



International Civil Aviation Organization

North American, Central American and Caribbean Office

**Seventh Meeting of Directors of Civil Aviation of the Central Caribbean
(C/CAR/DCA/7)**

San Juan, Puerto Rico, 28 June – 01 July 2004

C/CAR DCA/7-WP/05

18/06/04

Agenda Item 2:

Air navigation issues

2.1 Review of the Summary of Discussions of the Fourth C/CAR Working Group Meeting.

ATM PROGRESS IN THE CENTRAL CARIBBEAN

(Presented by the Secretariat)

SUMMARY

This Working Paper presents support actions to continue with ATM development in the Central Caribbean keeping in mind the follow-up to the work that the Central Caribbean Working Group has done, as well as the relevant results of the GREPECAS/11-12 and its contributory bodies, and NACC/DCA/1 Meetings.

References:

- Report of the First North American, Central American and Caribbean Directors of Civil Aviation Meeting (Grand Cayman, Cayman Islands, 8-11 October 2002)
- Report of the Eleventh Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/11) (Manaus, Brazil, 3-7 December 2002)
- Report of the Twelfth Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/12) (Havana, Cuba, 1-11 June 2004)
- Report of the Fourth Central Caribbean Working Group Meeting (Santo Domingo, Dominican Republic, 9 to 13 February 2004)

1. Introduction

1.1 The Eleventh Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/11) held in Manaus, Brazil, from 3 to 7 December 2002 and the Twelfth Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/12) held in Havana, Cuba, 1-11 June 2004, formulated several conclusions related to RVSM, RNAV Routes and RNP implementation in CAR/SAM Regions.

1.2 The First North American, Central American and Caribbean Directors of Civil Aviation Meeting held in Grand Cayman, Cayman Islands from 8 to 11 October 2002, agreed the working guidelines for the main ATM issues in the CAR Region through the following conclusions:

- **Conclusion 1/8** – ATS Quality Assurance Programmes
- **Conclusion 1/10** – National RNAV/RNP Implementation Programmes for the CAR Region
- **Conclusion 1/11** – Development of a National RVSM Implementation Plan in the States/Territories/COCESNA in the CAR Region
- **Conclusion 1/15** – Support for the continuing development and implementation of CNS/ATM Systems in the CAR Region

1.3 Also, the Fourth Central Caribbean Working Group Meeting, held in Dominican Republic agreed to carry out several works related to the implementation of RVSM, RNAV Routes and RNP, in accordance with the regional agreements achieved by States/Territories/International Organizations of the CAR/NAM/SAM Regions.

2. Analysis

RVSM

2.1 In the framework of the meetings of the contributory bodies of GREPECAS for the implementation of the CNS/ATM Systems in the CAR/SAM Regions, States/Territories/International Organizations have finalized different tasks related with RVSM implementation, such as ATC simulation in different RVSM scenarios, ATC Training for RVSM and RVSM Operational Requirements for ATC automated systems, among others.

2.2 The ICAO NACC Regional Office has carried out a follow-up of the RVSM works made by the States/Territories/International Organizations for RVSM implementation in their corresponding jurisdiction of the Flight Information Regions (FIRs). The RVSM programme is planned to be concluded by the end of 2004, with a view to implementing RVSM in the CAR/SAM Regions on 20 January 2005, in harmony with RVSM implementation in the NAM and PAC Regions.

RNAV Routes

2.3 The GREPECAS/12 meeting agreed upon a second phase of the RNAV Routes implementation schedule, through an action plan attached as **Appendix A** to this Working Paper, for the CAR/SAM Regions. This action plan shows a list of trajectories requested by users with detailed information related with weekly operations, distance savings, annual fuel savings and operational costs savings for each one. Some of these routes that have been developed by the C/CAR WG, permit the identification of some segments that might be joined by only one RNAV route in the same FIR or adjacent FIRs which distance among them is not beyond 200 NM, taking into consideration the SIDs/STARs located in the vicinity of the cities.

RNP implementation

2.4 Additionally, the GREPECAS/12 Meeting agreed that the States/Territories/International Organizations of CCAR might develop an **action plan**, based on the information attached in **Appendix B** to this Working Paper, for RNP implementation in CAR/SAM Regions taking into consideration their airspace characteristics. The Meeting also recognized that only types of RNP currently applicable in both regions would be RNP 10 or RNP 4 for the oceanic airspace and RNP 4 or RNP 5 for the continental airspace.

2.5 Keeping in mind the guidelines that are being defined in the Air Navigation Commission Panel on the application of RNP 4 and RNP 5, it is considered that RNP 5 availability could be applied within the continental airspace of the CAR/SAM Regions. This would be possible using the current available infrastructure, both in ground as on-board, such as applied in other regions.

2.6 In this regard, it was also considered that the Caribbean airspace, due to its air traffic and CNS infrastructure, has characteristics of continental airspace and therefore RNP 5 could be applied in such airspace. Additionally, the Havana FIR was considered as transition airspace between the CAR/SAM and NAM Regions, that today by itself justifies RNP implementation, but this implementation might cause a *domino effect* which might force to implement RNP in all the CAR Region; therefore it is recommended that the C/CAR States/Territories/International Organizations carry out an analysis to implement RNP in this airspace.

3 Suggested action

3.1 Taking into consideration the foregoing, the Meeting is invited to adopt the following:

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CONCLUSION 7/XX

SUPPORT TO THE RVSM, RNAV ROUTES AND RNP IMPLEMENTATION WORKS IN THE CENTRAL CARIBBEAN

That the Directors General of Civil Aviation of the States/Territories/International Organizations of the C/CAR:

- a) support the ATM works carried out by the C/CAR/WG with a view to implementing RVSM in the C/CAR on January 20 of 2005; and,
- b) request the C/CAR WG that, in coordination with the ICAO NACC Regional Office, present in the next C/CAR DCA/8 meeting an Action Plan for RNAV Routes and RNP implementation in the C/CAR based on the information of Appendices A and B to this Working Paper.

APPENDIX A

<p>RNAV ROUTES IMPLEMENTATION PROGRAMME IN THE CAR/SAM REGIONS (Phase II-a)</p>
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EXPLANATION OF THE TABLE

Column 1	Describes the activities to be carried out by the States/Organizations involved
Column 2	Shows the target dates for completion of the activities described in column 1
Column 3	Contains additional information

APPENDIX A

Activities under the responsibility of the States and International Organizations, which FIR/s are involved		
ACTIVITY	COMPLETION DATE	REMARKS
1	2	3
States' preliminary analysis	30/04/04	CAR/SAM States should analyse RNAV Routes proposals under their responsibility and send the results to the ICAO NACC and SAM Offices, keeping in mind the planning principles and issues to be considered in the planning process appearing in the Guidance Material.
CAR/SAM analysis regarding the routes implementation impact in the CAR/SAM RVSM implementation programme.	30/11/04	The CARSAMMA shall evaluate the implementation impact of phase 2 of the CAR/SAM RVSM implementation programme in the CAR/SAM RVSM Implementation Programme Safety Assessment
Agreement on the RNAV routes to be implement	23/07/04	Route paths, reporting points, agreements, etc., to be defined at the Meetings/Workshops of ATM Authorities and Planners.
Review of bilateral/multilateral agreements between service suppliers and/or identification of cases requiring their execution	23/07/04	According to the route paths, reporting points (including the geographical coordinates), agreements, etc., established during the Meetings/Workshops of ATM Authorities and Planners.
Distribution of the proposal for amendment to the ANP CAR/SAM – Basic Vol. by the ICAO NACC and SAM Regional Offices.	30/07/04	The distribution of the proposal for amendment will enable parties involved expressing their comments or observations.
Inclusion of agreements and procedures in national operating manuals	30/11/04	If necessary, States shall include the agreements and procedures in their operating manuals
Publication of AIP Supplement	12/04	States affected by RNAV routes should publish a common AIC and AIP Supplement with three AIRAC cycles in advance.
Entry into effect of the Implementation	03/05	

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CAR/SAM RNAV ROUTE PROGRAM - PROGRAMA DE RUTAS RNAV CAR/SAM (FASE II-a - PHASE II-a)								
N° Summary / N° Listado Gral	N°	Trajectory between/ Trayectoria entre		Total weekly operations/ Total operaciones semana	Distance saved in N.M./ Dist. Ahorro en NM	Operational annual savings / Ahorro operacional anual	Annual fuel savings in us gallons / Ahorro anual comb en Galon US	Notes / Notas
13	1	Cancun	Havana	40	29.9	\$355,765	101,538	
20	2	Caracas	Lima	20	24.2	\$137,348	40,684	
26	3	Great Inagua	Kingston	0	0	\$0	0	Traffic unknown, exit route to Europe, requested by Jamaica/Tráfico desconocido, ruta hacia Europa, solicitada por Jamaica
27	4	Great Inagua	Montego Bay	0	0	\$0	0	Traffic unknown, exit route to Europe, requested by Jamaica/Tráfico desconocido, ruta hacia Europa, solicitada por Jamaica
32	5	Guayaquil	San Jose	39	24.2	\$333,505	93,084	
38	6	Lima	Sao Paulo	30	10.6	\$158,395	42,733	Continuation of UM415 to be implemented in Jun 04/Continuación de UM415 a ser implantada en Jun 04
43	7	Mexico	Salvador	22	14.3	\$103,421	26,444	Segment of route Mexico-San Jose/Segmento de ruta México-San José
44	8	Mexico	San Jose	48	9.7	\$185,841	48,139	
53	9	Salvador	San Jose	42	7.2	\$107,180	25,419	Domestic route within Cenamer, route segment Mexico-San Jose/Ruta doméstica dentro de Cenamer, tramo ruta México-San José
57	10	Santa Cruz	Santiago	10	24.6	\$113,108	28,949	
58	11	Santiago	Buenos Aires	107	14.2	\$646,599	190,143	Eastbound only/Solamente en dirección este
62	12	Havana	Santo Domingo	4	92.3	\$169,754	\$43,448	

CAR/SAM RNAV ROUTE PROGRAM - PROGRAMA DE RUTAS RNAV CAR/SAM (FASE II-b / PHASE II-b)								
N° Summary / N° Listado Gral	N°	Trajectory between/ Trayectoria entre		Total weekly operations/ Total operaciones semanal	Distance saved in N.M./ Dist. Ahorro en NM	Operational annual savings / Ahorro operacional anual	Annual fuel savings in us gallons / Ahorro anual comb en Galon US	Notes / Notas
2	1	Aruba	San Juan	14	8.3	\$37,684	10,549	
3	2	Asuncion	Buenos Aires	42	3.9	\$54,952	14,686	
4	3	Balmaceda	Buenos Aires	0	0	\$0	0	Route requested for operations from Buenos Aires to Australia/Ruta solicitada para operaciones de Buenos Aires a Australia
7	4	Bonaire	Guayaquil	7	6	\$34,028	11,297	
8	5	Bonaire	Lima	7	50	\$283,567	94,144	
9	6	Bonaire	Quito	7	5.7	\$32,327	10,732	
10	7	Buenos Aires	Lima	48	7.7	\$164,300	44,271	
12	8	Buenos Aires	Puerto Montt	0	2.4	\$0	0	Route requested for operations from Buenos Aires to Australia/Ruta solicitada para operaciones de Buenos Aires a Australia
16	9	Cancun	Panama	10	8.6	\$37,315	8,906	
17	10	Cap Haitien	Puerto Plata	0	0	\$0	0	Route requested by Cuba and Haiti, unknown traffic/Ruta solicitada por Cuba y Haití, tráfico desconocido
18	11	Cap Haitien	Santiago de Cuba	0	0	\$0	0	Route requested by Cuba and Haiti, unknown traffic/Ruta solicitada por Cuba y Haití, tráfico desconocido
19	12	Caracas	Havana	0	21.6	\$0	0	At this moment there is not traffic, but in near future traffic will increase/Al momento no hay tráfico pero muy pronto el tráfico aumentará
21	13	Caracas	Mexico	14	81.1	\$402,420	95,439	
23	14	Caracas	San Jose	16	22.7	\$133,512	32,056	
24	15	Cucuta VOR	Villavicencio VOR	10	49.2	\$386,157	128,204	Domestic route in Colombia/Ruta doméstica en Colombia
25	16	Elorza	San Gabriel	0	19.5	\$0	0	Requested by Colombia, unknown traffic/Solicitada por Colombia, tráfico desconocido
33	17	Havana	Panama	48	5.7	\$88,346	24,761	
34	18	La Paz	Lima	22	3.4	\$29,605	7,888	
37	19	Lima	San Jose	22	34.3	\$248,066	63,430	Segment route Lima-Houston/Dallas/Segmento ruta Lima-Houston/Dallas
45	20	Mexico	San Pedro	7	62.3	\$195,166	57,186	
49	21	Panama	Port au Prince	4	21.5	\$37,507	8,964	
11	22	Buenos Aires	Santiago	107	3.6	\$163,926	48,205	Westbound only/En dirección oeste, solamente
31	23	Guayaquil	Lima	42	5.5	\$98,821	26,333	UL 780 segment Guayaquil/Trujillo to Lima/UL 780 segment Guayaquil/Trujillo, then UG436 to Lima/UL 780 Tramo Guayaquil/Trujillo a Lima/UL780 segmento Guayaquil/Trujillo, luego UG436 hasta Lima

CAR/SAM RNAV ROUTES PROGRAM FROM/TO NAM REGION - PROGRAMA DE RUTAS RNAV CAR/SAM DESDE/HACIA REGION NAM								
N° Summary / N° Listado Gral	N°	Trajectory between/ Trayectoria entre		Total weekly operations/ Total operaciones semanal	Distance saved in N.M./ Dist. Ahorro en NM	Operational annual savings / Ahorro anual operacional anual	Annual fuel savings in us gallons / Ahorro anual comb en Galon US	Notes / Notas
1	1	Antigua	Miami	34	17.5	\$274,174	78,375	
5	2	Barbados	Miami	39	23.7	\$394,608	107,656	
6	3	Belize	Miami	16	18.2	\$99,368	27,415	
14	4	Cancun	Houston	112	9	\$351,155	94,958	
15	5	Cancun	New York	42	176.8	\$2,899,397	798,946	
22	6	Caracas	Miami	112	20.3	\$1,039,353	285,168	IATA requests to be implemented during the year 2004/IATA solicita se implemente durante el año 2004
28	7	Guadalajara	Houston/Dallas	98	6.4	\$195,318	55,733	
29	8	Guatemala	Houston/Dallas	44	36	\$599,856	163,650	
30	9	Guatemala	Miami	82	12.3	\$407,571	115,301	IATA requests to be implemented during the year 2004/IATA solicita se implemente durante el año 2004
35	10	Lima	Houston/Dallas	28	23.7	\$296,978	87,018	
36	11	Lima	New York	16	77.3	\$646,759	179,335	
39	12	Managua	Miami	62	7.2	\$234,129	67,687	
40	13	Merida	Houston	8	46.7	\$158,760	37,685	
41	14	Mexico	Houston/Dallas	177	11.7	\$791,931	205,899	
42	15	Mexico	Miami	76	24.4	\$897,641	260,559	
46	16	Montego Bay	Miami	60	0.9	\$24,685	6,736	
47	17	Panama	Houston	14	9.7	\$44,040	12,328	
48	18	Panama	New York	14	30.1	\$136,660	38,256	
50	19	Port au Prince	Miami	77	4.9	\$177,460	50,431	
51	20	Salvador	Houston/Dallas	36	67	\$798,364	215,362	
52	21	Salvador	San Francisco	14	42.7	\$211,878	50,249	
54	22	San Jose	Houston	28	24.7	\$309,509	90,689	Segment route Lima-Houston/Dallas/Segmento ruta Lima-Houston/Dallas (IATA comment - Comentario de IATA)
55	23	San Jose	New York	24	71.8	\$580,468	151,607	
56	24	San Pedro	New Orleans	8	7.5	\$17,027	5,043	
59	25	Sao Paulo	Houston/Dallas	28	36.5	\$662,871	187,276	
60	26	Sao Paulo	Memphis	14	39	\$517,711	165,223	
61	27	Tegucigalpa	Miami	29	21.1	\$246,100	65,765	
62	28	Cancun	Miami	42	7.7	\$113,794	32,983	Southbound operations only, northbound no need improvement /Operaciones en dirección norte solamente, no necesitan mejora (IATA comment - Comentario de IATA)

APPENDIX B

ACTION PLAN FOR THE IMPLEMENTATION OF RNP IN THE (INVOLVED) FIRS

Activities	Responsible Area	Starting date	Finalization date	Status of application	Remarks
Regional Agreement for RNP implementation in CAR/SAM Regions.	GREPECAS				The GREPECAS/12 achieved a regional agreement to implement RNP in CAR/SAM Regions.
2. Identification of operational needs (RNP 10, 5, 4).	States				
3. Study of the impact in the airspace.	States				It must consider the use of airspace simulation tools
4. Establishment of procedures to approve RNP	States				- Reference documents: <ul style="list-style-type: none"> • RNP Manual (Doc. 9613). • Leaflet N° 2 Rev. 1: AMJ 20X2 – JAA Guidance Material on Airworthiness Approval and Operational Criteria for the Use of Navigation Systems in European Airspace Designated for Basic RNAV Operations;
5. Cost-benefit analysis between ATS providers and Users	States /Users				
6. AIC for the dissemination of Information.	States				
7. Develop Regional Documentation	GREPECAS /States				
8. Coordination with ATS providers and users.	States /Users				
9. Updated maintenance	CARSAMMA				

Activities	Responsible Area	Starting date	Finalization date	Status of application	Remarks
and establishment and maintenance of a record of RNP approved aircraft.					
10. Establishment of a minimal amount of RNP approved aircraft before initiating the trials.	States				
11. Programme for airspace safety assessment. 12. Data collection programme for the evaluation of airspace safety and operational availability	States /CARSAMMA States / Users				
13. Publication of an AIC that informs the aeronautical community about the introduction of RNP	States				
14. Publication of an AIP Supplement with the applicable procedures and requirements.	States				
15. Notification to the CARSAMMA of: RNP 4/5 approved Aircraft	States				

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Activities	Responsible Area	Starting date	Finalization date	Status of application	Remarks
16. Develop RNP training for air traffic controllers	States				
17. Preliminary Safety assessment	State /CARSAMMA				
18. Final Safety assessment	States /CARSAMMA				
19. Evaluation of the operational availability	CARSAMMA				
20. Decision to continue or postpone the pre-operational trials.	States				
21. Date of the RNP implementation	States				

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