International Civil Aviation Organization

**AUTOMATIC DEPENDENT SURVEILLANCE –
BROADCAST SEMINAR AND TWELFTH MEETING
OF AUTOMATIC DEPENDENT SURVEILLANCE –
BROADCAST (ADS-B) STUDY AND
IMPLEMENTATION TASK FORCE (ADS-B SITF/12)**

Kolkata, India, 15-18 April 2013

Agenda Item 6: **Review States' activities and interregional issues on trials and implementation of ADS-B and multilateration**

ADS-B IMPLEMENTATION : MEETING THE CHALLENGES

(Presented by Airports Authority of India)

SUMMARY

This paper presents the challenges that are being faced during the process of implementing ADS-B operations and the possible solutions. The paper also brings out various options for discussion by the meeting for the benefit of the States in the APAC region who are either in or yet to commence the process of implementing ADS-B operations in their airspace.

1.   INTRODUCTION

1.1.   In accordance with APANPIRG Conclusions, ICAO Global Plan Initiave and Aviation System Block Upgrades (ASBU), India has taken the initiative to provide seamless coverage by augmenting the existing radar coverage through the installation of fourteen ADS-B ground stations at strategic locations. The site acceptance test (SAT) of ADS-B ground stations have been successfully carried out at all the fourteen stations.

2.   DISCUSSION

2.1.   **IMPORTANT EMERGING ISSUES IN THE IMPLEMENTATION OF ADS-B OPERATIONS IN INDIA**

2.1.1.   **ATC automation systems:** India has ATM automation systems in 44 stations across the country. The ATM automation systems at these airports are provided by different vendors such as M/s.Raytheon,M/s Selex and M/s Indra. During the testing of ADS-B data integration with automation systems in India a number of issues have been identified. AAI is considering enhancements in automation systems to:

      i)   support different versions of ASTERIX CAT21 message formats

      ii)   display different symbology for ADS-B related tracks (~~single, fused~~, having below cut-off values for NUC/NIC/NAC/SIL)

      iii)   priority to sensors input is adaptable depending upon the quality of data.

      iv)   provision to have different adaptable cut-off values NUC/NIC/NAC/SIL for different ADS-B sensors when multi-feed is integrated with automation system.

      v)   support ADS-B inputs in the Tower types ATC automation systems

      vi)   enable ATC automation systems to associate ADS-B data with flight plan data-blocks in the absence of Mode-A information (DO-260); and

      vii)   update ADS-B track data using either Flight_Id or 24 bit address when Mode-C is not received in ADS-B messages

2.1.1.1.   The proposal is to upgrade the different types of ATC automation systems to facilitate integration of ADS-B data smoothly and to associate FDPS flight plans based on ICAO 24-bit address and match transmitted Flight_Id with Flight Plan ACID.

2.1.1.2.   **Option:***may consider, Mode-A information to be by DO-260 avionics while following all the other ED-129 standards. Vendors are not willing to add the feature referring that the transmission of Mode-A as a deviation from ED-129 standards.*

2.1.2.   **Requirement of a comprehensive Document**: Literature on ADS-B is available in fragments with varying standards. There is a dire need in bringing out a consolidated and a comprehensive document for the region to the states on ADS-B implementation.

2.1.2.1.   **Option:***With the experience gained in APAC region, SITF may consider consolidating the fragmented literature and remove the anomalies, if any. This would enable all the States to understand and assist them in implementing ADS-B.*

2.1.3.   **Requirement of additional Software to compare Radar and ADS-B tracks:** Software applications are required to compare the horizontal position information derived from ADS-B sensor with Radar sensor (MSSR) reports. The comparision will greatly enable to compare the positional accuracy of ADS-B with MSSR data, both mathematically and graphically.

2.1.3.1.   **Option:** *States may consider sharing the methodology*

      i)   *by which Radar data with ADS-B are being compared; and*
      ii)   *used to validate ADS-B data where ADS-B is stand-alone.*

2.1.4.   Training requirements of:
      i)   ATCOs.
      ii)   CNS personnel.
      iii) Pilots.
      iv) Flight Engineers.

2.1.4.1. **Option:***On-board ADS-B equipments need testing and certification. In some cases, retro-fitting or upgradation may also be required. Pilots and Flight engineers may need training. Could Airline operators / IATA brief on the progress made in this regard.*

2.1.5. **Transmission of incorrect ADS-B information by avionics:** One of the prime concerns is the unchecked mis-leading data through ADS-B. ICAO has rightly proposed to control the transmission of incorrect information by avionics especially through ADS-B.All the aircraft (Airframes) transmitting incorrect information through ADS-B should be covered under this clause whether or not ADS-B based ATS surveillance service is provided.

2.1.5.1. We cannot afford to have incorrect information even in procedural environment. However, there could be other indirect issues related to stopping of ADS-B transmissions which may need discussion.As per FPL 2012 format only aircraft equipped and capable (operational approval and flight crew authorization) of ADS-B transmissions with a dedicated 1090 ADS-B extended squitter needs to indicate in field 10a under surveillance "B1 or B2 (in case both OUT & IN transmissions capability). Airline operators should adhere to this.

2.1.5.2. ICAO may like to set the mandates and timelines for uniform implementation of ADS-B in the region.

2.1.5.3. **Clarification :**

i) *Could stopping ADS-B transmissions (wholly or partially) hamper Mode-S transmissions, ACAS, Mode A/C?*

ii) *How would pilots know that ADS-B transmissions are faulty and what action they are supposed to take?*

iii) *Is there any risk that ADS-B transmitters compliant with pre-RTCA/DO-260 Change 2 may continue to use HFOM data from the GNSS receiver during periods of HPL non-availability due to operational reasons (e.g. satellite geometry etc.)?*

iv) *During periods where HPL is not available the NIC should be set to 0 (zero), and the NAC should reflect the accuracy of the broadcast position. Who should be setting these values after the aircraft is airborne?*

v) *Pilots of certain aircraft have indicated that they cannot alter the call sign in FMS after it is airborne. What is the procedure to deal with such a scenario?*

3. **ACTION BY THE MEETING**

3.1. The meeting is invited to:

a) take note of the challenges in implementing ADS-B ;

b) discuss the possible options that has been proposed by India ; and

c) discuss any relevant matters as appropriate

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