



ICAO

International Civil Aviation Organization
North American, Central American and Caribbean Office

WORKING PAPER

C/CAR/DCA/14 — WP/12
24/04/15

Fourteenth Directors of Civil Aviation of the Central Caribbean Meeting (C/CAR/DCA/14)
Kingston, Jamaica, 11 to 13 May 2015

Agenda Item 4: Air Navigation Matters

- 4.2 Review of the Implementation of Air Navigation under the NAM/CAR Regional Performance Based Air Navigation Implementation Plan (RPBANIP) and the Aviation System Block Upgrades (ASBU) Methodology**
- 4.2.4 Other Regional Implementation Groups**

PERFORMANCE-BASED NAVIGATION (PBN) AIRSPACE REDESIGN PROJECT FOR THE CAR REGION

(Presented by the Secretariat)

EXECUTIVE SUMMARY	
<p>This Working Paper presents the progress on PBN implementation in the Central Caribbean (C/CAR) States, in accordance with Assembly Resolution A 37-11 requirements and the Regional Performance Objective (RPO) established in the NAM/CAR Regional Performance-Based Air Navigation Implementation Plan (RPBANIP) Version 3.1. This paper includes a recommendation to develop a PBN Airspace Redesign Project which will allow States to continue with regionally harmonized PBN implementation.</p>	
Action:	Suggested action in Paragraph 3
<i>Strategic Objectives:</i>	<ul style="list-style-type: none">• Safety• Air Navigation Capacity and Efficiency• Environmental Protection
<i>References:</i>	<ul style="list-style-type: none">• Annex 11- <i>Air Traffic Services</i>• Doc 9613 - <i>Performance-based Navigation (PBN) Manual</i>• Doc 9903 - <i>Summary Minutes with Subject Index. Council - Special Session (17 August 2006) and Council 179th Session (2 October - 8 December 2006)</i>• Doc 9905 - <i>Required Navigation Performance Authorization Required (RNP AR) Procedure Design Manual</i>• Doc 9906 - <i>Quality Assurance Manual for Flight Procedure Design</i>• Assembly Resolution A 37-11• <i>Port-of-Spain Declaration</i>, Trinidad and Tobago, April 2014• NAM/CAR Regional Performance-Based Air Navigation Implementation Plan (RPBANIP) Version 3.1• Final Report ICAO/IATA Regional PBN Airspace Concept Workshop (Miami, United States, 11 - 22 March 2013)

1. Introduction

1.1 NAM/CAR Regions Directors of Civil Aviation signed the *Port-of-Spain Declaration* where PBN implementation goals were established in order to comply with Assembly Resolution A 37-11. C/CAR States have complied with Assembly Resolution A 37-11 regarding the implementation of PBN Approach Procedure with Vertical guidance (APV).

2. Discussion

2.1 PBN implementation provides significant benefits to the Air Traffic Management (ATM) community in terms of enhancing safety, increasing airspace capacity and access to aerodromes and reducing environmental impact. PBN is not a concept by itself; it is one of the elements that support the strategic objectives of an airspace concept, together with Communications, Navigation and Surveillance (CNS) and ATM.

2.2 The last PBN implementation aspects in the CAR Region include:

- Required Navigation Performance (RNP) 10 in the New York Oceanic West Flight Information Region (FIR), RNP 10 and Area Navigation (RNAV) random routes of the oceanic airspace of the Gulf of Mexico and the Houston and Miami Oceanic FIRs
- Random RNAV routes in the Piarco FIR
- Review of RNAV 5 routes in the upper continental airspace
- Jamaica, Mexico and Trinidad and Tobago have submitted reports on PBN airspace redesign projects implementation
- Space/Satellite-based Augmentation System (SBAS) and Wide Area Augmentation System (WAAS) aspects continue to be analyzed

2.3 The **Appendix** presents the PBN implementation progress and results reported to ICAO Headquarters in Montreal for the Dashboards. Based on the progress presented and taking into account that several tasks have been completed; NAM/CAR States have established new goals as shown below:

- 80% of runways with APV instrument approaches and Barometric Vertical Navigation (BARO-VNAV) implemented by service providers and users by December 2016
- 80% of international aerodromes with PBN Standard Instrument Arrival (STARs) implemented by December 2016
- 60% of international aerodromes with PBN Standard Instrument Departure (SIDs) implemented by December 2016
- 50% of international aerodromes with Continuous Descent Operations (CDO) implemented by December 2016
- 60% of international aerodromes using Continuous Climb Operations (CCO) implemented by December 2016

- ICAO will provide, upon request by CAR States, training and implementation assistance for PBN airspace design and operational approval

2.4 Significant progress has been made on PBN implementation; nevertheless, key progress requirements include increasing the number of qualified personnel, improving training programmes, and PBN operational approval/certification. Therefore, States must review and enhance their own PBN programmes and achievements in coordination with the ICAO NACC Regional Office.

2.5 The analysis of the current airspace structure and increased air operations in the CAR Region results in lack of harmonization which does not facilitate coordination and provision of Air Traffic Control (ATC) service, as well as limited use by operators.

2.6 This renders necessary that States develop a PBN Airspace Redesign Project to be implemented in the short term upon a PBN airspace comprehensive concept approach as a high priority matter.

2.7 PBN airspace concept is based on a comprehensive redesign of the current airspace considering gate-to-gate operations. A PBN Airspace Redesign Project provides the description and ATC operational management framework foreseen for medium and long terms. The concept is developed in order to fulfill explicit safety objectives, ATS capacity and environmental impact mitigation, including airspace organization details, ATS route structure, obstacle clearance and separation minima.

2.8 Future PBN implementations should be grounded on the airspace redesign to face air traffic increase for 2015-2017, through four phases as described in Doc 9992 - *Manual on the Use of Performance-based Navigation (PBN) in Airspace Design*:

- Planning
- Design
- Validation
- Implementation

2.9 States should urge the development of the aforementioned project with participation of regulators, controllers, airspace planners, pilots/operators, military authority, general aviation representatives, etc. PBN projects should focus on RNAV routes implementation, RNP approach procedures, SIDs and STARs with CCO and CDO criteria, RNAV 10 or RNP 4 for Oceanic airspace.

2.10 The ICAO NACC Regional Office provides assistance to States in order to review and complement their project during 2015 providing information and necessary activities with practical exercises and implementation discussions. In these activities State experts participate, who have developed a PBN Airspace Redesign Project. In this regard, the Meeting should review and approve the following:

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CONCLUSION

C/CAR/DCA/14/xx PBN AIRSPACE REDESIGN PROJECT FOR THE CAR REGION

That, C/CAR States, in coordination with the ICAO NACC Regional Office, develop a PBN Airspace Redesign Project to be implemented from 2015-2017 in accordance with ICAO provisions, including:

- a) operational improvements implementation to the RNAV route network in the upper and lower airspace;
- b) Continuous Descent Operations (CDO) and Continuous Climb Operations (CCO) implementation in the SIDs and STARs of the terminal control area (TMA), accordingly;
- c) RNP approach procedures implementation in all instrument flight runways by 31 December 2016, in compliance with ICAO Assembly Resolution A37- 11;
- d) notify the ICAO NACC Regional Office by 30 October 2015 progress accomplished and new identified needs in accordance with above-mentioned items a), b) and c) for the implementation of a harmonized PBN airspace; and
- e) present to the C/CAR/DCA/15 Meeting a report of the progress achieved on the PBN Airspace Redesign Project implementation.

2.11 Also, States should timely disseminate, among users and aircraft operators, airworthiness and operational approval requirements in accordance with their regulations and valid procedures.

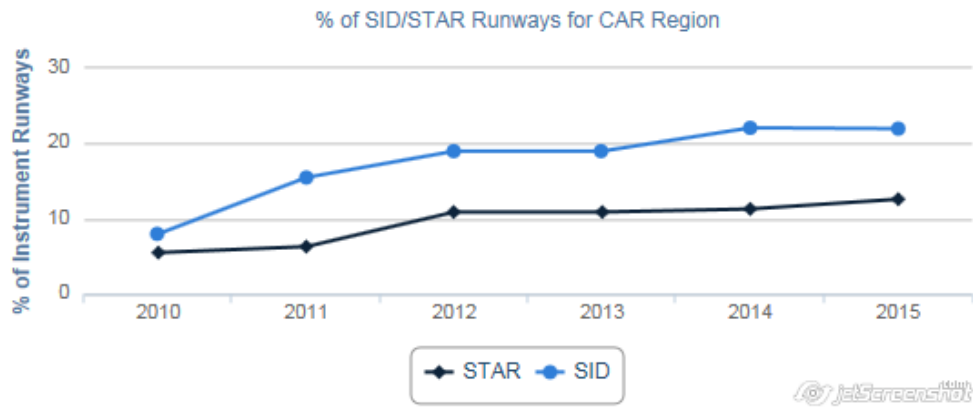
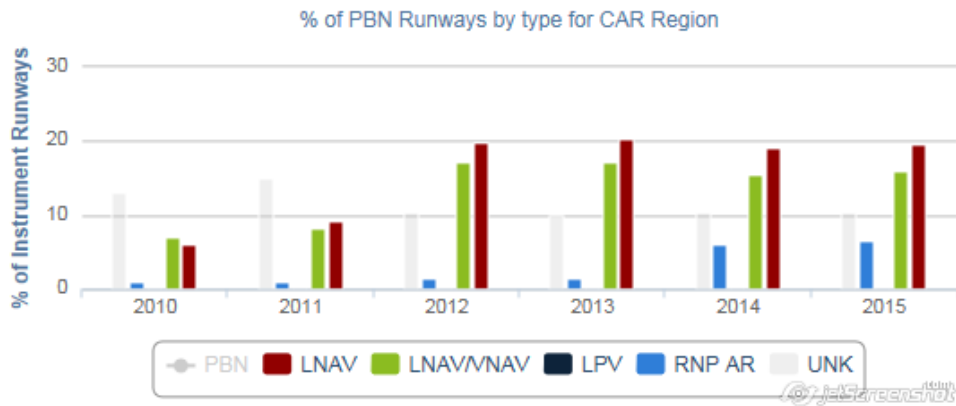
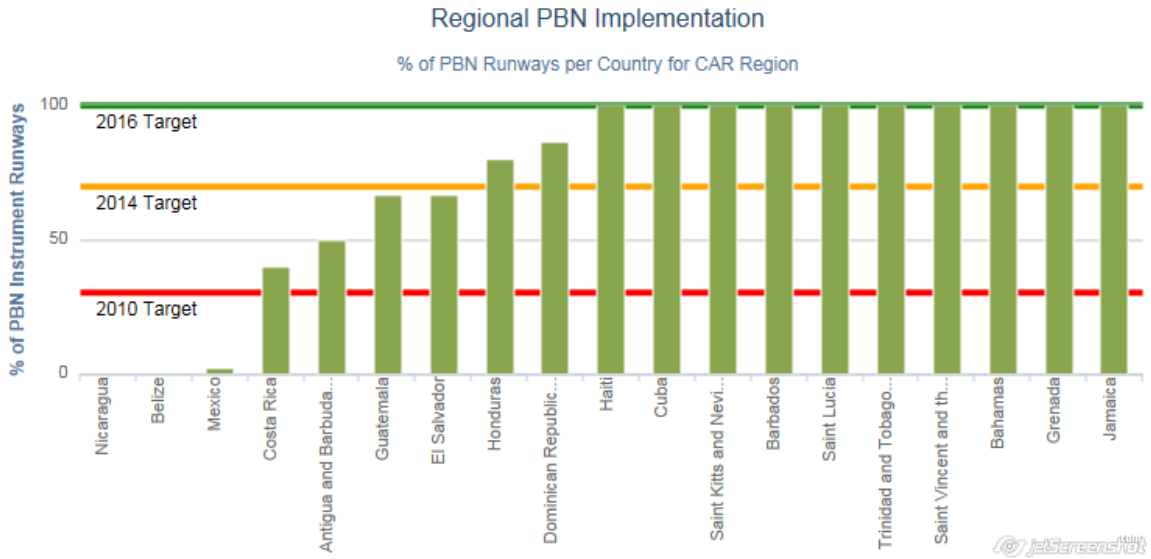
2.12 Additionally, routes and CO₂ emissions reduction benefits should be annually evaluated as applicable.

3. Suggested Actions

3.1 The Meeting is invited to:

- a) take note of the information contained in this working paper;
- b) review and approve the Draft Conclusion included in paragraph 2.10;
- c) designate and support experts participation in order to complete CAR Region PBN Airspace Redesign Project activities;
- d) notify the ICAO NACC Regional Office the PBN assistance required; and
- e) recommend other actions considered necessary.

APPENDIX PBN APPROACH PROCEDURES AND SID/STAR IMPLEMENTATION IN THE CAR REGION



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