



INTERNATIONAL CIVIL AVIATION ORGANIZATION

**TWENTY-SECOND MEETING OF THE
ASIA/PACIFIC AIR NAVIGATION PLANNING AND
IMPLEMENTATION REGIONAL GROUP (APANPIRG/22)**
Bangkok, Thailand, 5-9 September 2011
**Agenda Item 3: Performance Framework for Regional Air Navigation Planning
and Implementation**
3.4 CNS/MET
PBN IMPLEMENTATION INITIATIVES

[Presented by India]

SUMMARY

This paper presents the current status of PBN implementation in India. The paper also highlights the operational flexibility and benefits achieved through PBN implementation.

This paper relates to–

- A: Safety–*Enhanced global civil aviation safety*
- C: Environmental Protection and Sustainable Development of Air Transport–*Promote harmonized and economically viable development of civil aviation that does not unduly harm the environment*

Global Plan Initiatives:

- GPI-5 RNAV and RNP (Performance-based navigation)
- GPI-7 Dynamic and flexible ATS route management
- GPI-10 Terminal area design and management
- GPI-11 RNP and RNAV SIDs and STARs
- GPI-21 Navigation systems

1. INTRODUCTION

1.1. The 36th Session of ICAO Assembly held in Montreal in September 2007 adopted Resolution A36-23 urging all the States to implement RNAV and RNP ATS routes and procedures in accordance with the ICAO PBN concept. In 37th Session of ICAO Assembly in September 2010, in its Resolution A37-11; the importance of PBN has been reiterated and the States have been requested to implement PBN as a matter of urgency.

1.2. Use of GNSS as a sensor for air navigation purposes during all phases of flight has paved the way for availability of accurate, reliable and seamless position information globally. Avionics capability to fly pre-defined tracks accurately and repeatedly provides assurance and flexibility in the design of 3D segments to efficiently overcome environmental, terrain and/or airspace constraints.

1.3. Recognizing the benefits of PBN, India commenced work on development of PBN procedures in 2006-07 with the objective to achieve terminal capacity enhancement, reduce arrival delay, efficient management of arrival & departure operations & enhanced all-weather access to airport. The initiative is providing sustained quantifiable benefits to stakeholders.

2. PBN IMPLEMENTATION STATUS

2.1. Till date RNAV-1 SIDs and STARs at 6 international airports have been implemented. These airport handle major traffic flows and during peak traffic period suffered from capacity constraint, communication congetion, bunching and delays. It has ben possible to overcome these constraints and streamline traffic flows for efficient airspace management through the implementation of RNAV-1 ARR/DEP procedures. The reduction in track miles achieved through these procedures have provided significant fuel savings and reduction in emissions.

2.2. Design flexibility offered by PBN concept is being fully utilized to develop optimum flight trajectory and profile even in terrain challenged airports where conventional procedures have been restrictive and uneconomical. The requirement to circumnavigate noise-sensitive areas and danger/prohibited areas has been fulfilled effectively and efficiently.

2.3. Utilizing the track-keeping accuracy of PBN operations coupled with flexibility of procedure segments connected by waypoints; conditional SID/STAR through restricted airspaces/special use airspaces have been developed to encourage flexible use of airspace and provide substantial track-miles savings to airspace users.

2.4. Recognizing RNP-1 navigation specification as an enabler for effective airspace management in non-radar and terrain challenged environs; RNP-1 SID/STAR procedures are under development to achieve efficiency in flight profile and reduction in track mile. Such procedures are being developed at Calicut International, Cochin International and Coimbatore airport.

3. PBN IMPLEMENTATION ROADMAP

3.1. For sustained effort in implementing PBN procedures at airport and airspace in India, PBN Implementation Roadmap in harmony with APAC Regional PBN Implementation Plan has been developed. Director General of Civil Aviation, India approved the roadmap in 2009. APAC PBN TF in 2010 reviewed the roadmap and classified it as a Robust Plan.

4. PBN Implementation progress

4.1 Approach Operations

Implementation Targets (# of RWY ends)			Completed (# of RWY ends)		In Progress (# of RWY ends)	
Y2010	Y2014	Y2016	LNAV	LNAV/VNAV	LNAV	LNAV/VNAV
28	42	38	-	-	10	10

4.2 Arrival/Departure Operations

Implementation Targets (# of Intl airport)			Completed (# of Intl airport)		In Progress (# of Intl airport)	
Y2010	Y2014	Y2016	Arrival	Departure	Arrival	Departure
6	15	-	6	6	6	6

4.3 Enroute Operations

Navigation Specification	Completed (# of routes)	In progress (# of routes)
RNAV 10	-	34 ⁺
RNAV 5	-	8
RNAV 2	-	-
RNP 4	-	-
RNP 2	-	-

+ Currently 34 RNP-10 routes established during EMAARSH implementation are in operation.

5. INITIATIVE TO PROMOTE REGIONAL PBN IMPLEMENTATION

5.1. Recognising the need for cooperation among States to achieve PBN implementation objectives in line with the APAC Regional PBN Implementation Plan, India extends its support to States for collaborative development of PBN procedures.

5.2. India is enthusiastic to cooperate and support its Neighbouring States to jointly develop PBN routes and arrival/departure procedures to form a seamless network of PBN routes and arrival/departure procedures in the sub-continent.

6. ACTION BY THE MEETING

The meeting is invited to:

- i. note the PBN Implementation Roadmap of India that has been reviewed by APAC PBN TF in 2010 and classified it as a robust plan;
- ii. take advantage of India’s offer in developing PBN procedures of other states in the region to achieve their PBN Implementation objectives; and
- iii. collaborate with India in bringing out an effective RNAV-5/ RNP-4 ATS routes amongst the states in the region that will benefit users across the border.

— END —