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ASSEMBLY — 37TH SESSION

TECHNICAL COMMITTEE

Agenda Item 36: NextGen and SESAR as part of the global ATM system

PBN IMPLEMENTATION IN INDIA

(Presented by India)

EXECUTIVE SUMMARY

Implementation of performance-based navigation (PBN) is recognized as an enabler in the attainment of air traffic management (ATM) system-wide benefits. In accordance with the ICAO Assembly resolution and in line with the regional PBN Implementation Plan, India has drawn a roadmap for implementation of PBN with the objective to accrue quantifiable and sustainable benefits to the stakeholders in terms of fuel savings, reduction in emissions, capacity enhancement, improved access to the airport and enhanced safety.

The Assembly is invited to take note of the progress of PBN implementation in India; and India's commitment and support for regional and global PBN implementation initiatives of ICAO.

1. INTRODUCTION

1.1 Implementation of performance-based navigation (PBN) is recognized as an enabler in the attainment of air traffic management (ATM) system-wide benefits. In accordance with the ICAO General Assembly resolution and in line with the regional PBN Implementation Plan, India has drawn a roadmap for implementation of PBN with the objective to accrue quantifiable and sustainable benefits to the stakeholders in terms of fuel savings, reduction in emissions, capacity enhancement, improved access to the airport and enhanced safety.

2. PBN IMPLEMENTATION IN INDIA

2.1 PBN implementation is planned in three phases, short-term (2008-2012), mid-term (2013-2016) and long-term (beyond 2016). A brief on the objectives that are planned to be achieved in various phases are:

2.2 Short-term – With the objective to improve airspace design through development of arrival and departure corridors with minimal of conflict is to be achieved by consolidating terminal traffic flows thru the applications of RNAV-1/RNP-1.

2.2.1 PBN-based RNAV-1 departure and arrival procedures have been developed and successfully implemented at:

- Mumbai, Delhi, Ahmedabad – 2008
- Chennai – 2009
- Hyderabad Intl. – July 2010

2.2.2 Similar procedures for Kolkata and Bangalore International airports are planned to be implemented in the fourth quarter of 2010. In accordance with the ICAO objective, it is planned to implement terminal PBN arrival/departure procedures at all international airports in India by the end of 2012.

2.2.3 Route optimization in the continental airspace between city-pairs is undertaken to enhance airspace capacity and to offer optimum flight levels and reduced track miles to the users. Identified city-pairs for RNAV 5 implementation are – Delhi-Mumbai, Delhi-Kolkata, Chennai-Hyderabad, Chennai-Bangalore, Mumbai-Chennai, Kolkata-Chennai. These city-pairs cater to major traffic flows in the continental airspace of India.

2.2.4 In support of global harmonization and regional cooperation, India, with the participation of the States in the sub-continent, plans to introduce RNAV5/RNP4 routes in the subregion thereby bringing significant gains to users in terms of increased availability of optimum flight levels and reduced departure delays due to enhanced enroute capacity.

2.2.5 With the aim to increase safety in the final approach segment, to improve access to airports and to reduce reliance on ground-based final approach radio-aids, approach with vertical guidance (Baro-VNAV) approach procedures are under development initially to be implemented at all instrument runway ends at Mumbai, Delhi, Chennai, Ahmedabad, Kolkata, Hyderabad, Bangalore, Guwahati and Calicut.

2.3 Mid-term – In the enroute phase, focuses on implementation of additional RNAV5/RNP4 routes among major city-pairs such as Delhi-Ahmedabad, Mumbai-Nagpur, Kolkata-Guwahati, Delhi-Varanasi, Delhi-Lucknow. Implementation of RNP routes in oceanic and remote continental airspace with the use of automatic dependent surveillance — contract/controller-pilot data link communications (ADS-C/CPDLC) capability.

2.3.1 Implementation of Baro-VNAV will continue. At high density airports, ground-based augmentation system (GBAS) is planned to be implemented to provide global navigation satellite system (GNSS)-based precision approach capability. Introduction of GNSS-based precision, non-precision and approach with vertical guidance (APV) procedures will assist in reduced reliance on ground navaids thereby ensuring transition to the final phase of the PBN implementation plan.

2.4 To ensure that PBN implementation is undertaken in a safe manner, in accordance with ICAO provisions, every implementation is preceded by an exhaustive safety assessment to demonstrate that the procedures are flyable with the required level of accuracy, precision and safety.

3. SIGNIFICANT GAINS OF PBN IMPLEMENTATION

3.1 PBN implementation in India to date has helped in achieving significant gains in terms of reduced track miles and fuel savings. The environment has been the winner in all these initiatives as a result of reduced emissions.

3.2 The track-mile savings due to implementation of arrival/departure procedures at Mumbai, Delhi and Chennai when extrapolated to number of movements over a year indicate significant gains which are represented as:

- Fuel savings (KL) : 27 186 KL per annum
- Fuel savings (USD) : 19.6 million per annum
- Reduction in CO_2 emissions : 67 963 tonnes per annum
- Reduction in CO emissions : 21 204 tonnes per annum

3.3 Other noteworthy benefits accrued after the implementation of PBN arrival/departure procedure is reduction in approach frequency congestion, reduction in air traffic control (ATC) workload, enhanced safety through better situational awareness, efficient and segregated arrival and departure traffic flows.

4. ICAO FLIGHT PROCEDURE PROGRAM

4.1 While proactively developing and implementing PBN, India also recognizes the need for effective coordination and collaboration for regional and global implementation in the best interest of the industry. Accordingly, India has been actively involved in the ICAO Global PBN taskforce and also supports ICAO initiatives for the establishment of a Flight Procedure Programme for the Asia and Pacific (APAC) Region. India has deputed a PBN instructor for instructional and course development support of first ever flight procedure design course under the aegis of ICAO APAC FPP Office in Beijing, China during June 2010. India further extends support to the FPP Office in Beijing by sending another PBN instructor to conduct a PBN procedure design course scheduled to be held in Beijing in September 2010.

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