



INTERNATIONAL CIVIL AVIATION ORGANIZATION

**TWENTY-SECOND MEETING OF THE
ASIA/PACIFIC AIR NAVIGATION PLANNING AND
IMPLEMENTATION REGIONAL GROUP (APANPIRG/22)**
Bangkok, Thailand, 5-9 September 2011
**Agenda Item 3: Performance Framework for Regional Air Navigation Planning
and Implementation**
3.2 ATM/AIS/SAR
ATM ENHANCEMENTS THROUGH IMPROVED AUTOMATION

(Presented by India)

SUMMARY

The paper presents India's effort in restructuring the airspace and ATS routes to make them more efficient to save fuel, time, reduction in emission of aviation of gases, enhance the efficiency and regularity of flight operations through improved ATS Automation system.

Strategic Objectives:

- A: *Safety – Enhance global civil aviation safety*
- C: *Environmental Protection and Sustainable Development of Air Transport – Foster harmonized and economically viable development of international civil aviation that does not unduly harm the environment*

Global Plan Initiatives:

- GPI-6 Air traffic flow management
- GPI-7 Dynamic and flexible ATS route management
- GPI-8 Collaborative airspace design and management
- GPI-9 Situational awareness

1. INTRODUCTION

1.1 India, an emerging global economic power, has witnessed a tremendous growth in air traffic in the last decade, poised to grow at a rate much higher than the world average in the next five years. Additional capacity will need to be delivered, flight efficiency improved and environmental impact reduced, while maintaining or improving safety of operations. To achieve this Indian airspace will have to become more flexible and adaptable, allowing an effective balance between capacity, flight efficiency and environmental requirements on one hand, and the diversity of user requirements on the other, while maintaining or improving the safety of operations. The solution for meeting the diversity of user requirements is the effective and dynamic management of the pre-designed airspace structures through a highly flexible and integrated Collaborative Decision Making (CDM) process at network, regional, national and local level. Faced with these realities, India has taken the initiative to review the existing Indian airspace structure and develop a new Airspace Management Strategy to

cope with the predicted impressive future growth of air traffic through the state of the art ATM Automation. India is constantly working to restructure the airspace and ATS routes to make them more efficient to save fuel, time, reduction in emission of aviation of gases, enhance the efficiency and regularity of flight operations.

1.2 India took a landmark decision to modernize ATC system at Delhi and Mumbai airport in 1999 under MATS-BD project, the new integrated automation system was equipped with MSAW and STCA to enhance safety and efficiency of flights operations. This system has been further upgraded with features like advance Safety nets and arrival managers (AMAN).

1.3 ATC automation system has also been implemented at Hyderabad, Bangalore and is being upgraded at Chennai airport with advance features. Similar ATC automation system is planned for Kolkata also.

1.4 In addition to automation of ATC system at six Metro airports, India has also undertaken an ambitious plan for automation of ATC system at 38 Non-Metro airports which will be completed by March 2012. The automation system will provide alerts and warning in the form of short term conflict alert, minimum sector altitude warnings, and medium term conflict alerts etc to enhance the safety.

2. DISCUSSION

2.1 As per the existing plan for restructuring of entire Indian airspace, 11 ACCs will be amalgamated into 4 ACCs initially and finally into 2 centres. Each FIR will have only one Upper ACC centre with multiple sectors to be operated from four major cities. Entire airspace will have overlapping surveillance cover through Radar/ADS-B/Multilateration combined with matching seamless air-ground communication to facilitate efficient air traffic management and AIDC for ground to ground communication. The surveillance data from Radar/ADS-B/Multilateration will be networked and electronically processed with relevant flight data from the Flight data processor to provide an integrated track data output correlated with flight plan so as to enable application of uniform radar separation throughout the FIRs.

2.1 With the introduction of improved ATS automation system and installation of additional Radars /ADS-B/Multilateration, the entire continental airspace will permit seamless surveillance and in addition to the existing ADS-C over Oceanic airspace. India has successfully integrated all Radars in Chennai FIR in the first phase thus enabling seamless upper airspace with lower limit as FL 260. The newly introduced technique of cross coupling of VHF would facilitate creation of multiple sectorization over continental airspace. AIDC enabled through Automation will substantially reduce ATS coordination.

2.2 As a pilot project re-sectorization of Chennai FIR has been completed. Chennai FIR will have one Upper ACC centre with five sectors to be operated from Chennai. Lateral jurisdiction of existing ACC centers at Hyderabad, Mangalore and Trivandrum has been re-designated as Lower ACC centre with revised lateral and vertical jurisdiction up to FL255. Tower and approach will be operated from individual airport as per present lateral and vertical jurisdiction.

2.3 Similar concept of integrating Radars and upper ACC is also planned for Delhi, Mumbai and Kolkata FIRs. This will facilitate to merge present 11 ACCs into 4 ACCs initially and finally into 2 ACCs.

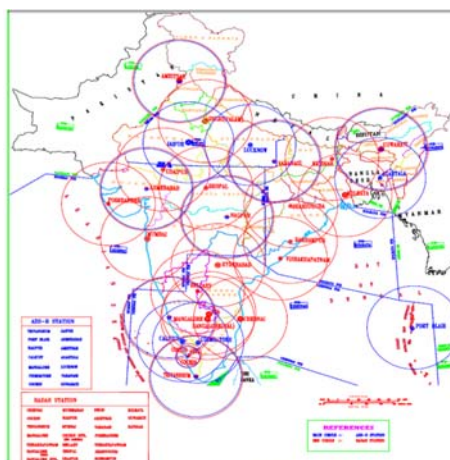


Figure 2B. Radar/ADS-B Coverage in Indian FIRs.

2.4 India has also planned ADS-B stations at 14 locations to cover Radar gaps and as redundancy surveillance system.

2.5 Complete integrated Radar / ADS-B surveillance will provide seamless operations and will help in reducing separations, provide better situational awareness, implementation of Dynamic and flexible ATS route management and smooth implementation of regional integrated Air Traffic Flow Management.

Restructuring of ATS routes in India

2.6 Airports Authority of India is constantly working to restructure the Airspace and ATS routes to make them more efficient to save fuel, time, reduction in emission of aviation of gases, enhance the efficiency and regularity of flight operations.

2.7 ATS route L 509 from GGC VOR to ASARI and M 875 from KAKID to BUTOP were promulgated through military areas under flexible use of airspace. These routes were further extended up to SAMAR and GUGAL to provide connectivity through Pakistan airspace thereby saving of 33NM and 64 NM respectively.

DESIGNATOR	SEGMENT	Saving in distance (NM)	Remarks
L 899	Trivandrum - Hanimadhoo	237	New route in coordination with Male
L 516	KITAL - ELKEL	41	New route designed under UPR
L 626	Kathmandu - Delhi	21	New route in coordination with Nepal
M 875	Delhi – DI VOR	64	Extension of route in coordination with Pakistan

R 457	Trivandrum - Chennai	112	Extension of route to provide connectivity to Intl flights
W 134	SG – Pune	24	New route
W 136	Hyderabad - Raipur	152	New route

- India has agreed for ten connector routes between Mumbai and Male FIR to facilitate Male to implement flexible routes in Male FIR for which safety assessment is being carried out. Shortly these routes will be promulgated.
- India has also agreed to implement UT 383 (VUTAS- ANODA - CIA VOR - W 46 – MDI VOR – DOGOS – P 761 to provide direct connectivity from Addis Ababa to Bangkok and UT 387 (CLAVA – MALE) to provide direct connectivity from Nairobi to Bangkok. Safety assessment is being carried out for these routes and a proposal to amend Basic ANP will be sent to ICAO shortly.
- A coordination meeting was held with Bangladesh from 20-22 July 2011 in Kolkata to discuss the feasibility of direct routes through Bangladesh airspace to/ from NE part of India. In the meeting Bangladesh desired that a new route may be established below the lower limit of L 507 for flights operating below the lower limit. India agreed with the proposal and the route will be designed.
- India has taken initiative to promulgate RNAV5 routes between Metro cities, eight RNAV5 routes are to be implemented by the end of this year i.e. Dec 2011. First RNAV5 route is to be implemented between busiest corridor of Delhi and Mumbai.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note India’s effort in restructuring the airspace enabled through ATS Automation in India;
- b) collaborate with India in bringing out an effective ATS route network that will benefit the stake holders across the borders;
- c) consider sharing of Radar and ADS-B data for seamless airspace in the region to facilitate reduction of separation; and
- d) encourage the States to have AIDC in place.