



AP/ATM/11  
WP/03  
15/09/05

**International Civil Aviation Organization  
South American Regional Office**

**ELEVENTH MEETING/WORKSHOP OF ATM AUTHORITIES AND PLANNERS IN  
THE CAR/SAM REGIONS  
(AP/ATM/11)**

(Lima, Peru, 28 to 30 September 2005)

**Agenda Item 1: Review of the RNAV/RNP Task Force and analysis of the actions  
adopted by the Task Force**

**RNAV/RNP implementation strategy and action plan for its Implementation**

(Presented by the Secretariat)

**Summary**

This working paper reflects the actions adopted by the ATM/CNS Subgroup ATM Committee as regards RNAV/RNP implementation strategy in the CAR/SAM Regions, as well as the action plan for implementation.

**References**

- ATM/CNS/SG/4. Fourth Meeting Report.

**1. History**

1.1 The Fourth Meeting of the ATM/CNS Subgroup thoroughly analysed the possible strategic options for RNAV/RNP concepts in the CAR/SAM Regions. After extensive discussions, the following was agreed:

## 2. Analysis

### **RNAV/RNP implementation strategy**

#### **En-route operations**

2.1 The strategy of including all the airspace of the CAR/SAM Regions into one En-Route Operations Implementation Plan will turn extremely complex the task of restructuring the airspace for the use of RNAV/RNP concept in the CAR/SAM Regions.

2.2 It was highlighted that the establishment of a unique RNAV criteria or RNP value for the CAR/SAM Regions is unlikely, taking into account the existing necessary operational differences in the CNS infrastructure.

2.3 It was considered that the strategy will be RNAV/RNP implementation by routing areas in CAR and SAM scenarios, depending on their own operational needs and infrastructure features that may involve a Group of States/Territories/International Organizations. This implementation strategy will be conducted by the States/Territories/International Organizations and will allow the establishment of the RNAV criteria or RNP values for the various areas which will be harmonized by the RNAV/RNP Task Force.

#### **Operations in the TMAs**

2.4 Operations in the TMAs have their own characteristics, taking into account the separation minima applicable among aircraft and among aircraft and obstacles and the diversity of aircraft, which involves low performance aircraft flying in the lower airspace and making arrival and departure procedures in the same path or near the high performance aircraft paths.

2.5 In this regard, States/Territories and International Organizations should develop National RNAV/RNP Implementation Plans in the TMA based on RNAV/RNP Operational Concept in the CAR/SAM Regions, to be developed by the RNAV/RNP Task Force to harmonize the applicable RNAV/RNP criteria, mainly to avoid the need for multiple operational approvals for flying in the CAR/SAM Regions; applicable separation criteria among aircraft will be shortly issued by ICAO Headquarters.

#### **Action Plan for RNAV/RNP Implementation in the CAR/SAM Regions**

2.6 RNAV/RNP Implementation Groups should consider the following aspects:

- a) taking into consideration the fact that there will be no change in the applicable criteria in the RNP 10, no alterations would be necessary in the application of the RNP 10 in the EUR/SAM Corridor and in the routes between Santiago, Chile and Lima;
- b) the Action Plan for RNP 5 implementation in the Brasilia, Curitiba and Montevideo FIRs, should be modified for the RNAV-5 application and its expansion to the most important TMAs of these FIRs;

- c) taking into account that the most important international traffic flow of the CAR/SAM Regions is to/from the NAM Region, the feasibility of RNAV-2 application should be also analyzed, in order to ensure the harmonization of the applicable criteria in the Regions involved and to avoid users to be obliged to carry out two types of operational approvals. This shall facilitate RNAV routes implementation from the CAR/SAM Regions to the NAM Region;
- d) the navigation capacity of the fleet and the possible RNAV application with or without radar coverage and NAVAIDs in some parts of the CAR/SAM Regions should be considered; and
- e) another aspect that should be kept in mind is the need for establishing a precision value for the RNAV routes already implemented, and their expansion to the TMAs, in order to allow the application of harmonized separation criteria between aircraft and approval of aircraft and operators.

2.7 A model Action Plan to be used for the RNAV/RNP Implementation Groups for the CAR/SAM Regions for both, en-route as well as for terminal areas, was developed.

2.8 The main difference between the two plans is that most of the actions in the Action Plan for En-route Implementation should be performed by the RNAV/RNP Implementation Group, considering the need for international coordination for its progress. Whereas in the Action Plan for RNAV/RNP Implementation in TMA, most of the actions will be carried out by States/Territories and International Organizations, taking in account that only the airspace under their jurisdiction should be involved. It is important to highlight that the two action plans will be widely related, taking into consideration that the movement among the TMAs (entry and exit points, SID/STARs) will significantly influence the new routes structure.

2.9 In the light of the above, it was agreed to use the action plan models shown in **Appendices A and B** to this working paper. These models should be reviewed by each one of the Task Forces ATM, OPS/AIR and SAM, in order to evaluate its content and if such were the case, amend the actions proposed. Further, the Implementation Groups of each Region, shall use such action plan models and would include the corresponding start/end dates of each task, as well as the persons and/or groups responsible of the implementation of the same.

### 3. **Suggested action**

3.1 The meeting is invited to:

- a) take note of the information provided in this working paper;
- b) assign ATM/WG, OPS/AIR/WG and SAM/WG the task of revising the actions proposed in the corresponding models, to its area, and if such were the case, propose the modifications deemed pertinent; and
- c) inform the RNAV/RNP Task Force on the possible amendments and one proposal on the progress of each one of the tasks.

-----

<b>RNAV/RNP Implementation Task List for Enroute Operations / Lista de Tareas para la Implantación RNAV/RNP para Operaciones en Ruta</b>				
<b>ID</b>		<b>Start/Inicio</b>	<b>Finish/Termina</b>	<b>Resource Names/Nombres Recursos</b>
<b>1</b>	<b>Identify Operational Need / Identificar necesidades operacionales</b>			
2	Develop operational concept for CAR/SAM RNAV/RNP /Desarrollar el concepto operacional RNAV/RNP CAR/SAM			
<b>3</b>	<b>Conduct Cost Benefits Analysis / Conducir un análisis costo/Beneficio</b>			
4	Conduct preliminary cost benefit analysis/ Conducir un análisis costo/beneficio			
5	Finalize cost benefit analysis / Finalizar análisis costo/beneficio			
<b>6</b>	<b>Safety Assessment/Evaluación de Seguridad</b>			
7	Review available summary data (non-compliant aircraft, aberrant aircraft etc) / Revisar resumen de datos disponible (aeronaves que no cumplen, aeronaves anómalas, etc)			
8	Examine history of errors related to ATC clearances and assess possible RNAV/RNP impact /Examinar la historia de los errores relacionados con autorizaciones ATC y valorar el impacto posible en la RNAV/RNP			
9	Confirm RNAV/RNP risk model assumptions/parameters are consistent with airspace where RNAV/RNP is to be applied/Confirmar que modelos de supuestos parámetros de riesgo RNAV/RNP sean consistentes con el espacio aéreo en donde se aplicará RNAV/RNP			
10	Conduct simulations to predict occupancy after RNAV/RNP implementation/ Conducir simulaciones para predecir la ocupación después de la implantación RNAV/RNP			
11	Report large lateral deviations to monitoring agency (including route assignment errors)/Reportar las grandes desviaciones a la agencia de monitoreo (incluyendo los errores de asignación de ruta)			
12	Determinar los mínimos de separación aplicables, basandose en Modelo de Riesgo de Colisión y considerando la infraestructura existente y planificada.			
<b>13</b>	<b>Feasibility Analysis/Análisis de Factibilidad</b>			
14	Examine the general operational factors associated with implementation/Examinar los factores operacionales asociada con la implantación			
<b>15</b>	<b>Determination of Requirements (airborne &amp; ground systems)/Determinación de los Requerimientos (de a bordo y sistemas de tierra)</b>			
17	States assess the impact of RNAV/RNP implementation on ATC automation systems (e.g. equipment suffixes) and plan for upgrades/modifications/Valoración por parte de los Estados del impacto de la implantación RNAV/RNP en los sistemas de automatización ATC (por ejemplo, sufijos de equipo) y los planes para mejoras/modificaciones			
<b>18</b>	<b>Aircraft &amp; Operator Approval Requirements/Requerimientos de aprobación de aeronave y operadores</b>			
	To develop and armonize the RNAV/RNP implementations including the minimum aircraft system performance specifications (MASPS) considering the available and planned CNS infrastructure/ Desarrollar y armonizar la orientación relacionada con la implantación <u>RNAV/RNP, incluyendo las</u> especificaciones mínimas de la capacidad de los sistemas de aeronave (MASPS), <u>considerando la infraestructura CNS existente y planificada.</u>			
19	Promulgate translation of sections of BRNAV//TGL-2 or FAA AC 90-100 into Spanish/Promulgar la traducción de la BRNAV//TGL-2 or FAA AC 90-100			
20	Promulgate the operational approval process/Promulgar el proceso de aprobación operacional			
21	Provide examples of Operations Specifications and Letters of Authority/Proporcionar a los Estados ejemplos de Especificaciones de Operaciones y Cartas de Autoridad			
22	Notify States when significant changes occur to RNAV/RNP documentation/Notificar a los Estados cuando haya cambios significativos en la documentación RNAV/RNP			
<b>23</b>	<b>Perform Rulemaking (if required) / Llevar a cabo reglamentaciones (en caso de ser requerido)</b>			
24	Recommend State airspace regulatory documentation/Recomendar al Estado la documentación de reglamentación del espacio aéreo			
<b>25</b>	<b>Perform Necessary Industry &amp; International Co-ordination/Llevar a cabo las coordinaciones con industria e Internacionales necesarias</b>			
26	Establish target implementation date/Establecer una fecha de implantación			
27	Report to ATM/CNS/SG/Reportar al ATM/CNS/SG			

<b>RNAV/RNP Implementation Task List for Enroute Operations / Lista de Tareas para la Implantación RNAV/RNP para Operaciones en Ruta</b>				
<b>ID</b>		<b>Start/Inicio</b>	<b>Finish/Termina</b>	<b>Resource Names/Nombres Recursos</b>
28	Establish format of CAR/SAM RNAV/RNP documentation webpage/Establecer el formato de documentación de la página web RNAV/RNP CAR/SAM			
29	Develop regional documentation/Desarrollar documentación regional			
30	Publish advance AIC / NOTAM/ Publicar un AIC / NOTAM adelantado			
31	Publish AIP Supplement containing RNAV/RNP policy/procedures/Publicar el Suplemento del AIP que contenga las políticas/procedimientos RNAV/RNP			
32	Review inter-facility coordination procedures/Revisar los procedimientos internos para la coordinación de la instalación			
33	Finalize airspace changes, if applicable/Finalizar los cambios en el espacio aéreo, cuando sea aplicable			
34	Finalize changes to Letters of Agreement/Finalizar los cambios a las Cartas de Acuerdo			
<b>35</b>	<b>Approval of Aircraft &amp; Operators / Aprobación de la aeronave y los operadores</b>			
36	Establish approved operations readiness targets/Establecer las operaciones aprobadas de los objetivos disponibles			
37	Assess readiness/Determinar la disponibilidad			
<b>38</b>	<b>Develop Pilot &amp; ATC Procedures /Desarrollar procedimientos para pilotos y ATC</b>			
39	Review application of tactical offset procedures/Revisar aplicación de los procedimientos tácticos de desplazamiento lateral			
40	Periodically review developments regarding actions for ACAS/TCAS Resolution Advisories that affect RNAV/RNP operations/Revisar periódicamente los desarrollos con respecto a las acciones para las Avisos ACAS/TCAS para operaciones RNAV/RNP			
41	Process Doc 7030 amendment including ATC and pilot procedures/Procesar la Enmienda al Doc. 7030 para los procedimientos meteorológicos y de contingencia			
42	Publish appropriate ATC policy & procedures on RNAV/RNP website/Publicar las políticas y procedimientos ATC en la página Internet del RNAV/RNP			
43	Report procedures to accommodate non-RNAV/RNP domestic aircraft, if applicable/Informar los procedimientos para acomodar las aeronaves domésticas sin aprobación RNAV/RNP, cuando sea aplicable			
44	Identify transition areas and procedures/Identificar las áreas y los procedimientos de transición			
45	States conduct ATC simulations to identify workload/operational factors, if necessary, and report results to ICAO regional offices/Que los Estados conduzcan simulaciones ATC para identificar la carga de trabajo/factores operacionales, si es necesario e informen los resultados a las Oficina Regionales de la OACI			
46	Publish report on ATC simulation activity/Reportar las actividades de las simulaciones			
47	Provide procedures for handling non-compliant aircraft (inc ferry & mntce) in ATS documentation/Proporcionar procedimientos para manejar aeronaves que no cumplen (incluyendo ferry y mantenimiento) con la documentación ATS			
48	Provide mutually acceptable ATC procedures for non-approved State/humanitarian/ferry/maintenance acft to transit RNAV/RNP airspace/Proporcionar los procedimientos ATC de aceptación mutua para las aeronaves de Estado/humanitario/ferry/mantenimiento no aprobadas para transitar en el espacio aéreo RNAV/RNP			
50	Liase with State defense authorities regarding military operations/Mantener una relación con las autoridades de defensa de los Estados en relación con las operaciones militares			
<b>51</b>	<b>Pilot &amp; ATC Training/Entrenamiento de Pilotos y ATC</b>			
52	Provide ATC training documentation to States/Proporcionar la documentación de capacitación ATC a los Estados.			
53	Conduct local RNAV/RNP training for air traffic controllers/Conducir capacitación RNAV/RNP local para los controladores de tránsito aéreo			



## APPENDIX B

## ACTION PLAN MODEL FOR IMPLEMENTATION OF RNAV-RNP IN TMA

Activities	Responsible Area	Initiation Date	Finalization Date	Application Status	Remarks
1. Approval of the Action Plan for implementation of RNAV-RNP in TMA	GREPECAS				
2. Identification of operational need.	States				
3. Study of impact in the airspace.	States				
4. Establishment of RNAV-RNP approval procedures.	States				
5. Analysis of cost-benefit considering: - ATS Service Providers; and - Users.	States / Users				
6. AIC for information dissemination.	States				
7. Develop Regional Documentation.	GREPECAS States				
8. Coordination with ATS service providers and users.	States				
9. Establishment and maintenance of an approved aircraft registry.	CARSAMMA States				

<b>Activities</b>	<b>Responsible Area</b>	<b>Initiation Date</b>	<b>Finalization Date</b>	<b>Application Status</b>	<b>Remarks</b>
10. Establishment of a minimum amount of RNAV/RNP approved aircraft before trial initiation.	States				
11. Programme for airspace safety evaluation.	States				
12. Programme for collecting information for safety evaluation and operational availability.	States and Users				
13. Publication of an AIC informing the aeronautical community of the introduction of procedures and requirements.	States				
14. Publication of an AIP Supplement with applicable procedures and requirements.	States				
15. Notification to CARSAMMA of RNAV/RNP approved Aircraft.	States				
18. Conduct local RNAV/RNP training for air traffic controllers.	States				

<b>Activities</b>	<b>Responsible Area</b>	<b>Initiation Date</b>	<b>Finalization Date</b>	<b>Application Status</b>	<b>Remarks</b>
19. Evaluation of applicable minimum separation, using Collision Risk Models, considering available and planned CNS infrastructure.	States				
19. Evaluation of the Preliminary Operational Safety.	States				
21 Evaluation of the Final Operational Safety.	States				
22 Evaluation of Operational Availability.	States				
23. Decision to continue or postpone pre-operational trials.	States				
24 Date for RNAV/RNP in TMA implementation	States				