International Civil Aviation Organization
THIRTEENTH MEETING OF THE
ASIA/PACIFIC AIR NAVIGATION PLANNING AND
IMPLEMENTATION REGIONAL GROUP (APANPIRG/13)
Bangkok, Thailand, 9-13 September 2002

Agenda Item 2: ASIA/PAC Air Navigation System and Related Activities
2.2 CNS/MET Matters
Agenda Item 3: CNS/ATM Implementation and Related Activities

ADS-B Potential for Asia Pacific

(Presented by Australia)

SUMMARY

ADS-B has potential to significantly increase ATC surveillance coverage within Asia Pacific

1 Background

ADS-B offers the potential for Asia Pacific to significantly increase ATC surveillance capabilities at a low cost.

2 ATC surveillance using ADS-B

The attached figures 1 and 3 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 – which can be expected for aircraft between 30,000 feet and 39,000 feet.

Attached Figure 2 and 4 shows one possible **indicative example** of ATC coverage that could be achieved at low cost. The examples show a 200 nautical mile coverage circle and a 250 nautical mile circle (dashed line in the figure). ATC coverage in excess of 250 nautical miles has already been demonstrated at Australia's ADS-B ground station. The Australian results are directly applicable to many Asia Pacific environments.

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 $300,000 USD and $600,000 USD** each including project management and data communications back to an ATC centre. Lower cost alternatives also exist.

Figure 3 shows an example of ADS-B coverage in South East Asia using 33 new ADS-B sites. The estimated cost could be expected to be less than $20 M USD.

Figure 4 shows an example of ADS-B coverage in the South Pacific using 21 new ADS-B sites. The estimated cost could be expected to be less than $13 M USD.

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

3 Benefits

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 if 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. Of course coverage would only be possible for equipped aircraft.

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

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: mismatches between actual aircraft level and coordination level

c) Improvements in efficiency

- Potentially the ability to use ADS-B radar like separation standards in lieu of existing procedural standards
- Ability to detect that aircraft have “passed” and hence issuance of preferred cleared levels
- Increase probability of states being able to offer user preferred routes.

4 Fitment

ADS-B standards are now well enough developed for countries to deploy. ICAO SARPS exist for Mode S extended squitter, RTCA standards exist, ARINC Formfit standards exist, Eurocae standards exist and Eurocae TSOs exist. Some Airbus and Boeing aircraft have already been equipped.

To realise the benefits ADS-B avionics needs to be deployed as soon as possible.

5 Action by the meeting

The meeting is invited to that note the potential benefits and low costs of ATC surveillance 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 SE Asia Radar coverage

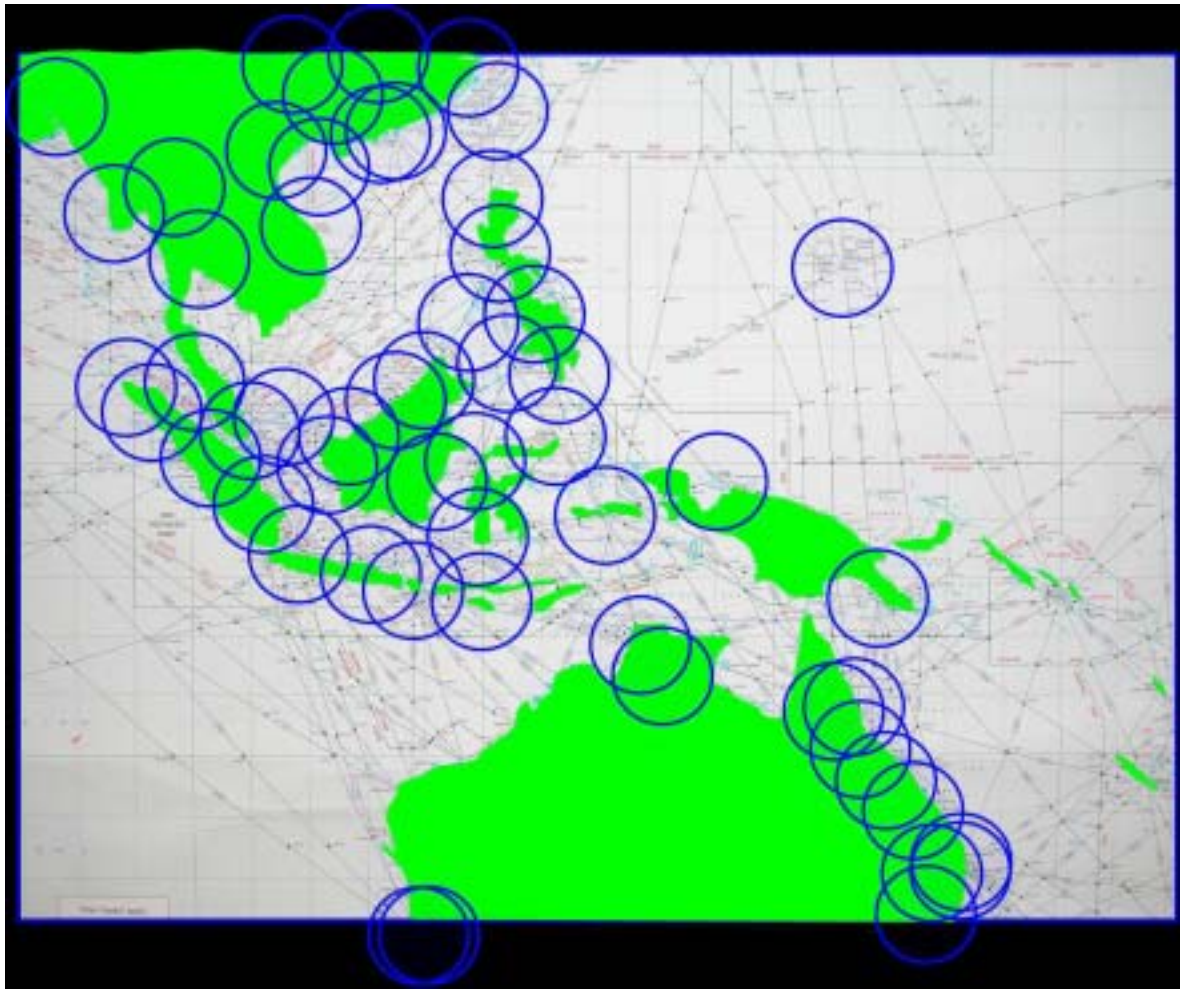


Figure 2 : Possible ADS-B Coverage in SE Asia

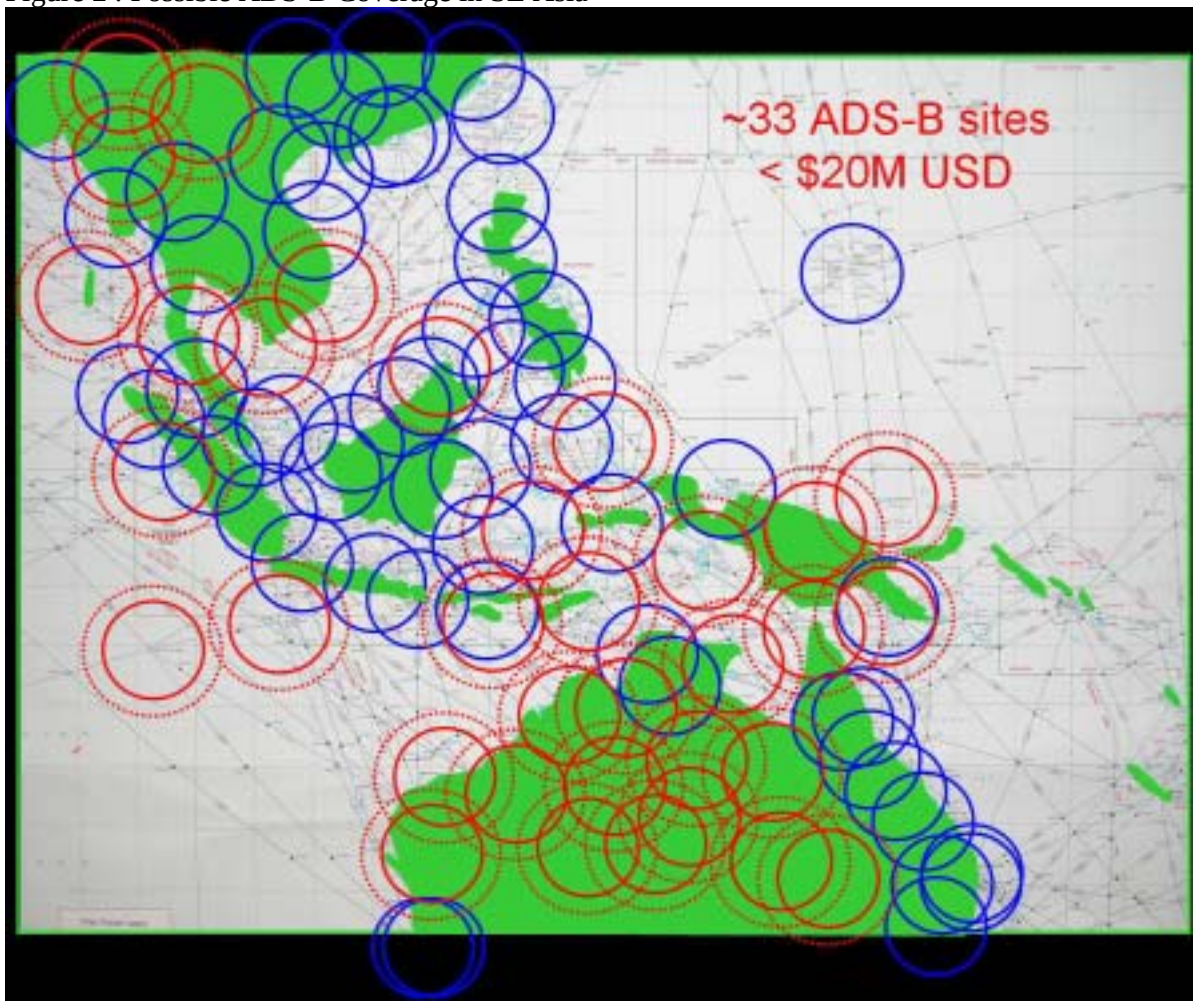


Figure 3: Approximation of existing radar coverage SE Pacific

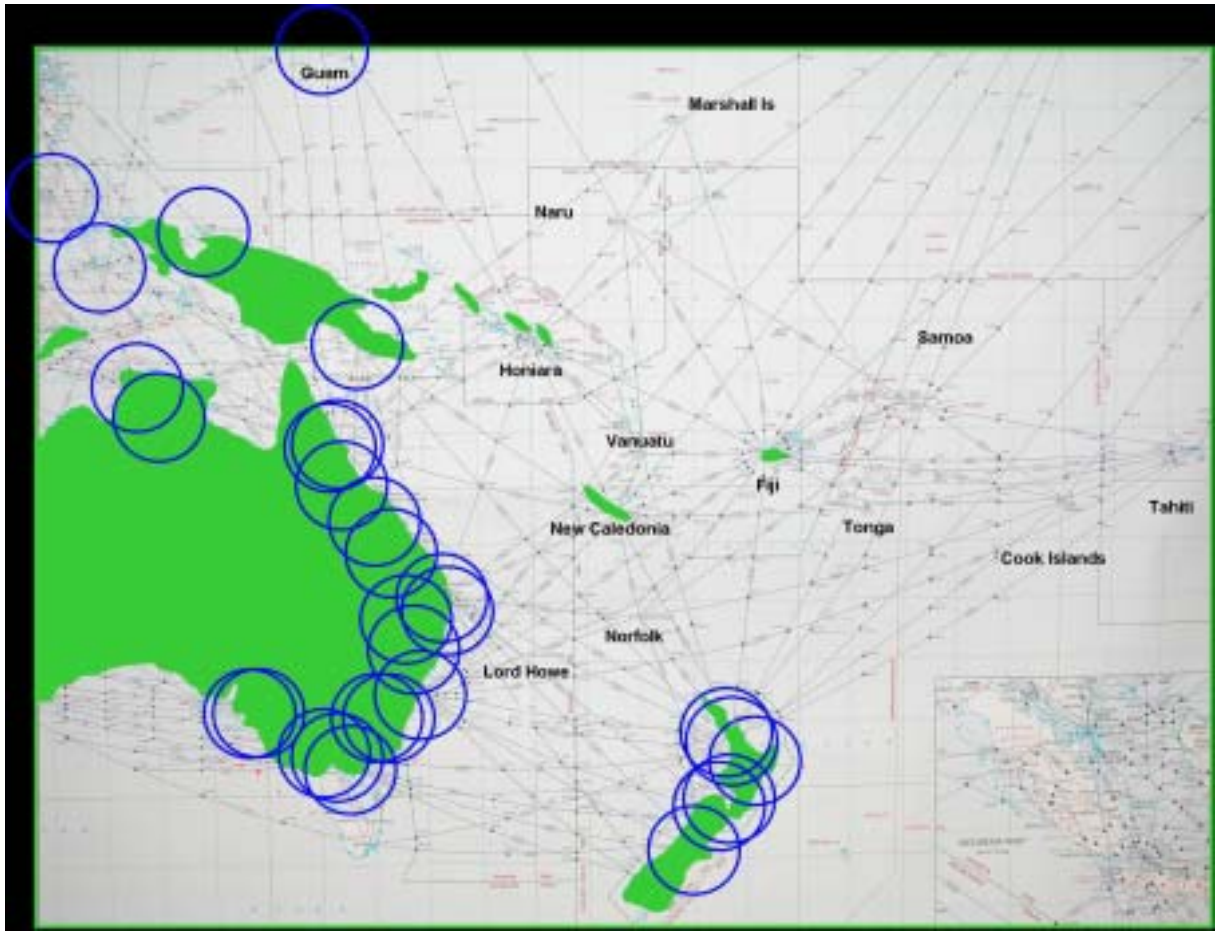
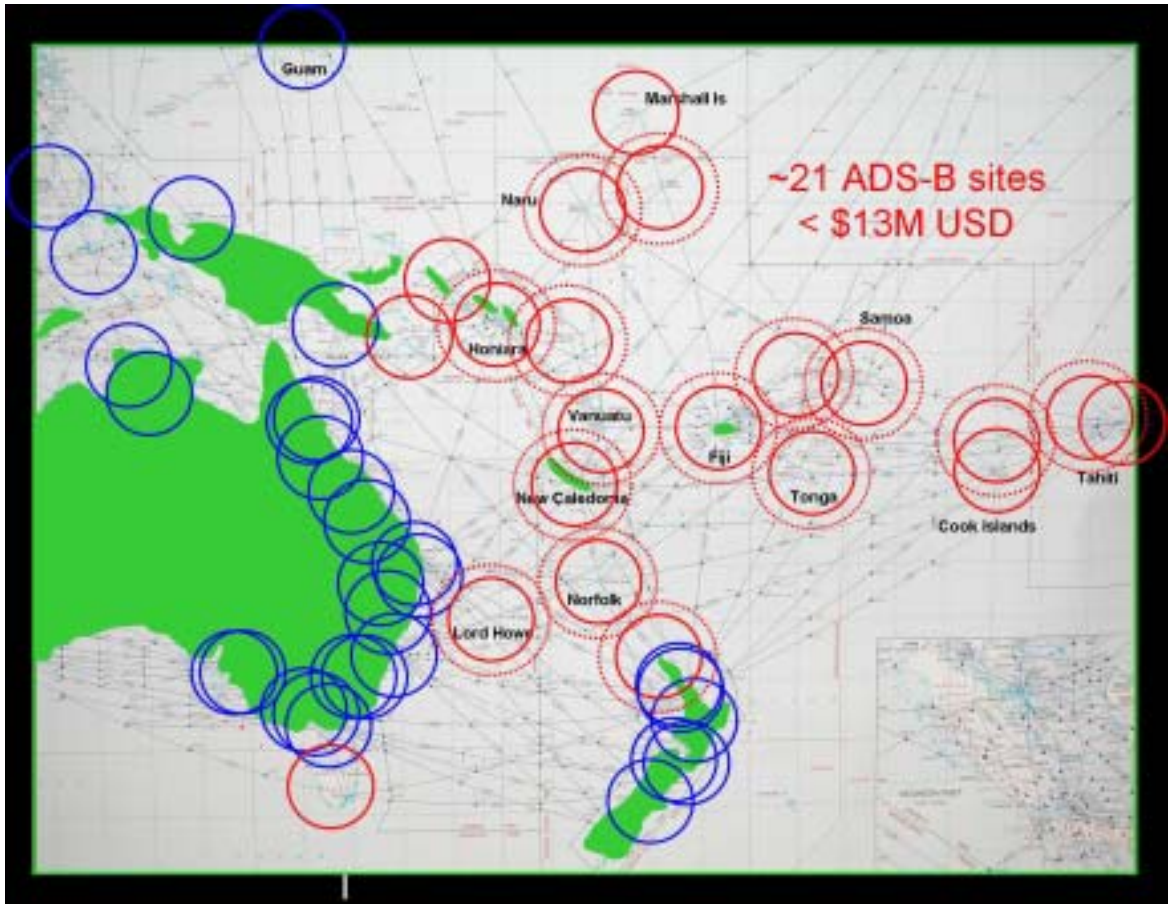


Figure 4 : Possible ADS-B coverage in SE Pacific


Guam
Marshall Is
Nauru
~21 ADS-B sites
< $13M USD
Samoa
Honiara
Vanuatu
Fiji
New Caledonia
Tonga
Tahiti
Cook Islands
Norfolk
Lord Howe