



International Civil Aviation Organization

**STUDY AND IMPLEMENTATION TASK FORCE
TWELTH MEETING OF ADS-B
IMPLEMENTATION (SITF/12 ADS-B)**



Kolkata India 15 to 18 April 2013

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

STATE IMPLEMENTATION PLAN FOR INDIA

(Presented by India)

SUMMARY

This paper provides an insight into the status of ADS-B Implementation in India. ADS-B plan aims at providing redundancy where Radar coverage exists and also fill the Surveillance gaps where Surveillances coverage is not possible due to high Terrain and remote areas. India is also taking lead in sharing the data with neighboring countries.

To meet the ICAO Global Plan Initiative and Aviation system Block Upgrade (ASBU):-

- a) India has installed 14 ADS-B ground stations. ADS-B Data has already been integrated with ATM Automation system at nine locations on test basis.
- b) In the second phase, India is in process of installing 7 more ADS-B system by Sep2013.
- c) India is taking a lead role in sharing the data with neighboring countries.

1. Introduction

1.1 In line with ICAO Global Plan Initiative and Aviation System Block Upgrade (ASBU) India has taken a lead in installing ADS-B Ground station to provide surveillance redundancy where Radar coverage exists and also to fill the gaps where surveillances coverage is not possible due to high terrain and remote areas. India is also taking lead in sharing the data with neighboring countries.

2. Discussion:

2.1 There are number of neighboring countries who are planning to create ADS-B infrastructure. India is in process of creating the ADS-B infrastructure in line, so that interoperability issue and data exchange issues can be minimized at a later date. This will reduce the complexity of operations and allow Aircraft operators to operate in the region with the same air-borne equipment. Sharing of ADS-B data from neighboring countries can also be looked into provided ADS-B data-link are provisioned by recipient countries.

2.2 India has installed and tested ADS-B Ground stations in redundant configuration at 14 Airports - Amritsar, Jaipur, Varanasi, Ahmedabad, Bhopal, Nagpur, Calicut, Cochin, Coimbatore, Mangalore, Port Blair, Trivandrum, Agartala & Guwahati

2.3 India is going to install seven more ADS-B ground system at Srinagar, Jaiselmer, Dibrugarh, Patna, Bhubaneswar, Trichy and Vijayawada.

2.4 ADS-B ground systems at Amritsar, Varanasi, Ahmedabad, Nagpur, Cochin, Mangalore, Trivandrum and Guwahati will provide supplementary surveillance coverage as standby to radar systems. ADS-B ground stations at other airports i.e. Jaipur, Lucknow, Srinagar, Jaiselmer, Dibrugarh, Patna, Bhubaneswar, Trichy and Vijayawada will facilitate in filling the surveillance gap due to non-availability of radars at these airports.

2.5 ADS-B Data has been integrated with respective ATM Automation Systems installed at Nagpur, Ahmedabad, Mangalore, Trivandrum, Guwahati, Varanasi, Cochin and Amritsar Airport and are under test. ATM Automation systems installed at Calicut, Coimbatore, Lucknow, Jaipur, Agartala, Patna, Bhubaneswar, Vijayawada and Trichy are being upgraded to process ADS-B Data.

2.6 In accordance with the "Guidance Material on Generation, Processing & sharing of Asterix Category 21 ADS-B Messages" deliberated by APANPIRG/23, ATM Automation systems installed in India, are processing data frames of Asterix 21 Version 0.23. However it may be noted that Asterix 21 Version 0.23 is not capable of processing all the capabilities of DO260A & DO260B compliant transponder.

2.7 Further, it may be noted that Mode-A information is not being broadcasted by Aircrafts compliant with DO 260 & 260A; as a result, ATM Automation systems are not coupling ADS-B tracks. Aircraft transponders compliant with DO260B are broadcasting Mode-A worldwide as a regular message and thereby allowing flight plans to be correlated with ADS-B Tracks.

2.8 In view of above, ATM automation systems are planned to be upgraded :

- to select different versions of Asterix 21 to take full advantage of future upgrades;
- to co-relate ADS-B target report with Aircraft Identity or 24 bit code;
- to differentiate Surveillance targets with different symbols and colors. Separate track symbol shall be provided on Situation data display for ADS B alone track, ADS B + SSR + PSR combined tracks and ADS B + SSR combined track and the choice of symbols and colours shall be adaptable;
- to display emergency status broadcasted by aircraft through ADS-B reports; and
- to display ADS B tracks whose NUC value less than 5 with a different color so that controllers will get a situational awareness about the track

2.9 ADS-B Data from Srinagar and Jaisalmer will be integrated with ATM Automation system installed at Amritsar and Delhi respectively to enhance the Surveillance coverage over the North-West part of India. Similarly, ADS-B system at Dibrugarh and Agartala will enhance the Surveillance coverage in North-Eastern part of India.

2.10 ADS-B ground station at Port Blair will provide the surveillance coverage over Bay of Bengal till the FIR boundary of Chennai / Kualalumpur and Kolkata / Yangaon. The Port Blair ADS-B information has already been integrated with ATM Automation System at Chennai.

2.11 ADS-B Data from Port Blair will also be integrated with Kolkata ATM Automation system after completion of installation of New ATM Automation system at Kolkata Airport by Oct 2013

2.12 India has also successfully integrated number of surveillance sensors in Chennai FIR thus enabling seamless upper airspace harmonization with lower limit as FL 260. India is also planning to integrate various surveillance sensors at Delhi and Mumbai ATM Centers.

3. Other Relevant Information About India ADS-B Project

3.1 In accordance with the recommendations made by Eleventh ICAO Air Navigation Planning Conference, India is using 1090MHz Extended Squitter data link for ADS-B data exchange over Indian Air-space.

3.2 In accordance with Asia Pacific ADS-B Implementation and Operations Guidance Document (AIGD), ADS-B Ground stations installed at Indian Airports are capable of detecting, identifying and tracking targets equipped with ADS-B transponders compliant with ICAO SARPS Annex 10 Volume IV and 1090MHz Extended Squitter avionics compliant with DOC9684 and RTCA DO-260, DO-260A & 260B.

3.3 ADS-B Ground Receivers being used by India shall accept the position data incorporated in ADS-B message with Navigation Uncertainty Category (NUC) value or Navigation Integrity Category (NIC) or Surveillance Integrity Value (SIL) respectively to maintain high degree of reliance and integrity.

3.4 In next phase by end of 2014, India proposes to install more number of ADS-B Ground station depending upon the traffic density at airports as well as to provide redundancy to existing Radar systems. India is also planning to install ADS-B Ground system at airport where terrain limitations are restricting Radar installation in the North-Eastern & Northern part of India. This will facilitate the Situation awareness on Air situation Displays at such Airports where Nav-Aid Installation is not feasible.

3.5 AAI has requested DGCA-India to mandate the ADS-B operations over the Indian Air Space.

3.6 ATS Procedures for ADS-B operations are being prepared.

4. Action by the meeting:

4.1 The meeting is requested to note the content of the Information paper.

SURVEILLANCE COVERAGE OVER INDIAN AIR SPACE

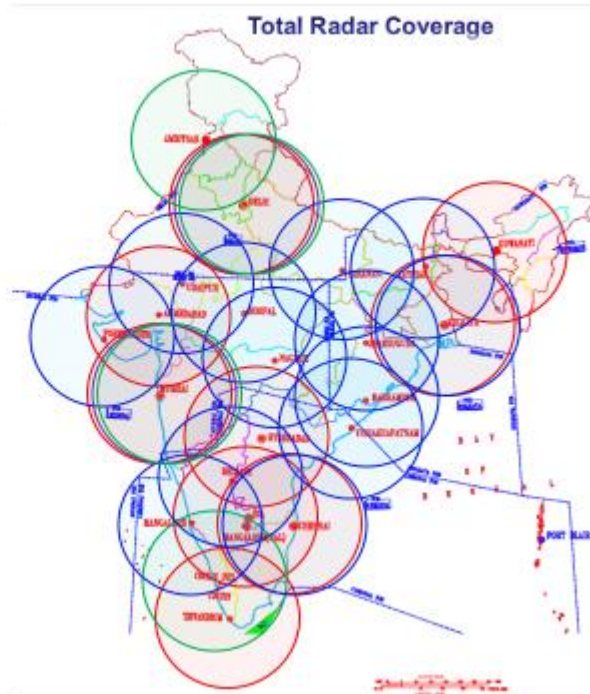
After implementation of ADS-B program, Surveillance coverage over Indian Air-space with available Radars and upcoming ADS-B ground stations is projected as below:-

- S-Band ASR/MSSR**
- 1. Delhi
- 2. Mumbai
- 3. Chennai (Replacement)
- 4. Kolkata (Replacement)
- 5. Ahmedabad (Replacement)
- 6. Hyderabad (HIAL)
- 7. Guwahati
- 8. Trivandrum (Replacement)
- 9. Bangalore (BIAL)

- New S-Band ASR/MSSR**
- 1. Cochin
- 2. Amritsar
- 3. Delhi
- 4. Mumbai

- L-Band ARSR/MSSR**
- 1. Delhi
- 2. Mumbai

- MSSR only**
- 1. Varanasi
- 2. Nagpur
- 3. Mangalore
- 4. Behrampur
- 5. Chennai
- 6. Kolkata
- 7. Porbandar
- 8. Bhopal
- 9. Bellary
- 10. Vizag
- 11. Jhansuguda
- 12. Katihar
- 13. Udaipur



- ADS-B**
- 1. Ahmedabad
- 2. Guwahati
- 3. Trivandrum
- 4. Varanasi
- 5. Nagpur
- 6. Mangalore
- 7. Bhopal
- 8. Amritsar
- 9. Cochin
- 10. Calicut
- 11. Coimbatore
- 12. Jaipur
- 13. Lucknow
- 14. Agartala

- PHASE - II ADS-B**
- 1. Bhubaneswar
- 2. Dibrugarh
- 3. Jaisalmer
- 4. Patna
- 5. Srinagar
- 6. Trichy
- 7. Vijaywada

