International Civil Aviation Organization

The Second Meeting of the APANPIRG ATM Sub-Group (ATM /SG/2)

Hong Kong, China, 04-08 August 2014

Agenda Item 4: ATM Systems (Modernisation, Seamless ATM, CNS, ATFM)

KOLKATA FIR UPPER AIRSPACE HARMONISATION PROJECT

(Presented by India)

SUMMARY

India has reviewed the existing Indian airspace structure and has developed an Airspace Management Strategy to maintain uniform service levels through Upper Airspace harmonization. India has also harnessed appropriate CNS technology, including the use of advanced ATM Automation systems, to cope with the growth of air traffic.

This paper highlights one of the major ANS initiatives in enhancing safety, efficiency and increasing airports & airspace capacity through implementation of a new state-of-the-art ATS Automation system, enhanced and overlapping ATS surveillance/VHF coverage enabling harmonization of upper airspace within the Kolkata FIR.

1. INTRODUCTION

1.1 Unprecedented in air traffic growth in the Asia/Pacific region in the last few years and the optimistic growth forecast required an enhancement in safety, efficiency and a proportionate increase in airspace capacity.

1.2 India had taken many major ANS initiatives in accordance with ICAO Global Plan Initiatives and recommendations of various high level committees, to enhance safety, efficiency, increase in airport & airspace capacity through installation of ATS Automation Systems, improved ATS surveillance coverage with installation of Radars (MSSRs) and ADS-B ground receivers, Data Link Clearance for departure, PBN based RNP10, RNAV 5 city pair ATS routes, RNAV1 SIDs &STARs , establishment of a single continuum of upper airspace for uniform application of rules and procedures and air space safety monitoring activities by BOBASBA in the sub-region of APAC.

1.3 This paper highlights the on-going Upper Airspace Harmonization program within the Kolkata FIR.

2. DISCUSSION

Establishment of a Single Continuum of Upper Airspace in Kolkata

2.1 The Master plan for restructuring the entire Indian airspace, details that, each FIR will have only one Upper ACC centre with multiple sectors to be operated from four Metro ATC Centers at Chennai, Kolkata, Delhi and Mumbai thereby amalgamating 12 Upper ACCs into 4 Upper ACCs initially and subsequently into 2 Upper ACCs.

2.2 Considering the complexity and magnitude of the task, India has decided to proceed in a phased manner and embarked on the project to restructure Chennai FIR in the first phase. Having successfully implemented the establishment of Upper Airspace Harmonization in Chennai FIR, India had taken up implementation of the Upper Airspace Harmonization in Kolkata and Delhi FIRs (Refer **Annexure - A**) .

2.3 The Upper Airspace of Kolkata FIR above FL255 was being restructured as a single continuum of airspace with the introduction of an Advanced ATS Automation System in Kolkata ATCC into which 9 Radars & 8 ADS-B stations have been integrated. The new technique of cross coupling of VHF facilitated creation of multiple sectors to be operated from a single ATC Centre at Kolkata and enabled consolidation/deconsolidation of sectors dynamically.

2.4 Kolkata airspace is divided into 6 upper area control and 1 Oceanic control sectors. The Kolkata FIR has been restructured by including some of the airspace under the control and jurisdiction of Delhi and Mumbai FIR, with the consideration of providing seamless ATC. The Kolkata airspace will have 9 lower ACCs and several CTRs and TWRs which would handle traffic from ground level to FL255.

2.5 Kolkata ATCC would be served by an efficient VHF network with cross coupling technique to provide VHF coverage throughout the airspace even at lower levels. IP Radio and IP based VCCS system shall be employed for the first time in the country and will be one of the largest networks using IP based system(s) in the world.

2.6 Benefits of the Upper Airspace Harmonization included harmonized ATM procedures, reduction in separation between aircraft resulting in increased airspace capacity utilization and enabling aircraft to get User Preferred Flight Profile, even distribution of workload reducing controllers' stress and fatigue, effective utilization of manpower by consolidating and deconsolidating sectors dynamically depending on traffic density.

Implementation of state-of-the –art ATS automation system

2.7 The advanced ATS automation system at Kolkata ATCC has servers in redundant configuration with 3 LANs to make it fail-safe .This system is capable of integrating 35 RADARs,32 ADS-B,10 M-LATs. Already 9 RADARs and 8 ADS-B sensors have been integrated to provide an extensive surveillance coverage well beyond Kolkata FIR with adequate redundancy. The system is capable of 4D trajectory calculation and the accuracy of trajectory calculation is enhanced by GRIB2 data integration.

2.8 The system provided advanced safety net features which detected conflicts and alerted the controllers. The safety net consisted of Short Term Conflict Alert, Medium Term Conflict Detection, Safe Altitude Warning, Area Proximity warning etc., this feature enhanced air safety to a great extent. The unique feature of Aircraft Downlink Parameters (DAP) through mode-S would display cockpit parameters to controllers, thereby making them situationally aware of aircraft intention(s).

2.9 The ATS Automation system was capable of ATS Inter Facility Data Communication (AIDC), which permits automatic exchange of aeronautical data among ATC units, thereby reducing ATS coordination significantly. The Kolkata ATS Automation system had incorporated all the core and optional message sets depicted in Asia Pacific Regional ICD for AIDC version 3.

2.10 The Kolkata system was capable of operating 12 Area Control Sectors, seven Approach Control Sectors simultaneously, providing for future expansion and further sectorisation. The system is also capable of providing advance information on sector capacity overflow, thereby facilitating optimum resource utilization.

2.11 Amongst other features, the system is capable of interacting with any external system (e.g. AODB). The system also provides Electronic Flight Progress Strips. The Arrival Manager (AMAN) feature will improve sequencing and considerably reduce delays in air due to holding.

2.12 The Data Analysis Tool in the system is useful in generation of statistics and error analysis. The system simulator can be used for airspace and procedure planning as well as controllers training.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) note India's initiatives to establish a single continuum of upper airspace enabled through ATS Automation and surveillance and communication networking in India;

c) urge the adjacent States in the Region to collaborate with India in early implementation of AIDC; and

d) discuss any relevant matters as appropriate.

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ANNEXURE - A

AIRSPACE HARMONIZATION OF CHENNAI, DELHI, KOLKATA AND MUMBAI WITH UPPER SECTORS SHOWN IN THREE LETTER CODE