Agenda Item 4: BOBASIO Region Seamless ATM Plan Status and Implementation Strategies

INDIAN AIRSPACE & AIR ROUTE CHANGES

(Presented by Airports Authority of India)

SUMMARY

This paper presents the changes to the Indian Airspace and Air route structures in the period between July, 2012 and October, 2013. It further details the plans for near term, including the plan to introduce RNAV 2 ATS Routes between major airports including Delhi-Chennai, Delhi-Bengaluru, Mumbai-Kolkata, Delhi-Kolkata. It includes a brief on the Upper Airspace Harmonization Plan for the Delhi, Kolkata and Mumbai FIRs. The paper lists a few airspace structures which have been created for Special Use of the Military in line with the principles of Flexible Use of Airspace, however, limits it to this feature since the FUA implementation in India is presented exclusively through another working paper.

This paper relates to –

**Relevant 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-1 Flexible use of airspace
- GPI-5 RNAV and RNP (Performance-based navigation)
- GPI-7 Dynamic and flexible ATS route management
- GPI-8 Collaborative airspace design and management

1. INTRODUCTION
1.1 The Indian Airspace and Air Route structure has undergone positive changes with the introduction of new ATS Routes which are either a part of the regional network or not a part of regional network, as well as either Area Navigation Routes or otherwise. The changes are demand driven and the principles of FUA, RNAV and RNP (Performance-based navigation), Dynamic and flexible ATS route management and Collaborative airspace design and management have been successfully employed to generate huge user benefits. In the period between April, 2012 and October, 2013 six connector routes with ATS Route designator “V”; one RNP 10 connector route with ATS Route designator “T”; thirteen RNAV 5 routes with ATS Route designator “Q”; six domestic routes and a realignment of a domestic route with ATS Route designator “W”; three area navigation routes (RNAV) which form part of the regional networks of ATS routes with ATS Route designator “L”, have been introduced.

1.2 Two Temporary Reserved Areas (TRA) and Five Temporary Segregated Areas (TSA) have been established for special use by military, operations subject to SOPs.

2. DISCUSSION

2.1 Upper Harmonization Plan & Airspace Classification

2.1.1 The Upper Airspace Harmonization, with a four tier Airspace structure, has been extremely successful in Chennai FIR with the Upper (FL 260+) ACC Sectors of Hyderabad, Mangalore, Trivandrum, Cochin, Bangalore and Chennai controlled from Chennai with the Lower (FL 155- FL 255) ACC sectors controlled by the respective centers. Vertical Consolidation of the Upper sectors during contingent situations have been handled effectively and the transitions have efficient.

2.1.2 The UAH Plan for Kolkata has been finalized, the lower ACC Sectors will be controlled from Bhubaneswar, Patna, Guwahati, Agartala, Varanasi and Kolkata and the Upper ACC Sectors will be controlled from Kolkata and the plan is likely to be operationalized in Q1-2014.

2.1.3 The UAH Plan for Delhi has been finalized, the lower ACC Sectors will be controlled from Jaipur, Amritsar, Lucknow and Delhi and the Upper ACC Sectors will be controlled from Delhi and the plan is likely to be operationalized in Q1-2014.

2.1.4 The UAH Plan of Mumbai is in the final stages of planning and is expected to be finalized by Q4-2013.

2.1.5 A proposal to migrate to higher airspace classification(s), especially to Class A in the Upper Airspace is under consideration and is expected to be introduced in Q1-2014.

2.2 ATS routes
2.2.1 The introduction of some of the domestic ATS Routes was necessitated by a demand to provide shorter connectivity to airports in the Central parts of India which are demonstrating increased passenger footfalls. Connectors have been provided in some cases to cater to accessibility to RNP and RNAV Routes so that the benefits of operating on these routes may be exploited by users. The introduction of L 518 has provided connectivity to Hyderabad from the APAC South East Asian States; L875 connectivity to Mangalore, Bengaluru and Chennai and L 756 connectivity to Male from Seychelles FIR (ICAO EASAF States). Excellent cooperation and timely coordination between India and Male made it possible to simultaneously promulgate the segments of the ATS Route L756 falling in the two FIRs. Refer Annexure 1)

2.2.2 RNAV 5 ATS Routes have been introduced, primarily, as city pairs between Delhi and Mumbai with connectivity to Ahmadabad, Vadodara, Jaipur and Udaipur; Mumbai and Chennai with connectivity to Bengaluru; Kolkata and Chennai; and recently Mumbai and Trivandrum with connectivity to Goa, Mangalore, Calicut, Cochin and Coimbatore. The RNAV 5 city pairs, although may not provide a significant savings due to reduction in track miles, since many of the major airports were already connected through almost straight routes, with suitable placement of terrestrial navigational aids, definitely provide an opportunity to increase airspace capacity through the application of a 50 NM longitudinal separation, in comparison to the erstwhile 10 minutes Longitudinal separation minimum and consequently the availability of optimum flight levels and sizeable fuel and environmental savings. The deployment of these Performance-Based Area Navigation routes allow the aircraft to fly their optimum aircraft profile, additionally by virtue of their being unidirectional, provide an opportunity for improved flexibility and efficiency in Departure and Descent Profiles (CCOs & CDOs) and add to Safety by eliminating the risk of encountering opposite direction traffic. (Refer Annexure 1)

2.2.3 A proposal for a RNAV 5 city pair between Delhi and Srinagar is likely to be cleared by the Air Headquarters, since it involved conditional transitioning through several major military airspace(s). This will ease the traffic congestion on international ATS Routes A589 and A466 Northwest of Delhi and increase the availability of optimum flight levels to flights operating along these ATS Route into Pakistan and Afghanistan airspace(s).

2.2.4 In the 24th meeting of the APANPIRG, India reaffirmed its commitment to introduce RNAV 2 Routes in continental airspace. With the introduction of redundant surveillance coverage from a combined network of SSRs and ADS-Bs and improved DCPC, India is in the final stages of design of RNAV 2 city pairs with 20 NM lateral spacing between the routes and a proposed 20NM Longitudinal Separation, for which TLS studies will be undertaken through simulation models, by BOBASMA, India’s Enroute Monitoring Agency. The separation minima along ATS Route W20 between Chennai and Delhi as well as along ATS Route R460 between Delhi and Varanasi (likely to be extended to Kolkata) is 40NM in a surveillance environment. The pairs between Delhi and Chennai,
Delhi to Bengaluru extended to Trivandrum, and between Kolkata and Delhi are ideal for the introduction of RNAV 2 Routes, which will double the capacity. In addition it is also contemplated to be introduced between Kolkata and Mumbai. (Refer Annexure 2)

2.2.5 India also has proposed a joint development of RNAV 5 city pairs between major Indian and neighboring States’ airports. (Refer Annexure 3 for a few examples)

3. **ACTION BY THE MEETING**

3.1 The meeting is invited to:

   a) Note the progress made and near term Airspace plans of India
   b) Propose a collaborative mechanism for joint design of RNAV 5 and RNAV 2 city pairs between major airports in the neighboring States and/or improvements in ATS Routes Regional Network.

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ANNEXURE 2

PROPOSED RNAV2 CITY PAIRS