International Civil Aviation Organization

The First Meeting of the APANPIRG ATM Sub-Group (ATM /SG/1)

Bangkok, Thailand, 20 – 24 May 2013

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

Implementation of Block Zero Modules- India's Update

(Presented by Airports Authority of India)

SUMMARY

This paper presents India's updates in implementing Block Zero Modules of ASBU methodology of the GANP.

This paper relates to –

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:

All GPI

1. INTRODUCTION

1.1. Airports Authority of India (AAI) is entrusted with the responsibility of providing Air Navigational Services (ANS) over the designated airspace across the Indian sub-continent, oceanic airspace in Arabian Sea, Indian Ocean and Bay of Bengal.

1.2. ICAO has introduced an updated Global Air Navigation Plan (GANP) in the Air Navigation Conference 2012. The GANP describes a rolling 15 year incremental technology up-gradation methodology called as Aviation System Block Upgrades (ASBU).

1.3. The ASBU methodology describes "Modules" achieving well defined and articulated concepts in measurable time frames of Blocks. The Block Upgrades are organized in five-year time increments starting in 2013 and continuing through 2028 and beyond.

1.4. The implementation process driven by the ASBU module elements will enable all States and stakeholders to realize the goals of global-harmonization, increased capacity, and environmental efficiency in a unified manner.

1.5. The Regional Air Navigation Plans are expected to be reviewed and updated by including all required supporting procedures, regulatory approvals and training capabilities based on the GANP and ASBU documentation, by the respective PIRGs.

1.6. All the States will need to reorient their planning to respective Block Upgrade Modules in order to ensure the near- and longer-term global interoperability of their Air Navigation solutions.

1.7. India is in the process of updating the national Air Navigation Plan in line with the ASBU role out keeping in mind the ICAO strategic objectives of safety, capacity, efficiency and environmental considerations. India is pursuing an aggressive implementation of Block Zero Modules to ensure regional and global seamless Air Navigation Services over a crucial airspace connecting three ICAO regions.

1.8. An update on the initiatives in implementation of Block Zero Modules being undertaken by India is attached as Appendix A to this paper.

2. ACTION BY THE MEETING

2.1. The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matters as appropriate.

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Appendix-A

India Updates – Implementation of ASBU Block "0" Modules

No	Module	Description	Module Elements	India Update
1.	B0-65	Optimization of Approach Procedures including vertical guidance	• Performance-Based Navigation (PBN) • Ground-Based Augmentation System (GBAS) landing system • Application of basic Global Navigation Satellite System (GNSS), • Baro-Vertical Navigation (VNAV), • Satellite-Based Augmentation System (SBAS) • and GLS	• India's SBAS system called GAGAN (GPS Aided Geo Augmented Navigation) is being developed. The certified GAGAN system will be available by June 2013 and should support the APAC region and beyond. • India has planned to implement GLS to support satellite-based navigation in terminal control area (TMA), to increase accessibility to airports. The first pilot project will be undertaken in 2013 at Chennai • PBN based RNAV-1 Standard Instrument Departures(SID) and Standard Terminal Arrivals(STAR) procedures have been implemented an nine major airports. • India is planning to implement 38 RNP APCH procedures with LNAV and LNAV/VNAV minima at major airports. At some airports, these approach procedures will be linked with RNP-1 STARs. • At Cochin for Rwy 27 PBN procedures with vertical guidance is established
2.	B0-70	Increased Runway Throughput through Optimized Wake Turbulence Separation	Improved throughput on departure and arrival runways through optimized wake turbulence separation minima, revised aircraft wake turbulence categories and procedures	Will study the feasibility.
3.	B0-15	Improve Traffic flow through Runway Sequencing (AMAN/DMAN)	To manage arrivals and departures (including time-based metering) to and from a multi-runway aerodrome or locations with multiple dependent runways at closely proximate aerodromes, to efficiently utilize the inherent Runway capacity.	• AMAN software capability is available at Delhi , Mumbai and Chennai and is being implemented at Kolkata in 2013. • Optimisation of AMAN capability is being tested at Delhi and Mumbai.
4.	B0-75	Safety and	Basic A-SMGCS provides surveillance and	• ASMGCS (L1) (SMR+ Mutilat) is operational at Delhi, Mumbai,

		Efficiency of Surface Operations (A-SMGCS Level 1-2)	alerting of movements of both aircraft and vehicles on the aerodrome thus improving runway/aerodrome safety. ADS-B information is used when available (ADS-B APT).	Chennai, Kolkata , Bangalore and Hyderabad airports. • ASMGCS (L1) is under implementation at 5 more international airports.
5.	B0-80	Improved Airport Operations through Airport-CDM	To implement collaborative applications that will allow the sharing of surface operations data among the different stakeholders on the airport. This will improve surface traffic management reducing delays on movement and manoeuvring areas and enhance safety, efficiency and situational awareness.	• Automated CDM platform is under trial operations at Delhi airport. • Non-Automated CDM platforms exist at all major airports • AAI is developing a web based A-CDM platform for Mumbai airport in consultation with other Stakeholders
6.	B0-25	Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration	To improve coordination between air traffic service units (ATSUs) by using ATS interfacility data communication (AIDC) defined by the ICAO Manual of Air Traffic Services Data Link Applications (Doc 9694).	• Major Indian airports and ATC centers have integrated ATS automation systems having AIDC capability • AIDC trials are underway among all Area Control Centers and other 32 aerodromes within India. • AIDC trials are planned with Kuala Lampur (Malaysia) , Karachi (Pakistan) and Muscat (Oman) , depending on the resolving of technical issues.
7.	B0-30	Service Improvement through Digital Aeronautical Information Management	The initial introduction of digital processing and management of information, through aeronautical information service (AIS)/aeronautical information management (AIM) implementation, use of aeronautical information exchange model (AIXM), migration to electronic aeronautical information publication (AIP) and better quality and availability of data	Based on ICAO AIS to AIM roadmap: 1st Phase of the transition has been completed. • AIRAC Adherence Monitoring: Implemented • Monitoring States Differences with ANNEX 15: Implemented • WGS-84 : Implemented • QMS: Implemented • Data Integrity Monitoring: Manual verification • AICM/AIXM: The AIS Automation System implemented in India is AICM/AIXM Version 4.5 compliant • e-AIP developed and published in March 2013. • e-TOD is being planned
8.	B0-105	Meteorological information supporting enhanced operational efficiency and safety	Global, regional and local meteorological information: a) forecasts provided by world area forecast centres (WAFC), volcanic ash advisory centres (VAAC) and tropical cyclone advisory centres (TCAC);	• IMD (India Met Department) and Airports Authority of India are jointly undertaking technological improvements in Aviation Weather Services. • DATIS is available at 46 airports. • DATIS is also available to data link enabled aircraft through ACARS (via SITA) .

			b) aerodrome warnings to give concise information of meteorological conditions that could adversely affect all aircraft at an aerodrome including wind shear; and c) SIGMETs to provide information on occurrence or expected occurrence of specific en-route weather phenomena which may affect the safety of aircraft operations	• D-VOLMET is available.
9.	B0-10	Improved Operations through Enhanced En-Route Trajectories	To allow the use of airspace which would otherwise be segregated (i.e. special use airspace) along with flexible routing adjusted for specific traffic patterns. This will allow greater routing possibilities, reducing potential congestion on trunk routes and busy crossing points, resulting in reduced flight length and fuel burn.	• FUA is implemented in Chennai FIR. • A High Level National Airspace Policy body has been approved by the Govt. of India. • Flexible Routing: Flexible routing is introduced in Arabian Sea between Mumbai FIR and Male FIR for ADS-C operating aircraft • RNAV 5 city pair between Delhi & Mumbai and Mumbai and Chennai established and Between Chennai & Kolkata, Delhi and Kolkata, Mumbai & Kolkata planned for near term implementation • 11 conditional RNP 10 ATS Routes have been established, in coordination with IAF, and they provide significant track distance reduction and fuel savings. • PBN Routes are being developed for Defence Airfield (Goa)
10.	B0-35	Improved Flow Performance through Planning based on a Network-Wide view	Air traffic flow management (ATFM) is used to manage the flow of traffic in a way that minimizes delay and maximizes the use of the entire airspace. ATFM can regulate traffic flows involving departure slots, smooth flows and manage rates of entry into airspace along traffic axes, manage arrival time at waypoints or flight information region (FIR)/sector boundaries and re-route traffic to avoid saturated areas. ATFM may also be used to address system disruptions including crisis caused by human or natural phenomena	• Tactical ATF Procedures in Delhi FIR since 2011. • India is a participating State in the BOBCAT ATFM for International Traffic Flow • Nation Wide Central ATFM system is planned for implementation in phases.
11.	B0-84	Initial capability for ground surveillance	This module provides initial capability for lower cost ground surveillance supported by new technologies such as ADS-B OUT and wide area multilateration (MLAT) systems.	• ADS-B ground stations installed at 14 locations in phase-I across continental airspace and Oceanic airspace at Port Blair and are under implementation at 7 more locations in phase-II.

			This capability will be expressed in various ATM services, e.g. traffic information, search and rescue and separation provision.	• Regulatory authority is considering mandating ADS-B OUT by December 2013 for operating in Indian airspace. • Wide area multilateration pilot project is being planned for implementation in Kolkata TMA to augment surveillance coverage. Project is in planning stage.
12.	B0-85:	Air Traffic Situational Awareness (ATSA)	Two air traffic situational awareness (ATSA) applications which will enhance safety and efficiency by providing pilots with the means to enhance traffic situational awareness and achieve quicker visual acquisition of targets: e) AIRB (basic airborne situational awareness during flight operations); and f) VSA (visual separation on approach).	Not planned at this stage.
13.	B0-86	Improved Access to Optimum Flight Levels through Climb/Descent Procedures using ADS-B	This module enables an aircraft to reach a more satisfactory flight level for flight efficiency or to avoid turbulence for safety. The main benefit of ITP is significant fuel savings and the uplift of greater payloads	Not planned at this stage
14.	B0-101	ACAS Improvements	To provide short-term improvements to existing airborne collision avoidance systems (ACAS) to reduce nuisance alerts while maintaining existing levels of safety. This will reduce trajectory deviations and increase safety in cases where there is a breakdown of separation	• ACAS is subject to global mandatory carriage for aero planes with a MTCM greater than 5.7 tons. The current version of ACAS II is 7.0. (Ref – AIC 03/2006. ACAS –I for GA and ACAS –II v 7.0 for commercial carriers has been mandated in India) • TCAS v7.1 is not mandated at this stage in India.
15.	B0-102	Increased Effectiveness of Ground-Based Safety Nets	To monitor the operational environment during airborne phases of flight to provide timely alerts on the ground of an increased risk to flight safety. In this case, short-term conflict alert, area proximity warnings and minimum safe altitude warnings are proposed. Ground-based safety nets make an essential contribution to safety and remain required as long as the operational concept remains human centred centric.	• STCA, MSAW, RAW, APW, MTCD are part of the Ground automation systems implemented at major airports.
16.	B0-05	Improved Flexibility and Efficiency in	To use performance-based airspace and arrival procedures allowing aircraft to fly	• CDO Procedures have been established for Delhi and Mumbai Airports..

		Descent Profiles (CDO)	their optimum profile using continuous descent operations (CDOs). This will optimize throughput, allow fuel efficient descent profiles and increase capacity in terminal areas.	• RNAV 1 SIDs/STARs are CCO/CDO compatible • RNAV 5 city pairs are designed as unidirectional routes and by design facilitate and encourage CCO/CDO
17.	B0-40	Improved Safety and Efficiency through the initial application of Data Link En-Route	To implement an initial set of data link applications for surveillance and communications in ATC, supporting flexible routing, reduced separation and improved safety	• FANS 1-A based ADS-C and CPDLC system is in operation In Mumbai, Chennai, Delhi and Kolkata FIRs since 2005-2006. • RHS (Reduced Horizontal Separation of 50 nm) has been introduced on RNAV route across Chennai, Kolkata, Delhi and Mumbai FIRs for ADS-C and CPDLC equipped aircraft from 2011. • Flex Routes between Mumbai and Male FIRs in operation from 2011 for ADS-C and CPDLC equipped aircraft.
18.	B0-20	Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO	To implement continuous climb operations in conjunction with performance-based navigation (PBN) to provide opportunities to optimize throughput, improve flexibility, enable fuel-efficient climb profiles and increase capacity at congested terminal areas	• RNAV 5 city pairs are designed as unidirectional routes and by design facilitate and encourage CCO/CDO • RNAV 1 SIDs/STARs are CCO/CDO compatible