



Agenda Item 3: Activities for the development of the air navigation systems/services
3.2 Air Traffic Management (ATM)

ATM DEVELOPMENTS

(Presented by the Secretariat)

SUMMARY

This Working Paper presents up-to-date information on the required tasks in the ATM field from the conclusions of the C/CAR DCA/7, NACC/DCA/2 and GREPECAS/13 meetings.

References:

- Report of the Seventh Meeting of Directors of Civil Aviation of the Central Caribbean (C/CAR DCA/7) (San Juan, Puerto Rico, 28 June to 01 July 2004).
- Report of the NACC/DCA/2 Meeting (Tegucigalpa, Honduras, 11–14 October 2005).
- Report of the GREPECAS/13 Meeting (Santiago, Chile, 14–18 November 2005)

1. Introduction

1.1 The Seventh Meeting of Directors of Civil Aviation of the Central Caribbean updated the working guidelines of ATM matters in the C/CAR area through the following conclusions:

- **Conclusion 7/4** - *Support to the efforts for the implementation of RVSM in the Central Caribbean*
- **Conclusion 7/5** - *Implementation of phase two of RNAV Routes in the Central Caribbean*
- **Conclusion 7/6** - *Studies for the Implementation of RNP in the Central Caribbean*
- **Conclusion 7/8** - *Development of ATM Contingency plans for the CAR Region*
- **Conclusion 7/1** - *Prioritizing Draft Conclusions referred by the Central Caribbean Working Group*

1.2 The Second Meeting of North American, Central American and Caribbean Directors of Civil Aviation (NACC/DCA/2) updated the work guidelines of ATM matters in the NAM and CAR Regions through the following conclusions:

- **Conclusion 2/14** - *Implementation of Performance-Based Navigation*
- **Conclusion 2/17** - *Support for the ATM Work in the NAM/CAR Regions*

1.3 The Thirteenth Meeting of the CAR/SAM Planning and Implementation Group (GREPECAS/13) agreed, among others, to formulate the following conclusions related with the development of Air Traffic Management (ATM):

- **Conclusion 13/56** - *RNAV/RNP Action Plan Model for En-Route and Terminal Area Operations*
- **Conclusion 13/58** - *Monitoring of RVSM Operations*
- **Conclusion 13/59** - *Establishment of State Data Banks (SDB)*
- **Conclusion 13/60** - *Minimum Monitoring Requirements*
- **Conclusion 13/61** - *Measures to Reduce Operational Errors in the ATC Coordination Loop Between Adjacent ACCs*
- **Conclusion 13/62** - *Adoption and Utilization of the Form for Reporting Large Height Deviations (LHD)*
- **Conclusion 13/68** - *ATM Contingency Plans for the CAR/SAM Regions*

Implementation of RNAV Routes and Required navigation performance (RNP)

1.4 Taking into consideration the necessary development of National RNAV/RNP Implementation Programmes of the CAR Region, the C/CAR WG, in its fifth meeting reviewed the routes of the Central Caribbean that would be feasible to implement and/or realign in the short-term. After finalizing all the coordination process, in late 2005 a proposal for amendment to the Basic ANP was developed for approval by ICAO Council. This work implies that presently, in the CAR/SAM Regions 54 ATS routes have been implemented, 44 have been realigned and 9 have been eliminated.

1.5 The strategy approved by GREPECAS also considers RNAV/RNP implementation in terminal areas (TMAs) and airports serving as start/end routes between city pairs. To that end, the Regional NAM/CAR/SAM Seminar on Area Navigation (RNAV) and Required Navigation Performance (RNP) Implementation was held in Mexico City, Mexico, from 11 to 13 August 2005, aimed at providing up-to-date information on ICAO work pertaining to Performance-Based Navigation (PBN) for the en route and approach flight phases, operational approval, concepts, terminology and related definitions.

1.6 With this new regional strategy, the NACC/DCA/2 meeting approved that the States, Territories and International Organizations of the NAM and CAR Regions take into account the most relevant aspects of the aforementioned seminar, included in **Appendix A** to this Working paper, in order to update their activities programme in line with the future RNAV and RNP implementation.

1.7 Additionally, the NACC Office has scheduled for the second half of 2006 a seminar on the Performance-Based Navigation (PBN) which objective is to provide to the States, Territories and International Organizations the new ICAO guidance material for planning and development of procedures and routes in terminal areas and approach in line with the requirements of airspace users and ATS service providers.

1.8 It is expected that at the Sixth meeting of the C/CAR WG information be provided on an action plan for the implementation of GNSS procedures and standardized SID and STAR procedures among the airports and the RNAV routes already implemented or under implementation process.

5-letter name code (5LNC) assignment system

1.9 Nowadays the 5-letter name codes (5LNC) are assigned in accordance with Annex 11, by the ICAO Regional Offices through a methodology based on response according to the official request by the States, and this coordination among States and the ICAO Regional Offices is very complex and sometimes time-consuming.

1.10 ICAO has developed an Internet-based assignment system using a global and centralized database called 5-letter name code (5LNC) assignment system, which objective is to expedite the process assisting States and the Regional Offices in the on-line assignment of 5-letter name codes. One of the most important objectives of the new 5LNC system is the elimination of the current 5LNC duplicity.

1.11 The database uses Internet-based tools and consists of two main components: Graphical User Interface (GUI) and Geographic Information System (GIS). The Internet-based GUI will allow users to view, search, reserve, allocate, modify and receive a confirmation of the assigned code. The GIS will allow to geographically visualize all existing 5LNC in the world, in relation with aerodromes, runways, flight information regions (FIR), approach area, landing area, etc.

1.12 The system also offers tutorials that will allow users to learn to use the system at their own convenience. Once ICAO proves its operation, it is expected that the system be available by the second half of 2006; member States will be timely invited to register in the 5LNC Assignment System and to begin using it.

RVSM Implementation

1.13 The implementation of the reduced vertical separation minimum (RVSM) from FL 290 to FL 410 inclusive, was successfully carried out on 20 January at 09.00 UTC 2005 by the States, Territories and International Organizations of the CAR and SAM Regions in accordance with an action plan approved by GREPECAS.

1.14 Additional to the operational benefits, the cost/benefit analysis carried out after RVSM implementation in the NAM and CAR/SAM Regions was based on a conservative price of the gallon of fuel of \$ 1.98, resulting in a Cost/benefit ratio of 17:1 for North America, and 6:1 for the CAR/SAM Regions, obtaining a joint ratio of 15:1.

1.15 Taking into account the increase of the price of fuel in the past months, the benefits have been greatly exceeded; notwithstanding, before the economic crisis of most of the commercial airlines, it is necessary that the C/CAR WG study new strategies on airspace management and planning of air operations to support the efficiency in the consumption of fuel and environment caretaking. In Working paper WP/07, ATFM activities are analysed, which eventually support the efficiency of air operations in the C/CAR.

1.16 In support of safety, GREPECAS agreed to activate a Scrutiny Working Group, which purpose is to analyze the information provided of all the notified large height deviations (LHDs) of 300 ft or above, and to issue recommendations to improve safety. Nowadays, the analysis of LHDs has shown that coordination errors among ATC units generate the greater percentage of deviations, and that not all the States, Territories and International Organizations of the CAR Region have timely notified LHDs.

1.17 Bearing in mind that these errors in the ATS coordination cycle directly affect safety, the C/CAR WG should ensure that LHDs be timely reported, and establish improvements to safety management, recommending the necessary corrective actions to reduce LHD reports caused by the occurrence of operational coordination errors among ATC units.

1.18 In order to assist the States and Territories of the Central Caribbean in the implementation of programmes and ATS Quality Assurance Units, the ICAO NACC Office periodically follows-up the corrective measures to the LHD reports and has coordinated several regional activities for the implementation of ATM safety management programmes.

ATM Contingency Plans

1.19 As from the effective date of 25 November 2003 of new requirements of Annex 11 for the development of the ATM contingency plans, as preventive measure for the possible total or partial disruption of air navigation services, the ICAO NAAC Office has kept a constant communication with the States, Territories and International Organizations so that they finalize their ATM contingency plan, applicable to airspace and aerodromes of their jurisdiction. The development status of the contingency plans in the Central Caribbean is shown in **Appendix B** to this Working Paper; it is expected that this information will be updated during the meeting.

1.20 The CAR Region is composed by continental and oceanic areas susceptible to earthquakes, seaquakes and hurricanes that have caused great human and material losses in the past years. The C/CAR WG should also establish in the contingency plans additional measures facilitating the provision of humanitarian aid in case of natural disasters.

2. Suggested action

2.1 Bearing in mind the background expressed in the paragraphs above, the Meeting is invited to:

- a) note the information presented in this Working paper;
- b) recommend specific actions for the development of the action plan for the implementation of Performance-based navigation (PBN);

- c) recommend relevant actions so that States and Territories of the C/CAR timely report LHDs and apply the necessary measures to reduce the occurrence of operational errors in the ATC coordination cycle;
- d) recommend the suitable measures to improve safety management in the airspace and aerodromes of the C/CAR;
- e) provide up-to-date information on the development of the contingency plans in the C/CAR;
- f) continue other work required for the development of the ATM system of the C/CAR; and
- g) recommend other actions as appropriate.

APPENDIX A

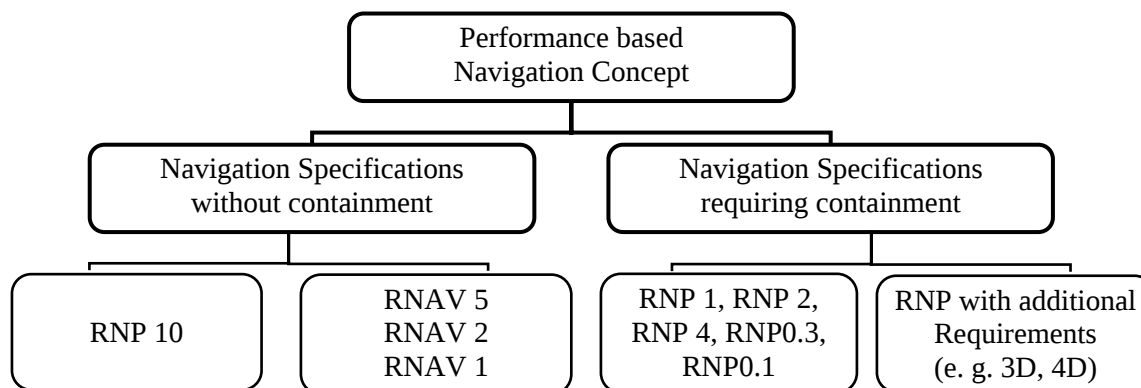
NAM/CAR/SAM REGIONAL SEMINAR ON RNAV AND RNP IMPLEMENTATION (Mexico City, Mexico, 11 to 13 August 2005)

1. In light of new technologies and capabilities and experience gained over previous years with RNP and RNAV implementations at the global level with respect to air navigation performance, discussions were focused in different perspectives and implementations of required navigation performance (RNP) and area navigation (RNAV) carried out between the international civil aviation community and some individual States, which evolved towards a divergence of interpretations and resulted in a lack of harmonization.

2. The participants noted that work of the RNP Special Operations Requirements Study Group (RNPSORSG) is presently progressing very well and agreed that the future RNAV and RNP applications should be as follows:

Area of Application	Navigation accuracy	Designation of navigation standard: Current situation	Designation of navigation standard: New RNP concept
Oceanic/ Remote	10	RNP 10	RNP 10
	4	RNP 4	RNP 4
En Route- Continental	5	RNP 5 Basic RNAV	RNAV 5
En Route- Continental and Terminal	2	USRNAV type A	RNAV 2
Terminal	1	USRNAV type B P-RNAV	RNAV 1

3. Also, considering that the navigation containment is based on accuracy, functional integrity, continuity and systems availability, the participants noted that the RNPSORSG agreed on the need for specifying future applications of a **performance based navigation concept without containment integrity and continuity, which will be designated as RNAV** and **with containment integrity and continuity, which will be designated as RNP**, as follows:



4. In addition, the Separation and Airspace Safety Panel (SASP) is in the process of drafting an amendment to *Attachment B* of Annex 11, “*Method of establishing ATS routes for use by RNAV-equipped aircraft*”, its work includes updating relevant guidance material on safety and separation.

5. The participants were informed of the new activities that ICAO, with the assistance of the RNPSORSG and SASP, is carrying out to clarify all RNAV and RNP guidelines so as to ensure a common understanding of the RNP concept and the relationship between RNP and RNAV functionality, facilitating at the same time global harmonization of existing applications as well as the establishment of the future basis of air navigation performance operations, in benefit to the entire global aviation community.

6. Attendees concurred that any new implementation should be in accordance with ICAO guidelines and considering other provisions for all weather operations, safety issues, ATM requirements, verification-approval procedures, fleet equipment and available infrastructure.

7. Also, future RNAV and RNP implementations should envisage aspects regarding Human Factors such as common use of ATC terminology and phraseology, radar and non radar procedures, safe use of air navigation database, training and educational events looking to sharing acknowledge, and CDM process of ATM community.

8. Participants took note that new ICAO guidelines with amendments to Annexes 6 and 11, a revised Performance Based Navigation Manual and other related provisions will soon be presented as follows:

- Revised RNAV and RNP Standards:
 - State consultation August 2006
 - Applicable November 2007
- Performance Based Navigation Manual:
 - Available July 2006
- Obstacle Clearance Criteria (PANS-OPS):
 - State consultation August 2006
 - Applicable November 2007
- ATC Separation Criteria (PANS-ATM):
 - State consultation August 2006
 - Applicable November 2007

APPENDIX/APÉNDICE B
STATUS OF THE ATM CONTINGENCY PLANS OF THE C/CAR
ESTADO DE LOS PLANES DE CONTINGENCIA ATM de C/CAR

FIR	Adjacent FIRs / FIR adyacente	Status / Estado		Remarks / Observaciones
		Draft / Borrador	Final	
Curacao	Colombia			
	United States / Estados Unidos			
	Kingston			
	Port-au-Prince		X	
	Santo Domingo	X		
	Venezuela			
Havana <i>(Plan presented with domestic Contingency procedures / Plan presentado con procedimientos nacionales de Contingencia)</i>	United States / Estados Unidos	X		
	Port-au-Prince	X		
	Kingston	X		
	Mexico	X		
	COCESNA	X		
Kingston	Curacao /Curazao			
	Colombia			
	La Habana			
	Panamá			
	Port-au-Prince		X	
	COCESNA			

FIR	Adjacent FIRs / FIR adyacente	Status / Estado		Remarks / Observaciones
		Draft / Borrador	Final	
Port-au-Prince <i>(Plan approved by the President of ICAO Council / Plan aprobado por el Presidente del Consejo de la OACI)</i>	La Habana		X	
	United States / Estados Unidos		X	
	Kingston		X	
	Curacao		X	
	Santo Domingo		X	
Santo Domingo	Curacao	X		
	Port-au-Prince		X	
	United States / Estados Unidos	X		
United States / Estados Unidos (FIRs)	La Habana			
	Mexico			
	Port-au-Prince		X	
	Santo Domingo	X		
	PIARCO		X	With New York Oceanic / Con New York Oceanic
	Venezuela			