International Civil Aviation Organization

The Meeting of Automatic Dependent Surveillance – Broadcast (ADS-B) Study and Implementation Task Force Working Group (ADS-B TF/3)

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Agenda Item 6.5: Cost benefit studies:

CROSS INDUSTRY BUSINESS CASE STUDY IN AUSTRALIA

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SUMMARY

The Australian Industry Group (ASTRA) has initiated an Cross Industry Business Case study for the deployment of ADS-B Lower Airspace Project

1 INTRODUCTION

1.1 The Australian Aviation Industry contracted the company "Access Economics" to prepare a cross Industry business case for LAP. This is a business case document rather than a simple Cost/Benefit document.

1.2 The purpose of the study was to examine whether the introduction of the Lower Airspace Project benefited the aviation community as a whole taking into all Australian industry costs and identified benefits. It did not attempt to quantify the benefits/costs for foreign airlines explicity.

2 THE STUDY

2.1 Access Economics commenced work on ADSB LAP in Nov 2004. Consultations with stakeholders were conducted in November and December 2004. Care was taken to protect the commercial confidentiality of the information obtained from various parties.

2.2 A Draft paper was sent out for comment in Feb 2005

2.3 Benefits flow over 15 years from 2008-09 to 2022-23 was considered.

2.4 Six scenario options were considered including the replacement of the existing enroute radars. In all cases benefits were kept as conservative (lower bound) values, and costs were maintained at the higher level of expectation. Costs were significant and mostly upfront due to the expected near term investment in avionics.

2.5 Benefits are long lived and spread evenly across time

2.6 Some benefits are only those due to a mandate above and beyond voluntary fitment in the upper airspace

3 INDUSTRY SEGEMENTS

3.1 The costs and benefits were calculated for various groups of the Industry as shown below :
(*the NPV values have been removed since these are confidential until the report has been validated*)

3.2 Transfers were considered when it could be justified to have a cross industry funding arrangement to "subsidise" an essential industry segment that did not derive commensurate benefits.

"ADSB Cross-Industry Business Case"		
Summary of NPV's	**Net Benefits - No Transfers**	**Net Benefits - With Transfers**
Airservices Australia		
Major Airlines		
Regional Airlines - Large		
Charter & Regional Airlines - Small		
General Aviation		
Airports		
CASA		
Department of Defence		
DOTARS		

4 BENEFITS CONSIDERED

4.1 A large range of benefits were identified, however only benefits that were tangible and measurable were counted in the analysis.

4.2 The benefits that were quantified included :

- Avoided radar purchase and maintenance
- Avoided Navaid replacement and maintenance
- Airline savings from increased operation at preferred level
- Airline savings from closer passing with crossing traffic (avoidance of level change)
- Airline savings from reduced CPDLC datalink charges
- Community benefits (lives saved) mainly from GA CFIT and improved SAR
- Community benefits – passenger time savings
- Improved air traffic control efficiency and capacity – marginal staff savings
- Benefits to remote aerodromes regarding better knowledge of arrival times
- More optimal flight through introduction of User Preferred Routes, for which ADS-B is one of several enabling technologies
- Improved surrounding traffic information and situational awareness – more efficient approach and departure from non-radar aerodromes. Resulted in Flight time savings (particularly regional aircraft flights)

Safety benefits **not** included

4.3 It was recognised that increased safety had a role including the following, BUT these benefits were not included in the study quantitative assessment :

- *Increase in airspace total system safety/reduction in overall system risk*
- *Improved aircraft position and identification reporting*
- *Improved in-flight emergency response (from ATC and other aircraft)*
- *Enhanced see and avoid benefits in non-radar airspace, through optional ADS-B "in" cockpit displays*
- *Reduced uncontrolled aerodrome collision risks*
- *Reduced IFR-VFR and VFR-VFR collision risks*
- *Most VFR aircraft known to IFR aircraft and ATC*

- *Improved pilot and ATC situational awareness*
- *Improved accident investigation*
- *Reduced runway incursion risks, where used for surface movement surveillance*
- *Enabler of additional ATC safety net functionalities*
- *Improved pilot / ATC communication*
- *Reduced Violations of Controlled Airspace (VCAs)*
- *More accurate navigation and surveillance*
- *Safer ATC tactical and vectoring operations*

Other benefits **not** included

- *Potential for future airspace reform*
- *Better fleet information and co-ordination possibilities to enable more rapid and potentially life saving medical interventions for the Flying Doctor Service*
- *Reduced greenhouse gas emissions due to increased fuel efficiency (over and above the direct fuel costs already allowed for).*
- *Defence surveillance –*
- *Australian aircraft operating overseas will get benefits once overseas jurisdictions start to install ADS-B.*
- *Further ATC rationalisation and even resectorisation is expected to be possible over and above the workload savings already allowed for in the model.*
- *The universal mandate for ADS-B would ensure that a higher proportion of aircraft are known, which may get around radio failure problems*
- *Other non-quantified safety benefits arising from prevention of deaths, injuries and property damage from key aircraft accident categories excluded from the analysis.*

5 Cost data

5.1 Many airline aircraft will be equipped with ADS-B out by 2009 to take advantage of the Australian Upper Airspace programs – even though the fitment and participation in this program is voluntary. The cost of this equipage is not attributable to the Lower Airspace project.

5.2 Actual cost data from Qantas and Virgin Blue has been incorporated, and for the remaining aircraft in the airline category, the following assumptions have been adopted:

- For the remaining aircraft, 25% of them were assumed to still need to fit for the purposes of LAP
- Of these, 45% of the fleet were assumed to not be ADS-B compliant by 2009; 55% will be fitted as part of programmed updates for UAP optional fit benefits
- For these aircraft, the average fitment cost of $200,000 per aircraft was assumed.

6 ISSUES

6.1 A number of problematic issues were identified.

a) How does one quantify the costs and benefits of Defence related aspects. The costs of equipage of Defence aircraft is difficult to quantify at this time – and is highly variable. How does one capture the value of the benefits? Should the costs and benefits be considered as part of the aviation INDUSTRY (or should they be considered in a different context). Military aircraft are not strictly required to conform to mandates in Australia.

Access Economics modelled the inclusion of Defence costs and the exclusion of Defence costs.

b) Difficulty was experienced for Airlines to define which aircraft would still be operating in 2009. This is important, because if the fleet is “rolling over” – and new aircraft are being fitted at low cost – then this can have a huge impact on the costs.

7 THE RESULTS

7.1 The draft report is being validated by stakeholders and is not yet available for wider distribution. However, the draft report is very encouraging and we hope to proceed with the Lower Airspace Project.

7.2 In part, this is due to the very new fleet of aircraft in Australia and the aggressive plans by our airlines to continue the renewal process.

7.3 One issue was reasonably clear – all other things being equal - the option of proceeding with LAP will result in lower air navigation charges compared with the option of “do nothing”/”more of the same” option.

7.4 It is anticipated that work will continue of the Cross Industry Business case until early 2006, when we expect to decide to purchase new radars or not.

8 RECOMMENDATION

8.1 The meeting is invited to note the progress in development of the Cross Industry Business case.
