



Combined Fourth Meeting of Arabian Sea/Indian Ocean ATS Coordination Group (ASIOACG/8) and Indian Ocean Strategic Partnership to Reduce Emissions (INSPIRE/4) – Melbourne, Australia 25th November – 28th November 2013

Agenda Item 9: [Report from ANSPs on initiatives listed in INSPIRE Strategic Plan]

Update on Implementation of ASBU Block 0 Modules

(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 –

Relevant Strategic Objectives:

*A: **Safety** – Enhance global civil aviation safety*

***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

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 subcontinent, 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). The GANP has been endorsed at the recently held ICAO 38th Assembly.

- 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. The Asia Pacific Seamless ATM Plan considered all the ASBU Block 0 elements and focused on implementation of six modules as critical for Seamless ATM and the same was endorsed by APANPIRG/24. The States should accord the highest priority in terms of the earliest implementation and the resources required to support this. The Critical modules are: B0-FRTO, B0-FICE, B0-DATM, B0-NOPS, B0-TBO and B0-ASUR.
- 1.8. 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 with emphasis on the critical Block-0 elements, to ensure regional and global seamless Air Navigation Services over a crucial airspace connecting three ICAO regions.
- 1.9. An update on the initiatives in implementation of Block Zero Modules being undertaken by India is attached as Appendix A to this paper.

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.

.....

Appendix- A**India Updates – Implementation of ASBU Block 0 Modules**

No.	Module	Description	Module Elements	India Update
1.	B0-APTA	Optimization of Approach Procedures including vertical guidance	<ul style="list-style-type: none"> • 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) 	<p>India's SBAS system called GAGAN (GPS Aided Geo Augmented Navigation) is being developed. Certification of the GAGAN system by regulator is being undertaken in steps and expected to be completed by April 2014.</p> <p>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 is being set up in Chennai and slated for operation by June 2014.</p> <ul style="list-style-type: none"> • PBN based RNAV-1 standard instrument departures (SID) and standard terminal arrivals (STAR) procedures have been implemented at ten 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 RNAV-1 STARs. • At Cochin for RWY 27 PBN procedures with vertical guidance is established

				<ul style="list-style-type: none"> • PBN SID/STAR are being developed for defense airfield (GOA)
2.	B0-WAKE	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	<ul style="list-style-type: none"> • No plans of implementation at present. Will study the feasibility.
3.	B0-RSEQ	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.	<ul style="list-style-type: none"> •• AMAN software capability is available at Delhi, Mumbai and Chennai and is being implemented at Kolkata in 2013. • Optimization of AMAN capability is being tested at Delhi and Mumbai.
4.	B0-SURF	Safety and Efficiency of Surface Operations (A-SMGCS Level 1□2)	Basic A-SMGCS provides surveillance and 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).	<ul style="list-style-type: none"> •• ASMGCS (L1) (SMR+ Mutilateration) is operational at Delhi, Mumbai, Chennai, Kolkata , Bangalore and Hyderabad airports. • ASMGCS (L1) procurement in progress for 5 more international airports.

5.	B0-ACDM	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 maneuvering areas and enhance safety, efficiency and situational awareness.	<ul style="list-style-type: none"> • 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 trial at Mumbai airport in consultation with other Stakeholders
6.	B0-FICE	Increased Interoperability, Efficiency and Capacity through Ground-Ground	To improve coordination between air traffic service units (ATSUs) by using ATS inter-facility data communication (AIDC)	<p>Major Indian airports and ATC centers have integrated</p> <ul style="list-style-type: none"> • ATS automation systems having AIDC capability
		Integration	defined by the ICAO Manual of Air Traffic Services Data Link Applications (Doc 9694).	<ul style="list-style-type: none"> • AIDC trials are underway among all Area Control Centers and other 32 aerodromes within India. • AIDC trials are planned with Kuala Lumpur (Malaysia) , Karachi (Pakistan), Male (Maldives) and Muscat (Oman) , depending on the resolving of technical issues.

7.	B0-DATM	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	<p>Based on ICAO AIS to AIM roadmap: 1st Phase of the transition has been completed.</p> <ul style="list-style-type: none"> • 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. Available online at www.aai.aero • e-TOD is being planned
8.	B0-AMET	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); b) aerodrome warnings to give concise information of	<ul style="list-style-type: none"> • IMD (Indian Meteorological Department) and Airports Authority of India are jointly undertaking technological improvements in Aviation Weather Services. • DATIS is available at 46
			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	<ul style="list-style-type: none"> • airports. • DATIS is also available to data link enabled aircraft through ACARS (via SITA) . • D-VOLMET is available.

<p>9. B0-FRTO</p>	<p>Improved Operations through Enhanced En-Route Trajectories</p>	<p>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.</p>	<ul style="list-style-type: none"> • FUA is being implemented in in all FIRs and airspace audit being undertaken. • High Level National Airspace Policy body is constituted. • 11 conditional RNP 10 ATS Routes have been established, in coordination with IAF, and they provide significant track distance reduction and fuel savings. Airports RNAV 5 city pairs between Delhi and Mumbai with connectivity to Ahmadabad, Vadodara, Udaipur, Jaipur ; between Mumbai and Chennai with connectivity to Bangalore; Kolkata and Chennai;; Mumbai and Trivandrum with connectivity to Goa, Mangalore, Calicut, Coimbatore and Cochin; are CDO enablers.
<p>10. B0-NOPS</p>	<p>Improved Flow Performance through Planning based on a Network-Wide view</p>	<p>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</p>	<ul style="list-style-type: none"> • Tactical ATF Procedures in Delhi FIR since 2011. • India is a participating State in the BOBCAT ATFM for International Traffic Flow • Nation Wide ATFM system is planned for implementation in

			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	phases from 2014.
11.	B0-ASUR	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. This capability will be expressed in various ATM services, e.g. traffic information, search and rescue and separation provision.	<ul style="list-style-type: none"> • ADS-B ground stations installed at 14 locations in phase one across continental airspace and Oceanic airspace at Port Blair and 5 more locations in phase two. • Installation in progress at two more locations. • Regulatory authorities 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-ASEP	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); & f) VSA (visual separation on approach).	<ul style="list-style-type: none"> • Not planned at this stage.

13.	B0-OPFL	Improved Access to Optimum	This module enables an aircraft to reach a more	<ul style="list-style-type: none"> • Not planned at this stage
		Flight Levels through Climb/Descent Procedures using ADS-B	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	
14.	B0-ACAS	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	<ul style="list-style-type: none"> • ACAS is subject to global mandatory carriage for aeroplanes with a MTCM greater than 5.7 tons. The current version of ACAS II is 7.0. (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-SNET	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.	<ul style="list-style-type: none"> • STCA, MSAW, RAW, APW, MTCD are part of the Ground automation systems implemented at all major airports.

16.	B0-CDO	Improved Flexibility and Efficiency in Descent Profiles (CDO)	To use performance-based airspace and arrival procedures allowing aircraft to fly their optimum profile using continuous descent operations (CDOs). This will optimize throughput, allow fuel efficient descent profiles and increase capacity in terminal areas.	<p>CDO Procedures have been established for Delhi , Mumbai, Ahmedabad, Bangalore and Kolkata Airports.</p> <ul style="list-style-type: none"> •• <p>RNAV 1 SIDs/STARs are CCO/CDO compatible</p> <p>RNAV 5 city pairs are designed as unidirectional routes and by design facilitate</p> <ul style="list-style-type: none"> • <p>and encourage CCO/CDO</p>
17.	B0-TBO	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	<p>FANS 1-A based ADS-C and CPDLC system is in operation</p> <ul style="list-style-type: none"> • <p>In Mumbai, Chennai, Delhi and Kolkata FIRs since 2005/2006.</p> <p>RHS (Reduced Horizontal Separation of 50 nm) has been introduced on RNAV route across Chennai, Kolkata, Delhi and Mumbai FIRs for</p> <ul style="list-style-type: none"> • <p>ADS-C and CPDLC equipped aircraft from 2011.</p> <p>Flex Routes between Mumbai and Male FIRs in operation from 2011 for ADS-C and</p> <ul style="list-style-type: none"> • <p>CPDLC equipped aircraft.</p> <p>UPR Geo-zone in Mumbai and Chennai FIR over</p> <ul style="list-style-type: none"> • <p>Arabian</p> <p>Sea and Bay of Bengal Oceanic areas has been established and information promulgated through AIP SUPP 29 of 2013.</p>

<p>18.</p>	<p>B0-CCO</p>	<p>Improved Flexibility and Efficiency Departure Profiles <input type="checkbox"/> Continuous Climb Operations (CCO)</p>	<p>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</p>	<ul style="list-style-type: none"> • 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
------------	---------------	--	---	--