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International Civil Aviation Organization
South American Regional Office

SECOND WORKSHOP/MEETING OF THE SAM IMPLEMENTATION GROUP (SAM/IG/2)
REGIONAL PROJECT RLA/06/901

Lima, Peru, 3 to 7 November 2008

Agenda :
Item 5: **Assessment of operational requirements in order to determine the implementation of communications and surveillance (CNS) capabilities improvement for en-route and terminal area operations**

ARINC ADS-B Network Infrastructure, Ground Station and Situation Display Software Deployment and Evaluation Activity

(Presented by ARINC)

Summary

ARINC proposes, to the SAM States, an opportunity to participate in the implementation of a low cost Regional ADS-B Network for trials and demonstrations with the goal of assisting in the development of standards, procedures and operational concepts with the potential of being tailored to the specific requirements as deemed necessary by the States in the future.

References:

- Report of the Sixth Meeting of the Air Traffic Management/Communications, Navigation and Surveillance Subgroup (ATM/CNS/SG/6)
- Previous GREPECAS Reports

1 Background

1.1 There is a growing international consensus that ADS-B will become the cornerstone technology of the next generation air traffic management (ATM) systems. This is primarily due to the substantial cost benefits and technical advantages over current RADAR systems. The lower cost differential of building and maintaining current RADAR systems and the other tangible benefits accrued directly to ATC providers is driving significant investment in ADS-B implementation activity in the global CAA / ATM arena.

1.2 ADS-B is viewed by the FAA, NavCanada, AirServices Australia, Eurocontrol and other global ATM organizations as the single unifying ATM technology of the future. While initial trials of ADS-B deployment occurred in areas with limited RADAR coverage, it is envisioned that within 10-15 years, ADS-B will supplement, if not totally replace primary RADAR functionality. Moreover, it is likely that secondary RADAR will be maintained as a backup capability. It is critically imperative that the standards being developed are harmonized in concert amongst all ATM organizations regionally, if not worldwide.

1.3 Other implications in attempting to further the implementation of any national ADS-B capability are that CAA/ATM organizations need to negotiate standards within their internal constituencies (ATC users), as well as with external constituencies (Airlines and Airports) somewhat simultaneously. These other users, particularly airlines, need to be part of the equation as they are required to be equipped in order to achieve the overall benefits.

1.4 One of the major obstacles to implementing a national ADS-B system has been the reluctance of some airlines to equip older aircraft with ADS-B avionics as these airlines do not see a great benefit or return on their investment. A case in point is the NavCanada implementation in the Hudson Bay non- RADAR airspace. NavCanada went through a process of obtaining airline buy-in and developed a business case for ADS-B/Out-Only as compared to RADAR. The outcome of the business case analysis was an estimated $200M in fuel savings alone due to reduced separation minimums and other routing advantages. Operational benefits generated by controller operations (reduced communication work load, less time providing IFR separation etc.) were not reported to be part of the benefit calculation. The acceptance and the equipping of the airlines required to ensure success is partially driven by the benefits that they expect to receive.

1.5 It is universally felt that the primary benefits of ADS-B are focused on ATC for separation, but there are many other benefits that can be obtained by both ATC providers and other airspace users - namely airlines and airports. This is clearly evident by observing the growing demand for products and services that assist our airline and airport customers in flight following and tracking. ARINC's own portfolio of products includes both webASD^{SM} our web based flight following graphical situational display tool and, AirPlan enRoute ^{SM}, our airline centric ACARS enabled flow management modeling system. Both of these products rely on real-time aircraft positional information that is only currently available in the continental USA and Canada.

1.6 Additionally, ADS-B can also provide a capability to augment airport surface tracking in some environments to automatically generate block time and OOOI messages in a non-ACARS capable / equipped areas. These messages have been proven to lower airline operating costs and improve efficiency and are highly desired by our customer base.

2 Discussion - ARINC & ADS-B

2.1 In order to be responsive to our customers needs for reliable and cost effective tracking of their aircraft fleets outside of the continental USA, ARINC has begun working with selected companies to develop a complete turn-key "low cost" non-certified ADS-B solution. Based on commercial (COTS) equipment and customized software, ARINC has conceived of, developed and begun testing a system that allows users to acquire ADS-B-generated information, monitor the ADS-B receiver network and graphically display the near real time position of tracks and other flight information. Though not certified, as would be required for use in providing ATC separation, this system provides many of the basic benefits of ADS-B for a small fraction of the traditional cost.

The three basic components of the ADS-B system being developed are:

- Low cost ADS-B receiver ground stations that are accommodated in a single 1U / 19 inch rack mount and a 1090 MHz antenna,
- The communications backbone and ADS-B track collector CPU/Server that resides in Annapolis, USA, and
- A Windows based graphical flight tracking application that provides for near real time geo display and situational awareness of tracked aircraft.

2.2 By utilizing the existing ACARS ground stations (over 1,000) to house the ADS-B receivers and the existing global communications network where available and feasible, ARINC is able to provide a dedicated ADS-B track collector system at our headquarters in Annapolis, USA connected to ground stations virtually anywhere in the world.

2.3 The users of our Display software are able to connect to our Annapolis Collector / Server and are able to monitor all ADS-B traffic on all ground stations or specific traffic as filtered when necessary.

2.4 The notion is that by providing selected segments of the addressable ADS-B market (airlines) with this low cost alternative, a compelling cost-benefit and business model could be developed to assist justifying an airlines investment in ADS-B avionics. In addition, deployment of ARINC-ADS-B would enable bundling of other ARINC services, particularly AirPlan, ACARS Data link and possibly could provide new user interface for sending and receiving ACARS messages as an overlay to the ADS-B situation display.

2.5 ARINC's ADS-B solution provides a unique opportunity to facilitate a seamlessly integrated cross border inter-agency collaboration capability. This common shared data set can extend information sharing, Collaborative Decision Making, and situational awareness to all users; Air Traffic Service providers, administrators (user charges), and aviation airspace users, across national and regional borders.

3 **ARINC ADS-B in Latin America**.

3.1 ARINC believes that the lack of an integrated approach to ADS-B across the world or an approach that fails to address all user requirements (CAA, Airlines & Airports) are factors that could contribute to delays in typical ADS-B deployment. These likely delays, beyond the already long time lines expected, offer an exciting opportunity to exploit low cost interim solutions to achieve some immediate benefits and gain necessary knowledge and understanding.

3.2 In discussions with various officials at the recent GREPECAS/15 in Rio de Janeiro, a low risk, ADS-B test bed approach based on utilizing the ARINC ADS-B development system was discussed and was concluded to be a good opportunity to provide an “entry-level” ADS-B evaluation tool that could be offered to the GREPECAS members at very reasonable cost. Panama has already agreed to participate in evaluation of an ARINC ADS-B ground station and Situation Display software connected to the ARINC track server in Annapolis. The Panama ground station will be implemented in the very near future.

3.3 The ARINC ADS-B test bed is an opportunity for countries contemplating a path to ADS-B deployment to learn and gain some early benefit from ADS-B without having to make the significant

investment in certified ground stations and integration of ADS-B traffic with their operational ATM systems.

3.4 The ARINC ADS-B test bed provides a lower but adequate-to-test-level of functionality (not certified for ATC separation) and is a platform that can be used to understand capabilities, develop operational requirements, standards and procedures. Additionally, local airlines that are ADS-B equipped can also participate and make use of their own fleet track information to enhance their situational awareness and operations.

4 **ARINC proposed ADS-B Test Be**d

4.1 ARINC proposes to make available, to interested GREPECAS members, ADS-B ground stations and necessary situation display software that would be part of an ARINC hosted and managed High Availability Latin America ADS-B network

4.1 The Proposed ADS-B Test Bed Service comprises the following components:

- Installation of ARINC ADS-B ground station and antenna on customer premises.
- Installation and training of ADS-B Windows based Situational Display software on customer supplied PC (appropriate configuration)
- Delivery of the ADS-B data stream to a Customer's premises from a pre-defined set of ADS-B receivers via a customer supplied IP connection(s)
- A service level commitment
- A total communications management system 24 hours - Seven days per week (24/7)
- Network availability will be to the performance standard agreed upon
- Customer access to 24/7 Help Desk support
- Dedicated Customer Support
- A service advisory system to ensure that Customers are notified of planned outages, service failures and predicted system restoration times
- Delivery of monthly performance reports
- Participation in a web based user group forum to discuss and document ideas and issues etc.
- Collaboration in documenting and presenting to appropriate organizations.
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5 **Suggested action**

5.1 The meeting attendees are invited to:

a) Analyze the information provided in this working paper, attached presentation and ADS-B demonstration.

b) Consider further coordination with ARINC to acquire additional information on ADS-B Network Infrastructure, Ground Station and Situation Display Software, for the Regional Group or individual State application.

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