C/CAR/DCA/13 — WP/09
International Civil Aviation Organization 12/03/13
North American, Central American and Caribbean Office (NACC)
Thirteenth Meeting of Directors of Civil Aviation of the Central Caribbean (C/CAR/DCA/13)
Havana, Cuba, 28 - 31 May 2013

Agenda Item 5: Air Navigation Matters

5.2 Review of the implementation of Performance Based Navigation (PBN), Aeronautical Information Management Quality Management System (AIM QMS), Meteorology Quality Management System (MET QMS) and Aerodrome Certification

REVIEW OF THE IMPLEMENTATION REQUIREMENTS OF PBN, AIM QMS, MET QMS AND AERODROME CERTIFICATION

(Presented by the Secretariat)

SUMMARY

This working paper presents a review of the critical requirements that should be implemented, as soon as possible, by the Central Caribbean States and Territories in their Air Navigation Systems (ANS), regarding the Performance Based Navigation (PBN), the Aeronautical Information Management Quality Management System (AIM QMS), the Meteorology Quality Management System (MET QMS) and Aerodrome Certification in the Central Caribbean.

The action suggested for the Meeting is presented in paragraph 3.1.

References:

Annex 3 - *Meteorological Service for International Air Navigation*
Annex 15 – *Aeronautical Information Services*
Doc 9750 - *Global Air Navigation Plan.*
Doc 9854 - *Global Air Traffic Management Operational Concept.*
Doc 9882 - *Manual on Air Traffic Management System Requirements.*
Doc 9883 - *Manual on Global Performance of the Air Navigation System.*
Doc 9774 - *Manual on Certification of Aerodromes*
Doc 8733 - *Caribbean and South American Regions Air Navigation Plan*
Doc 9883 - *Manual on Global Performance of the Air Navigation System*
Doc 9839 – *Guidelines for Electronic Terrain, Obstacle and Aerodrome Mapping Information (draft)*
Doc 9674 – *World Geodetic System — 1984 (WGS-84) Manual*
Doc 9881 – *Guidelines for Electronic Terrain, Obstacle and Aerodrome Mapping Information (draft)*
NAM/CAR Regional Performance Based Air Navigation Implementation Plan (NAM/CAR RPBANIP):
http://www.mexico.icao.int/RegionalGroups/CCARWG.html
ICAO Roadmap for the transition of AIS to AIM

Strategic Objectives	*This working paper is related to Strategic Objectives:* *A. Safety – Enhance global civil aviation safety* *C. Environmental Protection and Sustainable Development of Air Transport*

1. Introduction

1.1 The Third Meeting of North American, Central American and Caribbean Directors of Civil Aviation (NACC/DCA/3), through its Decision 3/3, approved the NAM/CAR Regional Performance Based Air Navigation Implementation Plan (NAM/CAR RPBANIP). The plan included the implementation of the Performance Based Navigation (PBN), the Aeronautical Information Management Quality Management System (AIM QMS), the Meteorology Quality Management System (MET QMS) and the Aerodrome Certification, based on the requirements of the ICAO *Global Air Traffic Management Operational Concept* (Doc 9854), *Manual on Air Traffic Management System Requirements* (Doc 9882), *Manual on Global Performance of the Air Navigation System* (Doc 9883) and the Global Planning Initiatives (GPI) of the *Global Air Navigation Plan* (Doc 9750).

2. Discussion

2.1 The evolution and improvement of the air navigation system are directly related to the performance expectations and ANS implementation requirements. Compliance with these requirements is possible through:

▪ Services and procedures implementation	According to States needs defined in their action plan
▪ Human resources allocation	Sufficient number of qualified personnel
▪ Infrastructure implementation	According to the service capability requirements for air operations
▪ Establishment of processing systems and technology	According to regionally agreed interoperability and operational enhancement
▪ Standards and regulations issuance	Publications in accordance with ICAO provisions

Compliance with ANS implementation requirements

2.2 Operational improvement strategies are reflected as Regional Performance Objectives (RPO) in the NAM/CAR RPBANIP. The RPOs maintain a short and medium term dynamic implementation systemic approach, identifying operational improvements in the ANSs. The following activities should be considered of critical compliance to achieve operational improvements agreed in the ANSs.

PBN Implementation

2.3 The implementation of a PBN airspace concept in the C/CAR requires coordination of a multidisciplinary team to analyze the Airspace Organization and Management (AOM). The airspace organization is related to flight, radio communication and service requirements provided, as specified in Annex 11, Appendix 4, Table of ATS Airspace Classes, and management is related to Air Traffic Control (ATC) management techniques, which together are an elementary component of the ATM Operational Concept, ICAO Doc 9854.

2.4 To achieve implementation of a comprehensive PBN airspace concept, States are required to implement RNAV 5/2 routes in the continental upper airspace and publish Continuous Descent Operations (CDO) and Continuous Climb Operations (CCO) criteria in Standard Instrument Departures (SIDS) and Standard Instrument Arrivals (STARS) terminal areas with Area Navigation/Required Navigation Performance (RNAV/RNP) navigation specifications. In addition, pursuant to Assembly Resolution A37-11, States are required to publish RNP approach procedures. The **Appendix** to this working paper shows progress of route implementation works, SIDs, STARS and PBN approach procedures in the CAR Region.

2.5 To assist States in PBN implementation, the ICAO NACC Regional Office organized two events together with IATA and CANSO, the Regional PBN Airspace Concept Workshop in Miami, United States, from 11 to 22 March 2013, and the Regional PBN Operational Approval (Train the Trainer) Course, Miami, United States, from 11 to 15 March 2013.

2.6 Participants from Costa Rica, El Salvador, Honduras, Jamaica, Mexico, Trinidad and Tobago, Turks and Caicos Islands and COCESNA provided presentations to implement a new PBN airspace project with clear dates and milestones. The ICAO NACC Regional Office will continue working in coordination to provide assistance in accordance with particular needs.

2.7 The participants in the workshop agreed to implement a PBN airspace concept following the NAM/CAR RPBANIP regional objectives. The outcome of the workshop is as follows:

- Significant improvements have been achieved for the ATS route network in the CAR Region.
- For airspace redesign, States shall follow ICAO standards.
- States should develop training programmes for all staff concerned (Civil Aviation Authority (CAA), ATS, airlines, etc.) for a better understanding on PBN fundamentals.
- States should develop and implement PBN approval processes.
- States should promote collaborative efforts for PBN with all stakeholders.
- States should ensure the high quality of the aeronautical information and data associated to the publication of PBN aeronautical charts.
- Very High Frequency (VHF) omnidirectional radio range/distance measuring equipment (VOR/DME) for PBN has significant coverage for en-route, terminal and approach procedures. However, States shall review their navigation infrastructure (DME/DME, VOR, etc.) coverage for PBN implementation in the terminal areas.
- Carry out coordination with the ICAO NACC Regional Office.

2.8 According to Resolution A37-19, all States should submit benefits accomplished in reducing CO_2 emissions with PBN implementation by using the online IFSET tool. The estimation of indicators should be based on operational improvements obtained in air traffic management, operational efficiency, use of infrastructure and alternative fuels.

MET QMS Implementation

2.9 The requirement to implement a MET Quality Management System (QMS) became applicable on 15 November 2012. The MET QMS implementation status in the Central Caribbean, according to communications with the focal points up to March 2013 is the following:

State/Territory	MET QMS implementation progress and status
Aruba	Is in the final phase of the MET QMS implementation
Bahamas	Is in the final phase of the MET QMS implementation and with a progress of 80%.
Cayman Islands	Is in an intermediate phase of the MET QMS implementation, is expected to terminate the implementation by the second semester of 2013.
Cuba	Completed the process and implemented the MET QMS
Curacao	Is about to complete the MET QMS implementation process
Dominican Republic	Is in an advanced phase of the MET QMS implementation and is expected to finalize by the second semester 2013.
Haiti	The process is in the initial phase.
Jamaica	The progress of the MET QMS implementation process is 80%. It is expected to be complete by the second semester 2013.
Mexico	Has advanced the process by 95% and has officially informed the implementation of Terminal Area Forecast (TAF) that is an important part of the MET QMS.
Netherlands (Bonaire)	Is in an initial phase of the MET QMS implementation process
Turks and Caicos Islands	Is in an initial phase of the MET QMS implementation process

2.10 For the States that did not complete the ICAO requirements on the MET QMS on time, this is a reminder that the lack of accomplishment could bring serious consequences for the MET service, therefore; the following actions are recommended:

a) it is required that States report to the ICAO NACC Regional Office the incapability to accomplish with the MET QMS SARPs of ICAO Annex 3, and also, the incapability to supply the quantity of required observations/predictions in some airports, in accordance with the air navigation regional agreements; and

b) search for support in the corresponding Ministry, as soon as possible, to complete the mandatory requirement of ICAO Annex 3 and report to ICAO.

Implementation of the AIM QMS, Electronic Terrain Obstacle Database (e-TOD) and transition to the AIM

2.11 The Standard of Annex 15 applicable from 6 November 1997 states that quality Aeronautical Information Services (AIS) (now AIM) system must provide to the community of users the information and necessary aeronautical data that meet the quality requirements in terms of accuracy, resolution and integrity to ensure confidence and validity in every stage of production or update and modification of data and information process. The system must also ensure the period of application of the information and data, as well as the dates of distribution required by the users. Below the progress status of the implementation of the AIM QMS in the Central Caribbean States and Territories is presented:

State / Territory	Percentage of progress in the implementation of the AIM QMS in the Central Caribbean States and Territories
Aruba	0% progress in implementing AIM QMS
Bahamas	0% progress in implementing AIM QMS
Cayman Islands	Waiting for the progress information
Cuba	100% progress in implementing AIM QMS, already has certification
Curaçao	It has started the implementation Action Plan and is preparing the Manual of procedures
Dominican Republic	100% Progress in implementing AIM QMS, already has certification
Haiti	The Action Plan for the implementation has started
Jamaica	The Action Plan for the implementation has started
Mexico	The Action Plan for the implementation has started. Phase 1 has not yet been completed
Netherlands (Bonaire)	Curaçao has started the Action Plan for the implementation and is preparing the Manual of procedures.
Turks and Caicos Islands	Waiting for the progress information

2.12 States and Territories in the Central Caribbean should present to the ICAO NACC Regional Office action plans for the transition to AIM.

2.13 It is also required that States and Territories in the Central Caribbean develop action plans for the implementation of the e-TOD, Areas 1 and 3. To date, only Cuba, Curaçao, Dominican Republic, and Mexico have drafted or initiated an action plan for the implementation of the e-TOD.

2.14 Regarding the implementation of the electronic AIP, it is expected that States develop geo-referenced databases and the respective action plans for the development of all the elements associated with the Aeronautical Information Conceptual Model/Aeronautical Information Exchange Model (AICM/AIXM), as well as Geographical Information Systems (GIS) and relational databases that allow the electronic management of the Integrated Aeronautical Information Package (IAIP); not only the digital versions in PDF formats. Cuba, Dominican Republic and Mexico have successfully implemented GIS. Likewise, the incorporation of the AIXM for the electronic version of the AIPs has started in some States (for example Dominican Republic and Mexico) which develops the possibility of accessing an interoperable system from the exchange of data and aeronautical information under the conceptual scheme of the AICM.

Aerodrome Certification Implementation

2.15 It is relevant to highlight to the Meeting the importance and responsibility of the States/Territories to inform the ICAO NACC Regional Office on the States' aerodrome certification status, in order to keep updated information.

2.16 Regarding the aerodrome certification implementation in the Central Caribbean, the ICAO NACC Regional Office has carried out annual events related to the certification and inspection of aerodromes, with little participation of States and their experts. Nevertheless, in the last years the number of certified aerodromes has increased, mainly in Mexico. In the ANP proposal for amendment, Mexico proposed to include in the Air Navigation Plan 21 international aerodromes in addition to the already existent 42, and Jamaica, one international aerodrome. The list of certified aerodromes is as follows:

AERODROME CERTIFICATION IMPLEMENTATION IN STATES/TERRITORIES IN THE C/CAR AREA

State / Territory	No of Aerodromes (Doc 8733, Vol. II, FASID, Table AOP 1)	Responsible Authority	Number of Aerodromes			
			Certified	On-going (Scheduled date for certification)	Planned (Scheduled date to initiate the certification)	Remarks
Aruba	1	DCA	**1**	0	0	
Bahamas	11	CAD	0	0	0	
Bonaire	1	CANA	**1**	0	0	
Cayman Islands (UK)	2	ASSI/UK	**2**	0	0	
Cuba	7	IACC	6	1	0	Third quarter of 2014
Curaçao	1	CCAA		0	0	
Dominican Republic	7	IDAC	0	2016	2013	
Haiti	2	OFNAC	0	0	0	
Jamaica	3	JCAA	1	2	0	Already initiated per President of JCAA
Mexico	63	DGAC	8	3	8	**2013-2018 (Six-year term) In process:** Queretaro Aerodrome certification renovation (First Semester 2013) Puerto Vallarta (First semester 2013) Monterrey (Second semester 2013) **Planned:** Mexico City International Airport, Victoria City, Uruapan, Matamoros, Hermosillo, San Jose de Cabo, LaPaz, Acapulco and Zihuatanejo.

State / Territory	No of Aerodromes (Doc 8733, Vol. II, FASID, Table AOP 1)	Responsible Authority	Number of Aerodromes			
			Certified	On-going (Scheduled date for certification)	Planned (Scheduled date to initiate the certification)	Remarks
Turks and Caicos Islands (UK)	3	ASSI/UK	0	0	0	
TOTAL	**101**		**19**	**12**	**8**	

2.17 In 2013, two workshops will be carried-out, "Taxiway Design to Avoid Runway Incursions and Alternative Methods for Runway Excursions" (25-28 June 2013); and the "Workshop on SMS and progress achieved in the aerodrome certification progress in the CAR Region" (14-18 October 2013). Participation of AGA experts at the abovementioned events is urged to cooperate with case studies related to the workshops topics in order to create a forum for the exchange of knowledge and expertise between the participants and have the best practices that guide towards the solution of similar problems in other aerodromes.

Conclusion

2.18 To ensure a harmonized implementation of air navigation infrastructure and services in the Central Caribbean, the Meeting should encourage compliance with requirements of the air navigation system and other operational improvement initiatives that adapt to States' needs. To date, there is a large number of deficiencies related to the lack of a sufficient number of qualified personnel.

2.19 The national implementation plans should be harmonized with the NAM/CAR RPBANIP, which also serves as guidance material to harmonize States implementation plans.

3. Suggested Action

3.1 The Meeting is invited to:

a) take note of the information presented in this working paper;

b) promote implementation of the air navigation system requirements mentioned in this working paper;

c) identify other initiatives and/or operational improvements for a regionally harmonized air navigation system, and

d) recommend other actions as necessary.

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PBN Implementation Progress in the CAR Region and Bermuda (10.04.13)
Avances de implementación PBN en la Region CAR y Bermuda (10.04.13)

FIR (RNAV Routes / Rutas RNAV)	PBN Routes, SIDS/STARS & RNP Approach Procedures Rutas PBN, SIDS/STARS & Procedimientos de Aproximacion RNP										
	State, Territory / Estado, Territorio (#Aerodromes / #Aerodromos)	Aerodrome / Aeródromo	RWY / Pista	SID	STAR	APPs LNAV (RNP)	APPs VNAV (RNP)	APPs RNP AR	Total APPs (RNP)	TOTAL	AIP
CENTRAL AMERICA (18 RNAV Routes / 18 Rutas RNAV)	BELIZE (1)	**MZBZ**	07/25								
	COSTA RICA (4)	**MROC**	07/25	2	4				2	8	feb-10
		MRPV	09/27								
		MRLB	07/25			1				1	
		MRLM	14/32						1	1	jun-09
	EL SALVADOR	**MSLP**	07/25	10	3				3	16	feb-13
		MSSS	15/33 - 08/26	3						3	
	GUATEMALA (2)	**MGGT**	01/19	3	4					7	nov-11
		MGTK	10/28								
	HONDURAS (5)	**MHTG**	02/20	1	2				3	6	nov-10
		MHSC	17/35			2			2	2	nov-10
		MHLC	06/24								
		MHLM	04/22	1	3				1	5	ene-09
		MHRO	06/24	1	1				1	3	ene-09
	NICARAGUA (1)	**MNMG**	09/27								
CURACAO (10 RNAV Routes / 10 Rutas RNAV)	ARUBA (1)	**TNCA**	11/29			2	1		3	3	mar-08
	BONAIRE (1)	**TNCB**	10/28	2	2				2	6	abr-12
	CURACAO (1)	**TNCC**	11/29		4				2	4	abr-12
HAVANA (13 RNAV Routes / 13 Rutas RNAV)	CUBA (10)	**MUCM**	07/25	2	2				2	6	oct-12
		MUCC	08/26	2	2				2	6	oct-12
		MUCL	12/30	2	2				2	6	oct-12
		MUCF	02/20								
		MUHA	06/24								
		MUHG	05/23	2	2				2	6	oct-12
		MUMZ	08/26								
		MUCU	10/28 - 01/19								
		MUSC	08/26								
		MUVR	06/24	2	2				2	6	oct-12
KINGSTON (10 RNAV Routes / 10 Rutas RNAV)	CAYMAN ISLANDS, UK (2)	**MWCB**	09/27			2			2	2	ene-10
		MWCR	08/26			2			2	2	feb-10
	JAMAICA (2)	**MKJP**	12/30	3		2	2		4	7	ago-08
		MKJS	07/25	4		2	1		3	6	jun-06

PBN Implementation Progress in the CAR Region and Bermuda (10.04.13)
Avances de implementación PBN en la Region CAR y Bermuda (10.04.13)

		MMUN	12/30 L/R								
MEXICO	MEXICO (66)	**MMMX**	05/23-L/R								
(55 RNAV Routes / 55 Rutas RNAV) RNP 10 implemented in the Gulf of Mexico oceanic airspace (10 RNAV Routes) / RNP 10 implementado en el espacio aereo oceanico del Golfo de Mexico (10 Rutas RNAV)		**MMTO**	15/33	2	2					4	jul-12
NASSAU	BAHAMAS (8)	**MYNN**	14/32 - 09/27	10					3	13	nov-08
		MYGF	06/24	7					2	9	jul-09
		MYEH	07/25	4					1	5	may-09
		MYSM	10/28	1	1				1	3	ene-10
		MYEF	12/30	2					2	4	ene-10
		MYEM	15/33	2					2	4	may-09
		MYAT	14/32	2					2	4	feb-10
		MYSM	10/28	1	1				1	3	ene-10
NAT	BERMUDA, UK (1)	**TXKF**	12/30		2	2	2		4	6	abr-12
PORT AU PRINCE	HAITI (2)	**MTPP**	10/28	2		2	1		3	5	jul-05
		MTCH	05/23	2		2			2	4	jul-05
	ANGUILLA, UK (1)	**TQPF**	10/28	1		2			2	3	
	ANTIGUA & BARBUDA (2)	**TAPH**									
		TAPA	07/25								
	BARBADOS (1)	**TBPB**	09/27	2		2	1		3	5	may-09
	DOMINICA (1)	**TDPD**	09/27	1					1	1	jun-11
	FRANCE (5)	**TFFM**	09/27								
		TFFR	11/29	4	1				2	7	abr-09
		TFFF	09/27	4	2				2	8	ene-09
		LVFM	12/30								
PIARCO		**LFVP**	08/26	1	1				2	4	sep-05
Random RNAV Routes implemented in the Piarco FIR / Rutas Random RNAV implementadas en la FIR Piarco	GRENADA (2)	**TGPY**	10/28						2	2	mar-12
		TGPZ									
	MONTSERRAT, UK (1)	**TRPG**									
	ST. KITTS & NEVIS (1)	**TKPK**	07/25	3					2	5	jun-11
		TKPN	10/28	1					2	3	mar-12

PBN Implementation Progress in the CAR Region and Bermuda (10.04.13)
Avances de implementación PBN en la Region CAR y Bermuda (10.04.13)

UL435, UL695, UL375, UL337, UL776, UL205, UM791, UL462, UM402	ST. LUCIA (2)	**TLPC**	09/27								jun-11
		TLPL	10/28						2	2	
	ST. VINCENT & THE GRANADINES(2)	**TVSV**	07/25								
		TVSC	13/31						2	2	ene-09
	TRINIDAD & TOBAGO (2)	**TTPP**	10/28			2			2	2	oct-12
		TTCP	11/29			2			2	2	oct-12
SANTO DOMINGO (18 RNAV Routes / 18 Rutas RNAV)	DOMINICAN REPUBLIC (7)	**MDSD**	17/35	10	14	2			2	26	dic-08
		MDPC	09/27	8	10	2			2	20	mar-12
		MDPP	08/26	10	10	2			2	22	jun-09
		MDLR	11/29	2	2	2			2	6	mar-09
		MDST	11/29	8	12	2			2	22	dic-10
		MDJB	01/19								
		MDCY	07/25			1			1	1	oct-10
SAN JUAN - MIAMI RNP 10 implemented in the San Juan FIR and WATRS airspace (25 RNAV Routes) / RNP 10 implementado en el espacio aereo de la FIR San Juan y WATRS (25 Rutas RNAV)	BRITISH VIRGIN I., UK (1)	**TUPJ**	07/25								
	PUERTO RICO, US (6)	**TJBQ**	08/26						1	1	oct-09
		TJIG	09/27			1			1	1	abr-08
		TJMZ	09/27			1			1	1	oct-05
		TJPS	12/30			2			2	2	mar-09
		TJSJ	08/26-10/28	4		4	4		8	12	may-09
		TJVQ	09/27	1		1			1	2	feb-10
	ST. EUSTATIUS, NL (1)	**TNCE**	07/25								
	ST. MAARTEN (1)	**TNCM**	10/28	3	3				1	7	abr-12
	TURKS & CAICOS I., UK (5)	**MBAC**	07/25	4					2	6	feb-10
		MBGT	11/29	1		2			2	3	feb-10
		MBMC	10/28	7					2	9	dic-08
		MBPV	10/28	2		2	1		3	5	sep-11
		MBSC	11/29	1		2			2	3	feb-10
	VIRGIN ISLANDS, US (2)	**TIST**	10/28			1			1	1	nov-06
		TISX	10/28			2			2	2	nov-06
159 RNAV Routes (Fixed)	**TOTAL**			**153**	**94**				**130**	**374**	**may-13**