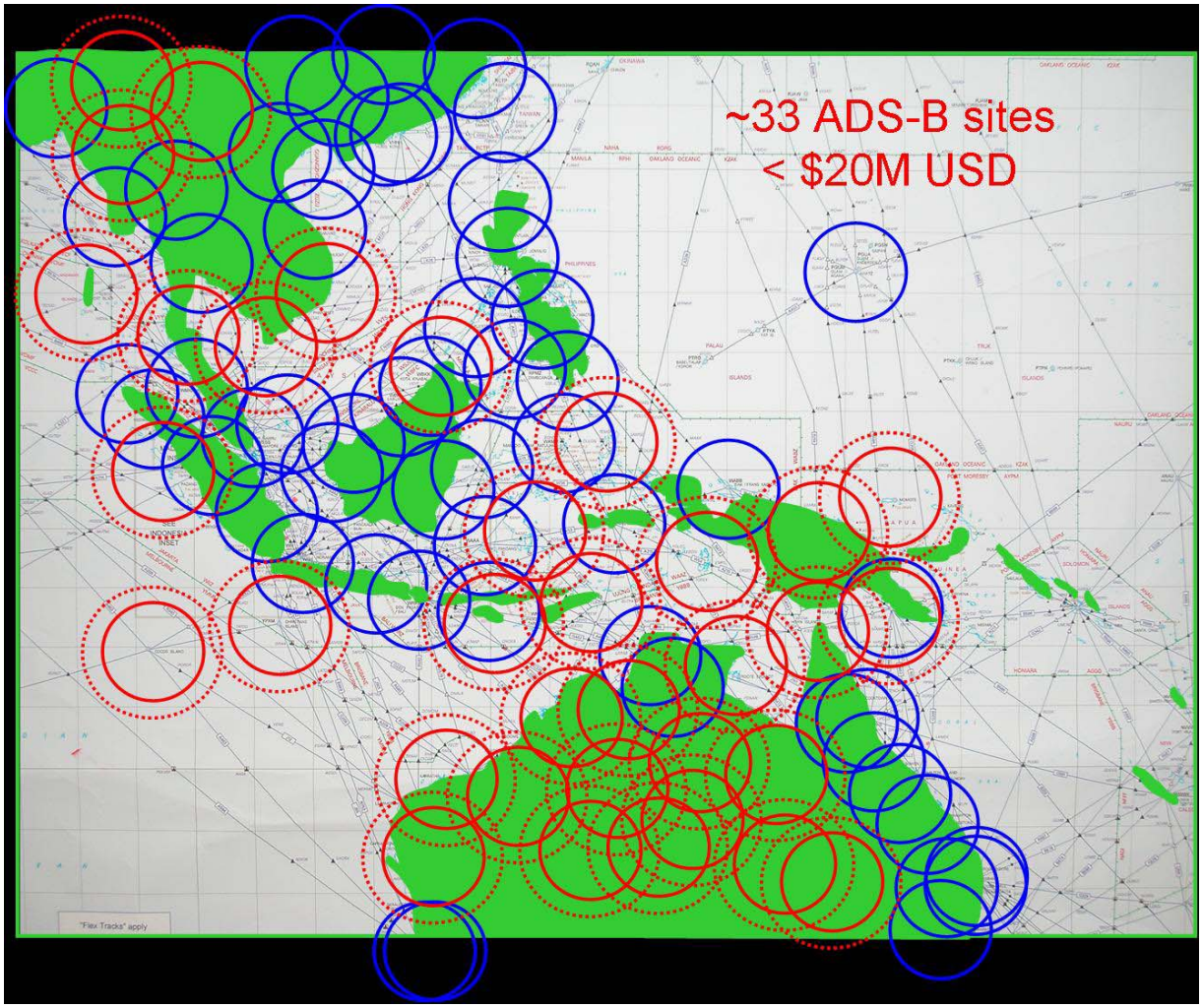

Figure 2: Possible ADS-B coverage in SE Asia

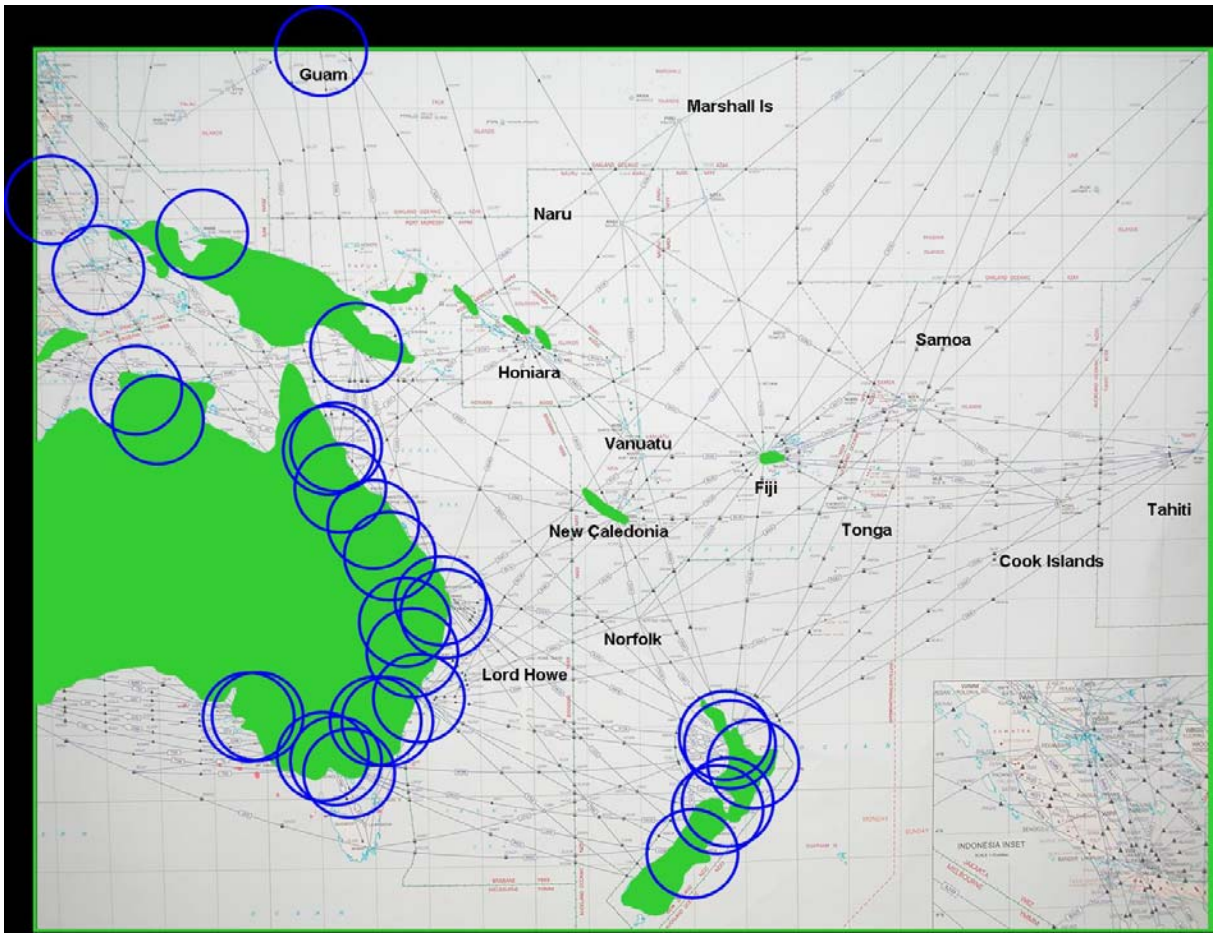

Figure 3: Approximation of existing radar coverage in SE Pacific

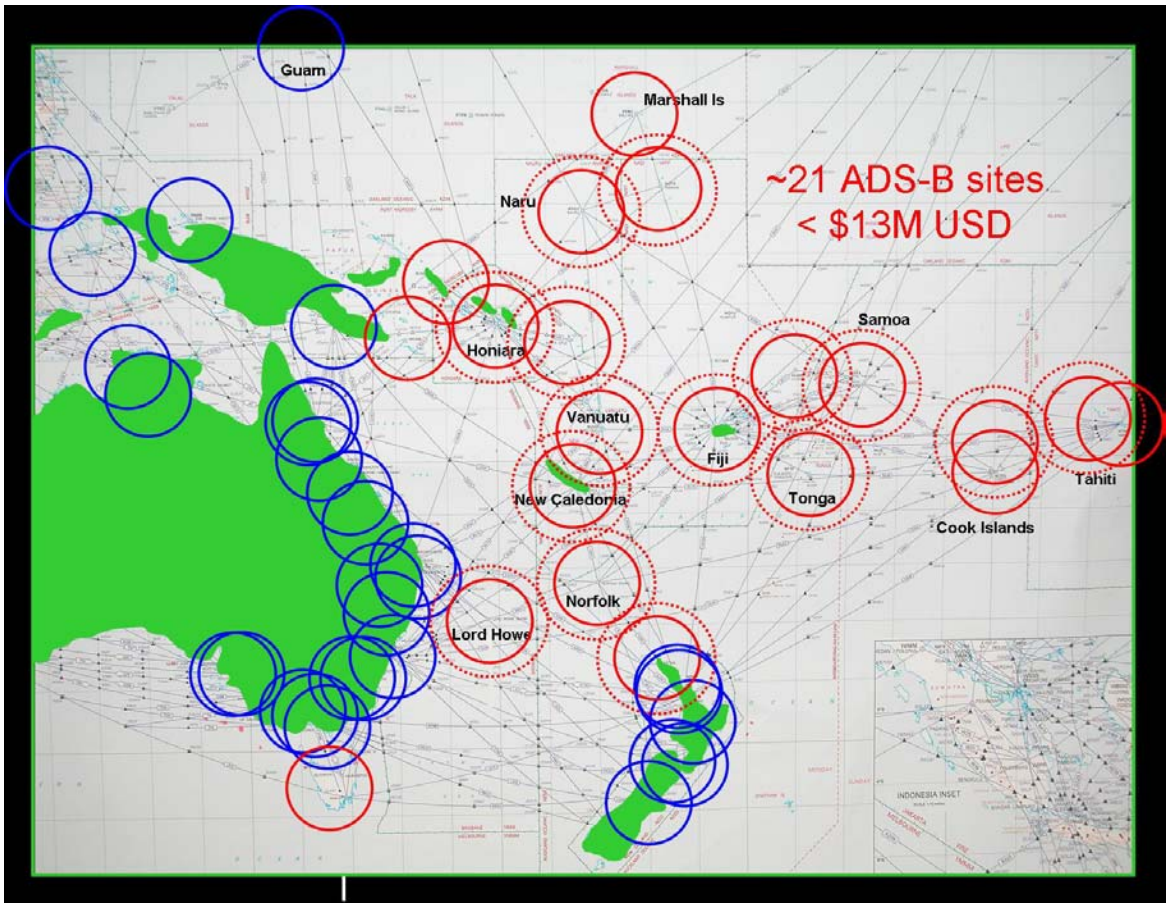

Figure 4: Possible ADS-B coverage in SE Pacific