



**Agenda Item 3: Implementation of performance-based navigation (PBN) in the SAM Region**

**Implementation of RNP arrival and departure procedures for the Tocumen Airport**

(Presented by Panama)

Summary	
<p>This information paper has the aim to inform on the actions adopted by Panama to timely comply with the PBN implementation programme, and also to present the procedures designed by Panama for RNP AR approaches to the Tocumen International Airport, as foreseen in the PBN National Implementation Plan of the Air Navigation Directorate, Panamanian Civil Aviation Authority.</p>	
<b>References:</b> <ul style="list-style-type: none"><li>• ICAO Annex 11</li><li>• ICAO Doc 9750</li><li>• National PBN Plan</li><li>• Doc 8169</li><li>• RNAV RNP Procedural Manual – Tocumen Intl. Airport</li></ul>	
<b>ICAO Strategic objectives</b>	<i>A – Safety</i> <i>B – Security</i> <i>C – Environmental Protection and Sustainable Development of Air Transport</i>

**1 Background**

1.1 ICAO XXXVI Assembly Resolution A36-23 urges Regional Planning and Implementation Groups and States to develop their national PBN implementation plans.

1.2 With the improvement in on board equipment capabilities and the continuous evolution of data-based navigation and other state-of-the art technologies, ICAO has presented the performance based navigation (PBN) concept. This concept saves the gap of the continuous progress in technology which involved huge investments both for users and States. PBN refers to performance requirements in function of precision, integrity, availability, continuity and functionality, necessary for operations proposed within the context of a specific airspace concept.

1.3 Within the framework of this Resolution, the Panamanian Aeronautical Authority initiates the dissemination of Aeronautical Information Circulars (AIC) respect to GNSS in the Panamanian airspace. Prior to the conception of this plan, since 2007, and as a result of the ICAO XXXVI Assembly, studies were initiated to develop the new RNAV routes of Panama.

1.4 In continuing with the content of the PBN National Plan, the implementation of RNAV procedures was complemented with other Aeronautical Information Circulars.

1.5 The Panamanian Civil Aviation Authority, together with the Airline COPA, drafted agreements in order to design RNAV procedures for the most important airport in the State.

1.6 In assessing the results reached with the implementation of RNAV procedures, studies were made for the creation of RNP AR APCH procedures for the Tocumen Airport, thus complying with the content of the PBN National Plan.

## 2 Analysis

2.1 Currently Panama has developed and implemented 100% of the procedures required in a short term within the TMA (approaches to all runway ends and exit procedures) and is working in RNAV approaches for international airports in the State, complying in this stage in most airports. Implementation of RNAV approaches in the main State's airport has enabled a greater number of operations within the same time frame, and it is expected to increase this number in the forthcoming months with the application of a number of RNP AR procedures. Operations per hour have reached an average of thirty four during the peak hour period, thus complying with greater effectiveness with itineraries. This has resulted in benefits for all airlines.

2.2 Aircraft fleet that use national airspace is represented in 74% by commercial flights at international level (B737, EA320, E190, etc.), which are the main users of RNAV en route procedures at a domestic level, and a 5% by private and training flights within the national territory. The most representative activity in the segment of international flights is the Hub of the Americas, starring COPA Airlines, which carries out more than one hundred daily operations.

2.3 The final product of RNP AR APCH approaches designs for the Tocumen Airport runways are as follows:

### MPTO:

RNAV (RNP) 03R	RNAV (RNP) Y 03L	RNAV (RNP)
RNAV (RNP) Z 03L	RNAV (RNP) 21L	
RNAV (RNP) DP 03L	RNAV (RNP) DP 03R	

2.5 Validation flights were carried out by aircraft of COPA and Panamanian AAC Safety inspectors, procedures designers and aeronautical technical personnel, also participated.

### 3 **Conclusions**

3.1 Implementation of RNP AR APCH approaches in Panama are aimed at contributing in the development of the aeronautical activity, with a better air traffic flow, continuous ascending and descending operations, enabling great amounts of fuel savings, reducing CO<sub>2</sub> emissions to the atmosphere, improving flight times and enabling passengers a better life quality and shorter stay in aircraft.

### 4 **Suggested action**

4.1 The meeting is invited to take note of the information provided in this information paper, to serve as guidance material to States in process of implementation of RNP AR APCH procedures.

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