International Civil Aviation Organization

Automatic Dependent Surveillance – Broadcast (ADS-B)

Study and Implementation Task Force

Brisbane, Australia, 24-26 March 2003

Agenda Item 4: Cost Benefit Studies

> b) Identify factors to be considered in the analysis and sources of information.

Agenda Item 5: Implementation Plan

> a) Initial consideration for implementation of ADS-B in the Asia/Pacific Region

AUSTRALIAN PROPOSAL TO DEPLOY 20 ADS-B GROUND STATIONS

SUMMARY

This paper briefly describes the Airservices Australia proposal to deploy 20 ADS-B Ground stations across Australia in airspace currently not supported by radar.

(Presented by Australia)

1. Background

1.1   Airservices Australia has proposed to its customers to deploy 20 ADS-B ground stations to support "radar like" services in airspace typically above FL300 over the Australian continent. This is consistent with the Australian Air Traffic Management Strategic Plan (AATMSP).

1.2   The proposed sites are at existing Airservices Australia facilities with easy access to the Airservices communication network via satellite. Airservices Australia would connect these ground stations to TAAATS and provide radar like ATC services to equipped aircraft.

1.3   The TAAATS automation system would be upgraded to support a large number of ground sensors as well as support ADS-B fallback modes. In addition, improved techniques will be developed to deliver information to relevant ATC positions when GPS performance is expected to be compromised due to RAIM holes or satellite outages.

1.4   As a by-product, surveillance capabilities would be provided for "local" operations at Ayres Rock, Alice Springs and Kalgoorlie/Goldfields, for aircraft that are equipped, resulting in benefits to those aircraft.

2. Proposal Benefits

2.1   The benefits of this proposal are, in the near term:

a)   Significantly improved safety for equipped aircraft

b)   Improved operating efficiency for the airlines including higher probability of obtaining desired clearances

2.2   The proposal is also a strategic step towards widescale ADS-B deployment. Widescale deployment will bring further benefits such as

a) Possible replacement of expensive enroute radars with ground stations costing 1/10th the amount of radar sensors.
b) Possible new procedures outside controlled airspace saving considerable flight time for regional airlines
c) Increased safety as a result of General aviation equipage
d) New services

2.3   To benefit from ground station deployment, aircraft would need to equip with ADS-B avionics built in accordance with RTCA, Eurocae and ICAO standards. Initially it is expected that few aircraft will be able to take advantage of the service although significant safety benefits will accrue to equipped aircraft, even when no other aircraft have equipped. Economic advantages will exist in some cases as equipped aircraft more frequently obtain their desired clearances.

2.4   It is proposed that deployment commence late in 2003 and complete by end of financial year 2004/5. A complementary gradual fitment of aircraft is expected commencing in early 2003 and will allow a growing number of aircraft to gain operational benefits from operational commissioning of each site. The benefits will grow as additional aircraft equip because the number of ADS-B resolvable separation conflicts increases. Customers were invited to provide comment on the proposed coverage as well as a number of implementation options.

3.   Airline Operating Efficiency Benefit

3.1   It is proposed that Air Traffic Controllers provide radar like services to aircraft equipped with ADS-B. These services will increase operating flexibility of aircraft and will hence lower operating costs for airlines. Identified benefits are discussed below:

a. ADS-B will provide a higher probability of providing pilot requested altitude or route clearances

- Equipped aircraft could be expected to more often receive their preferred level (and receive it earlier) since the controller has definitive knowledge of aircraft position and may be able to establish an ADS-B separation standard in lieu of a more restrictive standard.

- Equipped aircraft could expect increased flexibility of operation since the controller will be able to solve ATC separation problems by different means compared to complete reliance on existing procedural control

b. Provides the opportunity to separate aircraft using radar like separation services when conflicting aircraft are both equipped.

- Radar like separation reduces the lateral and longitudinal separation compared to today's procedural standards and will increase controller flexibility and reduce operating restrictions on aircraft.

- ADS-B will enable the ability to issue "climb through" clearances when one aircraft has been observed to pass another. Facilitate climb/descent by observation of a passing and not delaying the approval until a procedural standard has been achieved.

c. Procedural separation tolerances could be reduced for one aircraft when separating one equipped and one non equipped aircraft

d. Reduced distances flown could be expected

e. Reduced flight delays and increased predictability of flight times where existing delays are the result of application of restrictive procedural standards.

   The level of benefit is significantly higher when both conflicting aircraft are equipped with ADS-B. As the percentage of equipped aircraft rises, the overall benefit rises exponentially since the chance of conflicting pairs of aircraft both being equipped has risen exponentially.

f. For the equipped aircraft, within the coverage area, there will be no requirement for pilots to issue position reports to ATC because ADS-B reports to ATC automatically. This reduces pilot workload.
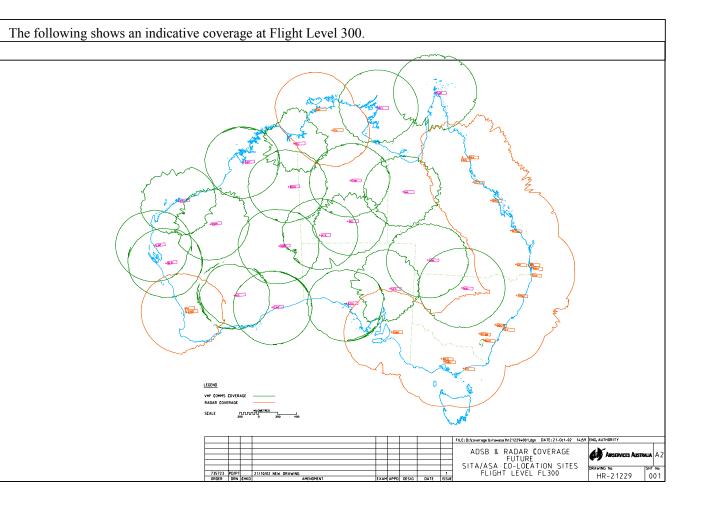
4.   Recommendations

4.1   It is recommended that the meeting note the Australian 20 ADS-B ground station proposal.

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Proposed sites

1. Kalgoorlie
2. Caiguna
3. Ceduna
4. Leigh Creek
5. Ayers Rock
6. Alice Springs
7. Tennant Creek
8. Mount Isa
9. Thursday Island
10. Gove
11. Kununurra
12. Derby
13. Karratha
14. Newman
15. Warburton Range
16. Balgo Hills
17. Jackson
18. Mt Oxley
19. Billabong
20. not allocated

The following shows an indicative coverage at Flight Level 300.

LEGEND

VHF COMMS COVERAGE
RADAR COVERAGE
SCALE

ADSB & RADAR COVERAGE
FUTURE
SITA/ASA CO-LOCATION SITES
FLIGHT LEVEL FL300

AIRSERVICES AUSTRALIA

DRAWING No HR-21229   SHT No 001