



- Agenda Item 3: Air Navigation Matters**
3.2 Follow-up to the implementation of the NAM/CAR RPBANIP in Eastern Caribbean
- **Progress reports of the AIM, AGA, ATM, CNS, MET and SAR Committees, Ad-hoc Committees and the E/CAR/WG Chairman**

RPO 1: IMPLEMENTATION OF PERFORMANCE BASED NAVIGATION (PBN)

Report of the ATM Committee

(Presented by the ATM Committee Rapporteur)

SUMMARY	
This paper presents the discussions carried out by the ATM Committee	
References	
• Report of the North American, Central American and Caribbean NACC/WG/3/1, Guatemala, May 09 – 13, 2011 • Report of the Twenty Third Meeting of Directors of Civil Aviation of the Eastern Caribbean (E/CAR/DCA/23), Christ Church, Barbados, 9 to 12 November 2010	
Strategic Objectives	<i>This working paper is related to Strategic Objectives A and C.</i>

1. Introduction

1.1 The ATM Committee comprises Antigua and Barbuda, Barbados, France, Grenada, ECCAA (representing the OECS States), Trinidad and Tobago, United States and IFATCA. The list of participants is attached as **Appendix A** to this paper. The Committee welcomed the new ATM Rapporteur. The Committee examined the aspects of PBN implementation as its main task.

1.2 The implementation of the PBN Airspace Concept is supported by the ICAO Global ATM Operational Concept (Doc 9854), PBN Manual (Doc 9613), and the Regional Performance-based Air Navigation Implementation Plan (RPB ANIP) for NAM/CAR Regions. The implementation of a PBN Airspace Concept covers safety, capacity and efficiency: it will facilitate the harmonization and interoperability of procedures and air operations among the ATS airspace; the implementation of Continuous Descent Operations (CDO) and approach procedures with vertical guidance APV (Baro-VNAV) and/or RNP AR, through stabilized approaches, will reduce the risk of Controlled Flight into Terrain (CFIT); it will allow the reduction of spacing between aircraft and the use of ATC vector guidance in departure and arrival routes, which will result in a reduction of airspace complexity and of ATC workload. The final goal effect will be an increment in ATS airspace capacity; it will allow aircraft

operations on optimum tracks from the en-route phase to final approach and from departure to the selected route. Efficiency will also be reflected in the publication of better climb and descent profiles in gate-to-gate operations with more flexible tracks to increase operational efficiency, while reducing fuel consumption.

1.3 After the implementation of PBN as part of the airspace concept, the total system needs to be monitored to ensure that the safety of the system is maintained. A System Safety Assessment shall be conducted during and after implementation and evidence collected to ensure that the safety of the system is assured. Performance requirements are defined in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept. Performance requirements are identified in navigation specifications which also identify which navigation sensors and equipment may be used to meet the performance requirement. **Appendix B** attached shows the short and medium term PBN Implementation.

2. Discussion

2.1 In its deliberations and discussions the Meeting reviewed the following Conclusions from the NACC/3 and E/CAR/DCA/23 Meetings:

CONCLUSION

NACC/3/1 **IMPLEMENTATION OF A PBN AIRSPACE CONCEPT IN THE CAR REGION**

That CAR States and Territories and COCESNA implement a PBN airspace concept, in accordance with the PBN Airspace Concept for the CAR Region (<http://www.mexico.icao.int/ATM.html#PBN>) with the following milestones:

- a) *Publish by 30 November 2011:*
 - i) *RNAV 5 navigation specifications for RNAV routes that have been implemented or are in the process of being implemented in the upper airspace; and*
 - ii) *RNAV 1 specifications, as required, for RNAV routes that has been implemented or, are in the process of being implemented in the terminal areas (TMA);*
- b) *Implement:*
 - i) *realignment improvements or new RNAV routes in the lower airspace, in accordance with the air navigation regional agreements;*
 - ii) *continuous descent operations (CDO) in terminal areas (TMA) as required;*
 - iii) *PBN approach procedures, in compliance with ICAO Assembly Resolution A37-11;*
- c) *complete the NDB deactivation in coordination with other States with adjacent ATS units, by 31 January 2018;*
- d) *develop by 31 January 2012 a national data collection programme on PBN implementation results; and*
- e) *inform the ICAO NACC Regional Office by 31 December 2011 on the progress achieved and newly identified needs in accordance with items a), b), c) and d) above for a harmonized implementation of a PBN airspace concept in the CAR Region.*

CONCLUSION
E/CAR/DCA/23/11

PBN IMPLEMENTATION IN THE E/CAR REGION

In order to accomplish the benefits of PBN implementation in the E/CAR Region and ensure the cooperation and participation of E/CAR States/Territories:

- a) *E/CAR States/Territories establish/update their National PBN Implementation Plans and forward them to Trinidad and Tobago and the ICAO NACC Regional Office by 31 December 2010; and*
- b) *Trinidad and Tobago establish a Regional E/CAR PBN Implementation Plan taking into consideration the national PBN implementation plans provided by the E/CAR States/Territories and inform the E/CAR/WG Chairman and ICAO by 28 February 2011.*

2.2 The updates to the conclusions are in **Appendix C** to this paper.

2.3 Antigua and Barbuda stated that they were in the process of having their WGS surveys along with establishing RNAV Approaches which will commence in July, 2012. There will also be the reassessment of existing approaches which is to be completed by July, 19, 2012. Antigua and Barbuda further stated that they may need assistance with their PBN implementation programme.

2.4 Grenada completed their RNAV Approaches and would also be requiring assistance with regards to their PBN programme.

2.5 In order to continue the work of the ATM Committee on PBN implementation, the Meeting agreed to carry out a teleconference by August 22, 2012 with all the States Points of Contacts. This teleconference will be hosted by ICAO.

2.6 The IFATCA informed the meeting of the existence of “PBN Go Teams” and “PBN Implementation Teams” and the possibility of the E/CAR Member States acquiring the services of these entities and noted that there is a need to determine the criteria for the employment of the services from these Teams.

2.7 Trinidad and Tobago shared the proposed airspace concept, the associated navigation applications for Piarco’s airspace and the importance of collaboration between E/CAR States to ensure the harmonization of en-route airways with Continuous Descent Operations/Continuous Climb Operations (CDOs/CCOS) and SIDs and STARs.

2.8 Implementation of CDOs, SIDs and STARs

2.8.1 IFATCA stated that collaboration among all stakeholders is necessary to adhere to ICAO requirements on PBN implementation. Antigua and Barbuda provided one example of the outcome of the lack of Regional collaboration whereby St. Kitts and Nevis developed SIDs and STARs which has a negative impact on VC Bird’s airspace and operation.

2.8.3 IFATCA strongly urged all States to attend the ICAO PBN Symposium scheduled for October 2012.

2.8.4 Barbados stated that they had secured the assistance of an expert with regards to the design, evaluation and implementation of CDOs, SIDs and STARs. In the discussion of utilizing expert assistance to realize the goals of PBN implementation the Meeting formulated the following draft conclusion:

DRAFT CONCLUSION ATM/1

In order to accomplish the benefits of PBN implementation in the E/CAR Region and ensure the cooperation and participation of E/CAR States/Territories:

- a) The ATM Committee report to ICAO the issues faced with regards to their respective PBN programmes and a requirement for ECCAA to coordinate the development and implementation of PBN within the OECS States by 31st October 2012;
- b) States identify appropriate personnel for the receipt of training on PBN and the implementation of respective PBN programmes and notify the ATM Rapporteur by 31st July 2012;
- c) The ATM Committee write to IFATCA and request IATA to provide Regional training in PBN by August 31, 2012.
- d) Trinidad and Tobago to establish a Regional PBN Implementation Plan by May 30, 2013.
- e) States develop and harmonize their respective National Plans with this Regional PBN Plan by December 31, 2013.

2.9 Preliminary off-line testing of the new FPL Format

2.9.1 The United States provided a brief on the off-line testing of the New FPL Format and stated that currently development ongoing in this area.

2.9.2 In keeping with ICAO Global Plan Initiatives – DOC 9750 (GPI-22) Communication and Infrastructure, ICAO implementation of the New Flight Plan format (Amendment 1 to Doc 4444) and ECAR/DCA/23 Conclusion 23/6 on Missing and Duplicate Flight Plan, Trinidad and Tobago Civil Aviation Authority signed contracts with COMSOFT and IDS for the supply and installation of an Air Traffic Services Message Handling System – Extended Service (AMHS) and an Aeronautical Information Services System (AISS) respectively.

2.9.3 Grenada stated that the Flight Plan Processing System (FPPS) and the Atom™ application will be ready for the acceptance of Amendment 1 FPL Format by 31st July 2012. All testing with Piarco's AFTN is expected to be completed by 20th August 2012.

2.9.4 Antigua & Barbuda having benefited from the ICAO Workshop on the new FPL format in Mexico City is now in a position to implement an awareness programme. Antigua intends to internally recruit and train adequate number of personnel for the AIS.

2.9.5 Barbados stated that they are in a transitional state whereby they are working towards acquiring permanent staff for the AIS Office. They are also working on various organizational structures for each ATS Section. With regards to the NEW FPL, their FPPS provider will be in Barbados in June, 2012, to install and test the software with the FAA and Trinidad and Tobago. There will also be the provision of training and ATC Refresher Courses in July, 2012.

2.9.6 The United States commented that one of the challenges faced is the level of training that will be received by ATCOs based on the number of systems being modified. There are other States that are faced with a similar dilemma (e.g. Cuba and Mexico). There is also testing currently in progress for cross-border and oceanic airspace with future testing to occur in the en-route airspace. One of the issues faced with this programme is familiarity with the system. In this regard the Meeting formulated the following draft conclusion:

DRAFT CONCLUSION ATM/2

Further to activities for the implementation of the New ICAO Flight Plan Format, States are advised:

- To ensure their ATS Staff receive the requisite levels of training;
- To encourage greater participation from certain stakeholders such as IATA; and
- To host workshops with the various stakeholders (i.e. Airline operators and General Operators).

2.10 Amendment to Document 7030

2.10.1 United States shared their plans to implement 50nm longitudinal, 30nm lateral and 30nm longitudinal separation minima between suitably equipped and authorized aircraft within the New York Oceanic Flight Information Region. The Committee reviewed the proposal for amendment to the Document 7030 submitted by the United States in conjunction with their separation reduction. The changes that the United States proposed were agreed. However, it was discovered that some of the information presented with regards to operations within Piarco airspace (Subsections 6.2.1.1 and 6.2.2.2) was incorrect. A decision was taken to submit the amendment with the updated information for Piarco airspace at a later date.

2.11 Coordination between ATS Units

2.11.1 Antigua and Barbuda informed the Meeting of a coordination issue that exists between Piarco ACC and V C Bird Approach for flight into/out of St. Maarten transiting V C Bird airspace, which creates an inefficient descent/climb profile. In this regard the Meeting agreed to review the letters of Agreement as applicable by 30th September 2012.

3. Suggested Action

3.1 The Meeting is invited to:

- a) Take note of the information presented in this paper; and
- b) Take any other action that the meeting considers appropriate.

APPENDIX A

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APPENDIX B

Short Term (until 2010)	
Airspace	RNAV or RNP navigation specification
Route (Oceanic or Remote)	RNP 10 Corridor EUR/SAM and Santiago/Lima/AORRA/WATRS
Route (Continental)	RNAV 5 in selected airspaces
TMA	RNAV-1 in radar environment and with adequate ground navigation infrastructure.
	RNP 1 – No radar environment and/or without appropriate DME coverage.
Approach	RNP APCH in most possible airports and in all international airports. RNP AR APCH in airport where there are operational benefits.
• Non-compulsory installation of RNAV equipment on board of non-equipped aircraft in TMA and APP • Mixed Operations (equipped and non-equipped aircraft) in TMA and APP • Required RNAV 2 equipment above FL350 for flights to/from United States.	

Medium Term (2011-2015)	
Airspace	RNAV or RNP navigation specification
Route (Oceanic or Remote)	RNP 4 in the oceanic airspace
Route (Continental)	RNP 2 in selected airspaces
TMA (SID/STAR)	Expansion of RNAV-1 or RNP-1 application Compulsory RNAV 1 or RNP 1 approval for aircraft operating in greater air traffic density TMAs (exclusionary airspace)
Approach	Expansion of RNP APCH and RNP AR APCH application Application of GBAS procedures**
• RNP2 required equipment over FL290 for flights to/from United States.	
** GBAS procedures are currently not covered under the PBN concept	

APPENDIX C

Description	State	Remarks
CONCLUSION NACC 3/1 IMPLEMENTATION OF A PBN AIRSPACE CONCEPT IN THE CAR REGION That CAR States and Territories and COCESNA implement a PBN airspace concept, in accordance with the PBN Airspace Concept for the CAR Region (http://www.mexico.icao.int/ATM.html#PBN) with the following milestones:		
a) publish by 30 November 2011:		
i) RNAV 5 navigation specifications for RNAV routes that have been implemented or are in the process of being implemented in the upper airspace	Trinidad and Tobago	Valid
ii) RNAV 1 specifications, as required, for RNAV routes that has been implemented or are in the process of being implemented in the terminal areas (TMA)	All E/CAR States	All States - Valid
b implement:		
i) realignment improvements or new RNAV routes in the lower airspace, in accordance with the air navigation regional agreements	All E/CAR States	Valid
ii) continuous descent operations (CDO) in terminal areas (TMA) as required;	All E/CAR States	Valid Barbados is presently conducting a survey to verify the feasibility of CDOs.
iii) PBN approach procedures, in compliance with ICAO Assembly Resolution A37-11;	All E/CAR States	Valid • Barbados – 2 RNAV GPS approaches • Dominica – 1 RNAV GNSS approach • France – 6 RNAV GNSS approaches • Grenada – 2 RNAV GNSS approaches • Saint Kitts & Nevis – 4 RNAV GNSS approaches • Saint Lucia- 2 RNAV GNSS approaches • Saint Vincent & The Grenadines – 2 RNAV GNSS approaches

-C2-

Description	State	Remarks
		Trinidad and Tobago – 4 RNAV GPS approaches
c) complete the NDB deactivation in coordination with other States with adjacent ATS units, by 31 January 2018;	All E/CAR States	Valid In coordination with the CNS Committee
d) develop by 31 January 2012 a national data collection programme on PBN implementation results	All E/CAR States	Valid Proposed date of first quarter of 2013
e) inform the ICAO NACC Regional Office by 31 December 2011 on the progress achieved and newly identified needs in accordance with items a), b), c) and d) above for a harmonized implementation of a PBN airspace concept in the CAR Region.	All E/CAR States	Valid
CONCLUSION E/CAR/DCA/23/11 PBN IMPLEMENTATION IN THE E/CAR REGION In order to accomplish the benefits of PBN implementation in the E/CAR Region and ensure the cooperation and participation of		
a) E/CAR States/Territories: E/CAR States/Territories establish/update their National PBN Implementation Plans and forward them to Trinidad and Tobago and the ICAO NACC Regional Office by 31 December 2010	All E/CAR States	Valid States develop and harmonize their respective National Plans with this Regional PBN Plan by December 31, 2013.
b) Trinidad and Tobago establish a Regional E/CAR PBN Implementation Plan taking into consideration the national PBN implementation plans provided by the E/CAR States/Territories and inform the E/CAR/WG Chairman and ICAO by 28 February 2011.	Trinidad and Tobago	The ATM Committee with Trinidad and Tobago as the lead State establishes a Regional PBN Implementation Plan by May 30, 2013.

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