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ASSEMBLY — 36TH SESSION

TECHNICAL COMMISSION

Agenda Item 32: Development of an up-to-date consolidated statement of continuing ICAO policies and practices related to a global ATM system and communications, navigation and surveillance/air traffic management (CNS/ATM) systems

IMPLEMENTATION STATUS OF CNS/ATM SYSTEMS IN INDIA

(Presented by India)

EXECUTIVE SUMMARY

Airports Authority of India (AAI) is entrusted with the responsibility for provision of Air Navigational Services (ANS) Infrastructure and Air Traffic Services (ATS) over the designated air space. AAI is also responsible for providing ATS at Greenfield airports developed by Private operators and limited navigation services at Defense airfields in India. To provide efficient ATS over designated airspace, various CNS/ATM systems have been implemented as well as planned to meet the future requirements. AAI has been developing ANS Plans to meet the projected growth of passenger/aircraft movement in accordance with the ICAO plans.

<i>Strategic Objectives:</i>	This working paper relates to Strategic Objective D: Efficiency – <i>Enhance the efficiency of aviation operations.</i>
<i>Financial implications:</i>	N/A
<i>References:</i>	

1. INTRODUCTION

1.1 India being situated at a very strategic geographical location at the confluence of ATS routes connecting the major destinations in the East/South East and Western parts of the world, the Indian airspace has become a vital link to the smooth flow of traffic between these two major blocks of airspace.

1.2 The Indian airspace structure and air traffic management (ATM) system therefore become a vital factor in the growth of global air transport industry. The traffic flow across the Indian airspace including the oceanic airspace over Bay of Bengal and Arabian Sea has increased phenomenally and is anticipated to increase further in view of open sky policy and commencement of new services by various new airlines and Low Cost Carriers both in domestic and international sectors.

1.3 In order to exploit these natural advantages and to derive maximum benefits in terms of economic growth and associated benefits, there is a requirement to improve the airspace capacity and enhance safety level throughout the FIRs.

2. AIR TRAFFIC MANAGEMENT

2.1 India has been delegated with a large air space of 6 million sq km (approx) which comprises of 2.2 million sq. km of continental air space and 3.8 million sq. km of oceanic airspace. For efficient ATM, this airspace has been divided into four FIRs and 11 en-route control centres each equipped with en-route radar. The Indian airspace has 89 international and 110 domestic ATS routes with 31 routes as RNP-10. Entire Indian air space is RVSM airspace and all international routes are direct routes with short distances.

2.2 For safe and orderly movement of air traffic, AAI has provided a large CNS infrastructure, the details of which have been notified to ICAO earlier. However, a boom in the air traffic in India in last few years has brought in urgency for faster augmentation / implementation of the CNS/ATM systems for airspace capacity enhancement to deal with sustained growth efficiently and safely. The following initiatives are proposed for Integrated ATM System.

- a) All the eleven ACCs shall be integrated into four or two main enroute control centers to provide seamless en-route services to the entire traffic across the Indian FIRs;
- b) Radar data from all twenty-four radar sites (PSR and MSSR) shall be networked and additional radars to cover the gaps will be installed at appropriate sites to provide seamless radar cover;
- c) VHF and HF Tx /Rx also be networked to facilitate single center operation with multiple sector configuration;
- d) ATC centers will be established with integrated ATS automation system such as RDPS, FDPS, ASBS, DRF. Each center will serve as a back up facility for the other;

- e) Sectorisation will be done based on the traffic flow and route structure. Sector jurisdiction, lateral and vertical, will be planned and implemented as per the traffic requirements;
- f) Sectorisation will include ACC, OCC and APP control requirements. APP control sector will be planned to cater the requirements of more than one airport in close vicinity, if required. Adequate number of controller workstations to meet the current and future traffic demand will be provided in each center;
- g) Control towers will be established at all airports and connected with the main ATC center through data link and voice capability;
- h) All control towers shall be equipped with controller work stations as available in the ACC center and all flight data exchange shall be automatic with least need for manual inputs; and
- i) Aerodrome Simulator is being installed at the central training facility of AAI.

3. COMMUNICATION

3.1 To ensure efficient communication, AAI is moving towards providing direct pilot-controller VHF voice coverage in the whole of the Indian airspace and simultaneously inducting data communication capability. Following initiatives have been taken up to make the communication systems more efficient:

- a) Twelve more locations for VHF - RCAG to augment existing en-route VHF coverage in terrestrial Indian airspace and large part of oceanic airspace to provide seamless VHF coverage above 20,000 feet;
- b) Dedicated Satellite Communication Network (DSCN) based on VSAT technology, connecting 80 airports for voice and data communication is under implementation and is likely to be commissioned shortly;
- c) Aeronautical Message Handling System (AMHS) at Mumbai to handle ground sub-network of Aeronautical Telecommunication Network (ATN) under implementation as per ICAO Regional Plan;
- d) Additional VCCS (3), DATIS (12) and DVTR (31) are being installed;
- e) AIDC for Delhi and Mumbai is under implementation;
- f) Networking of all DATIS (28) to enable download of terminal information of any airport through data communication; and
- g) Data link for clearance delivery is under implementation at Mumbai, Delhi and also planned for Kolkata and Chennai.

4. NAVIGATION

4.1 While augmenting the ground based navigational infrastructure to provide navigational facilities at new airports, AAI is also inducting satellite based navigation system in accordance with ICAO Global Plans. Initiative that has been taken for seamless navigation in Indian FIRs is given below.

- a) DVOR / DME as new facility at 20 airports under implementation;
- b) Additional ILS (14) (with low power DME) under implementation;
 - 1) Cat-III ILS – Planned at Delhi for the new runway under construction.
 - 2) Cat-II ILS –Planned up-gradation for Amritsar, Jaipur, Jammu and Lucknow.
- c) Extensive use of R-NAV/RNP procedures;
- d) Under GNSS Programme, Indian SBAS named ‘GAGAN’ (GPS Aided GEOAugmented Navigation) is under implementation. Technology Demonstration System (TDS) has been installed and Final Operating System (FOP) is likely to be available by 2010; and
- e) Ground Based Augmentation System (GBAS) under implementation at Delhi and Mumbai Airport.

5. SURVEILLANCE

5.1 Radar surveillance coverage gap is a constraint for smooth and efficient flow of air traffic. AAI has taken steps to provide seamless radar coverage in the continental airspace for en-route control and plans to integrate all the radars for re-structuring of the airspace and efficient air traffic flow management. Initiatives taken up for providing seamless surveillance from 25,000 feet and above are given below:

- a) New ASR/MSSR (5) under implementation at Cochin, Amritsar, Delhi (2nd system) and green-field airports at Bangalore & Hyderabad;
- b) New MSSRs (7) Jodhpur, Bhopal, Porbandar, Bellary, Vizag, Jharsuguda & Katihar/ Kishanganj to fill up radar gaps at 25,000 feet under implementation; and
- c) ASMGCS under implementation for Chennai, Kolkata, Mumbai, Bangalore & Hyderabad.

6. UP-GRADATION OF FLIGHT CALIBRATION FACILITIES

6.1 AAI is responsible for calibrating the CNS facilities in India. Three aircrafts are available in the fleet and two aircrafts are fitted with Automatic Flight Inspection System (AFIS). AFIS is also being fitted in the third aircraft. AFIS is being up-graded to make ready for GNSS Signal-in-Space (SIS) flight checks. India will explore the possibility of providing calibration services to states that are located in the region.

7. NEW INITIATIVE

7.1 Keeping in view the present unprecedented traffic growth and also in future, a high level Committee has been set up by the Government of India for formulating Futuristic Air Navigation Services Master Plan. The Committee shall examine/review the following aspects with a view to formulate Futuristic Air Navigation Services Master Plan and make appropriate recommendations.

- a) Assessment of Air Navigation Services (ANS) in the country based on the requirements specified by ICAO in the Global and Regional Air Navigational Plans;
- b) Assessment of the weather work stations based on the standards and recommended practices prescribed by ICAO;
- c) Recommend a Futuristic Master Plan of Air Navigation Services based on the latest technologies in the field and the forecast of the future requirements; and
- d) Recommend ways and means of harmonization of ANS in the country with the ANS systems of other countries/regions.

8. CONCLUSION

8.1 With implementation of various CNS/ATM systems as described above, India will be able to provide efficient air traffic services while keeping pace with the growing air traffic requirements as per ICAO plan. The Assembly is requested to take note of the information.

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