



International Civil Aviation Organization

**Automatic Dependent Surveillance – Broadcast (ADS-B)
Study and Implementation Task Force**

Brisbane, Australia, 24th March to 26th March 2003

Agenda Item 3: Evaluate information available on the selection of link technology as the preferred technology for Asia/Pacific Region

THE LINK POSITION OF A NUMBER OF ORGANISATIONS

SUMMARY

This paper outlines the link decision by a number of organisations

(Presented by Australia)

1. Introduction

1.1 There has been a battle over recent years regarding the datalink to be used for ADS-B. Recently the situation has become significantly clearer in favour of 1090 MHz Extended squitter for Air Transport Category aircraft as indicated below:

2. FAA link decision

2.1 The United States of America has formally announced that it will use 1090MHz extended squitter as the ADS-B link technology for Air Transport category aircraft. It will use “UAT” technology for low performance General aviation.

2.2 A number of selections from the FAA decision follows:

- *1090ES is selected for the airspace that is principally used by the domestic and international commercial aircraft.*
 - *ICAO SARPs and RTCA MOPS exist for 1090ES (currently being updated)*
 - *FAA is cooperating with Eurocontrol for the selection of 1090ES as the interoperable link for the U.S. and the core of Europe*

- *1090ES will provide 40 nmi. air-to-air range in the high density and high interference environments and 90 nmi. in the low density and low interference environments*
 - *Within coverage of the ground infrastructure, TIS-B on the 1090MHz uplink will provide reports for non-ADS-B equipped aircraft and a multi-link gateway service will provide ADS-B reports for UAT equipped aircraft*
- *UAT is selected to provide ADS-B and associated services for the general aviation users because of its lower cost and greater uplink capacity, especially for FIS-B services.*
 - *RTCA MOPS are being developed for UAT (ICAO SARPs not yet started)*
 - *UAT is being considered as a regional implementation at this time. UAT would satisfy future rulemaking in the high density terminal airspace but not in the high altitude free flight airspace*
 - *Within coverage of the ground infrastructure TIS-B on the UAT uplink will provide reports for non-ADS-B equipped aircraft and a multi-link gateway service will provide ADS-B reports for 1090ES equipped aircraft*
- **OPERATIONS IN HIGH ALTITUDE FREE FLIGHT AIRSPACE**
 Airspace Rule: all aircraft are transmitting ADS-B (position, velocity, identity, etc.) on 1090ES

3. Eurocontrol decision

3.1 Eurocontrol's Joint Coordination Board (JCB) for European ADS-B oriented projects has stated in version 1.4 of the draft document EUROPEAN RECOMMENDATION ON ADS-B DATA LINK SELECTION. It is not known whether this is the final position of Eurocontrol.

"5. It is confirmed that 1090ES will provide the required level of data link interoperability between Europe and the US for initial ADS-B applications forming part of Package 1

6. The view is shared with the airspace users that the adoption and early deployment of 1090ES will enable important progress in the areas of air-to-ground and air-to-air surveillance. Most importantly, it is expected to initiate essential work towards the definition of avionics enhancements including Cockpit Display of Traffic Information (CDTI) to provide Enhanced Situation Awareness.

7. While acknowledging that a 1090ES based single-link solution is an appropriate choice for ensuring early deployment of ADS-B applications for air transport category operations, it is confirmed that the full potential of Package 1 ASA applications cannot be realized in the expected future environment using any single data link selected from the three technologies currently available (1090ES, VDL Mode 4 and UAT).

8. It is considered that, for the expected future environment, the need for a dual ADS-B Data Link, based on 1090ES and VDL-4, is essential for the realisation of the full potential of the Package 1 ASA applications and beyond. The need for such a dual link is required as soon as ASA applications are due to become operational."

4. IATA/AEA JURG decision

4.1 A meeting on 14 June 2002 of the JURG¹ of Association of European Airlines and IATA concluded that 1090 MHz extended squitter ADS-B was the interoperable link. The draft minutes read:

Quote:

- *No requirement for two links on the same airframe unless decided voluntarily by the airline concerned;*
- *1090ES is accepted as the interoperable link with the USA*
- *1090 ES is accepted for general use in Europe for the Package 1 applications, to be accommodated wherever ADS-B service is provided*
- *Reciprocal treatment by the US for 1090ES equipped aircraft arriving from Europe*

Unquote

4.2 IATA has also published in their magazine "One Sky (ISSUE 01 - OCTOBER - NOVEMBER 2002) their draft policy on implementation of ADS-B :

- “1. IATA recognises ADS-B as a prime enabler of ATM applications bringing substantial safety and capacity benefits.*
- 2. Consistent with the longer-term aim of introducing new ATM concepts, IATA supports the cost-effective early implementation of ADS-B. In this context ADS-B means receiving as well as broadcasting capability.*
- 3. ADS-B implementation worldwide must be interoperable, both in respect of the supporting data link and the ATM applications.*
- 4. IATA supports 1090 Extended Squitter as the single, interoperable link until at least 2008.*
- 5. Different link(s) may be deployed and used on a voluntary basis or based on regional agreement between the airspace users and Air Navigation Service Providers concerned, however, this shall in no circumstances penalise aircraft equipped only with 1090 Extended Squitter.”*

The joint AEA and IATA position presented to Eurocontrol and the European Commission is attached.

¹ Joint User Requirement Group (JURG) of Association of European Airlines and IATA

5. Position of major Aircraft manufacturers

5.1 Airbus has indicated that it will make ADS-B out capability, using 1090 MHz extended squitter, available on all aircraft produced after early 2003. Airbus also states that retrofit kits will also be made available at that time.

5.2 Some Boeing aircraft are already equipped with ADS-B (eg some British Airways B747 and B757). Boeing is expected to consider ADS_B 1090MHz squitter implementation together with other transponder changes required for Europe's enhanced surveillance and the FAA's anticipated transponder rules regarding security enhancements.

5.3 Customer demand from Airlines, not ATS providers, is needed for these units and the associated aircraft fitment STCs to become more readily available. This can be achieved through Airlines recognising the benefits, and initiating fitment or through appropriate rulemaking.

6. Position of major Avionics manufacturers

6.1 Each of the major avionics manufacturers have available ADS-B capable avionics. In some cases the avionics are certified and in other cases are only available as red label products. Customer demand from Airlines and/or aircraft manufacturers, not ATS providers, is needed for these units to become readily available. This can be achieved through Airlines recognising the benefits, and fitting or through appropriate rulemaking.

7. CANSO Draft Position

7.1 CANSO have released a draft position on ADS-B as follows:

“It is recommended that the ANS Providers having a requirement for broadcast data link during the period 2003-2012 adopt Mode S 1090 Extended Squitter.”

8. Recommendation

8.1 The meeting is invited to decisions by other major aviation organisations in favour of Mode S extended squitter (1090 MHz) ADS-B link technology for Air Transport aircraft for the near term.

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Association of European Airlines



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10th March, 2003

Mr. Wolfgang Philipp
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Dear Messrs. Ayrat and Philipp,

SUBJECT: EUROPEAN ADS-B LINK STRATEGY

As you are aware, Automatic Dependent Surveillance-Broadcast (ADS-B) is recognized by both the AEA and IATA as a prime enabler of Air Traffic Management (ATM) applications, which bring substantial safety and capacity benefits. As such, its cost-effective early introduction, consistent with the longer-term aim of introducing new ATM concepts, shall be a priority for air navigation service providers and airspace users operating in Europe.

The AEA and IATA agree that the ADS-B "Package 1" applications shall be based on Mode S 1090 MHz extended squitter and are convinced that this is the most pragmatic approach to start with, while at the same time, guaranteeing the required interoperability with the USA.

The AEA and IATA would be grateful if the European Commission and Eurocontrol accepted to progress – at full speed - for further cost beneficial applications beyond Package 1 and assure you of their full support when discussing and deciding on such future ADS-B programmes

With thanks and kind regards.

Yours sincerely,

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