International Civil Aviation Organization

The Twenty-Second Meeting of the APANPIRG ATM/AIS/SAR Sub-Group (ATM/AIS/SAR/SG/22)

Bangkok, Thailand, 25 – 29 June 2012

Agenda Item 5: Provision of ATM/AIS/SAR in the Asia/Pacific Region, including associated CNS matters

GNSS APPROACHES FOR NON-INSTRUMENT RUNWAYS

(Presented by India)

SUMMARY

This paper presents: GNSS approach procedure development progress in India. The paper also highlights that GNSS coverage over Indian sub-continent can support PBN approach operations and full benefits of such approach procedures can be derived.

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*

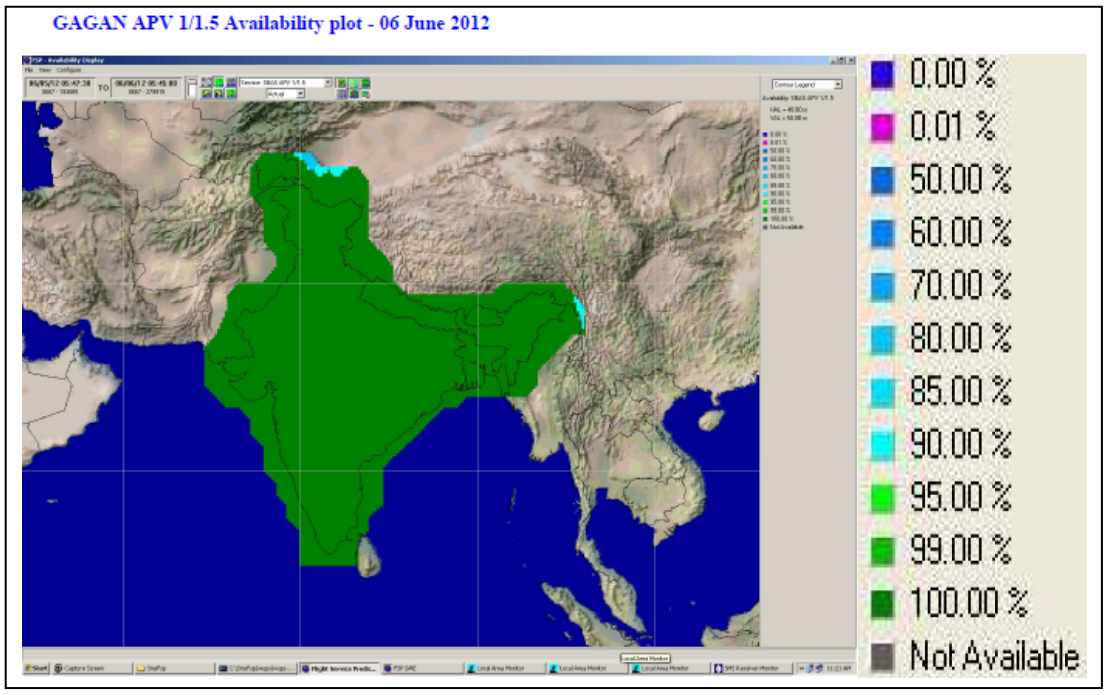
Global Plan Initiatives:
GPI-5 RNAV and RNP (Performance-based navigation)
GPI-10 Terminal area design and management
GPI-11 RNP and RNAV SIDs and STARs

1. INTRODUCTION

1.1 PBN procedures due to their capability of accuracy, reliability and repeatability derived from navigation specifications (navspec) are enablers of improved airspace management, greater access to airport and enhanced safety. These attributes are amply evident wherever approach procedures such as LNAV, LNAV/VNAV, LPV or RNP-AR have been implemented.

1.2 In the year 2004, operations at Mumbai airport were severely hampered for several hours as navigation and final approach aids became unserviceable due to flooding. This event highlights the need for approach procedure without reliance on ground-based navigation aids. PBN approach procedures provide an effective response to such situations.

1.3 Since approach procedures are based on RNP specification, GNSS sensor is utilized for navigation. Therefore information regarding availability of GNSS coverage is critical while planning development of GNSS-based procedures. A GNSS coverage for GAGAN over Indian sub-continent on 6 June 2012 for APV1/1.5 operations availability is shown in the image below. The coverage diagram indicates that GNSS-based approach operations at all airports in India can be supported.

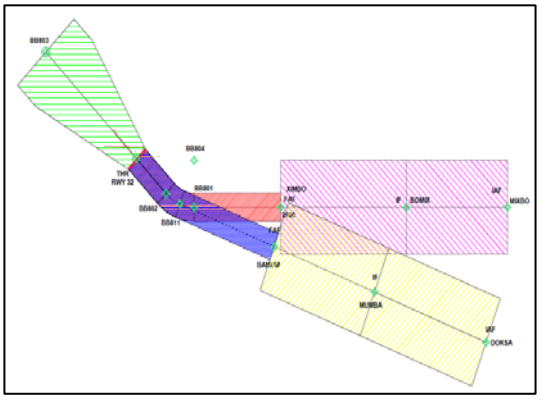


1.4 India has implemented its first LNAV/LNAV-VNAV procedure at Cochin International airport subsequent to establishment of Ops Approval regulatory framework for approach procedure in 2011. The approach procedures are linked to Basic RNP-1 STARs. It has been possible to achieve significant track miles savings due to design of shorter and efficient arrival flight paths. LNAV/LNAV-VNAV procedures are under development at international airport for all runways as a back-up to existing precision approaches.

1.5 LNAV/LNAV-VNAV approach procedures are being developed at other major airports providing an alternate approach procedure and to runways were conventional instrument approach procedures could not be developed due to navaid siting constraints.

1.6 All other instrument runways are planned to have LNAV/LNAV-VNAV approach procedure linked to Basic-RNP-1 STARs to support efficient and short arrival trajectories and runway aligned approaches.

1.7 RNP-AR approach procedure has been developed for RWY32 at Mumbai airport. The procedure prescribes an RF leg to avoid Trombay hill and is expected to reduce landing minima requirement from 4000M to 2400M. Critical Design Review and simulator trials have been completed in collaboration with Boeing and Jet Airways (lead airline). Procedure documentation and airline ops approval documentation is being prepared for submission to DGCA for RNP-AR approval. The image depicts the RNP-AR procedures for RWY32.



2. ACTION BY THE MEETING

2.1 The meeting is invited to take note the information contained in this paper regarding India approach procedure development activities.

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