



AP/ATM/11
WP/10
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REVISED

**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**

CAR/SAM Performance Based Navigation Road Map

(Presented by the RNAV/RNP Rapporteur)

Summary

The objective of this working paper is to present proposals to obtain the information needed to develop the CAR/SAM Performance Based Navigation Road Map, in accordance with working programme of the RNAV/RNP Task Force.

References

- Report of AP/ATM/11 Meeting.
- Report of ATM/CNS/4 Meeting.
- Report of RNPSORSG Meetings.

1. Introduction

1.1 During ATM/CNS/4 it was discussed the strategy of including all the airspace of the CAR/SAM Regions into a single En-Route Operations Implementation Plan. Along these lines, it was considered extremely complex the task of re-structuring the airspace for the use of RNAV/RNP concept in the CAR/SAM Regions in a single Implementation Plan.

1.2 Furthermore, 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.

1.3 The ATM/CNS/4 Meeting considered that the best strategy is to implement RNAV/RNP 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.

1.4 In order to begin the process of harmonization, the RNAV/RNP Task Force shall develop a Road Map, in order to give the necessary guidance to the Implementation Groups.

2. Analysis

2.1 The development of a Road Map is a key issue to harmonize the implementation of RNAV/RNP in the CAR/SAM Regions.

2.2 In accordance with presentation made by FAA during the RNAV/RNP Seminar the key Steps in Developing a Roadmap are the following:

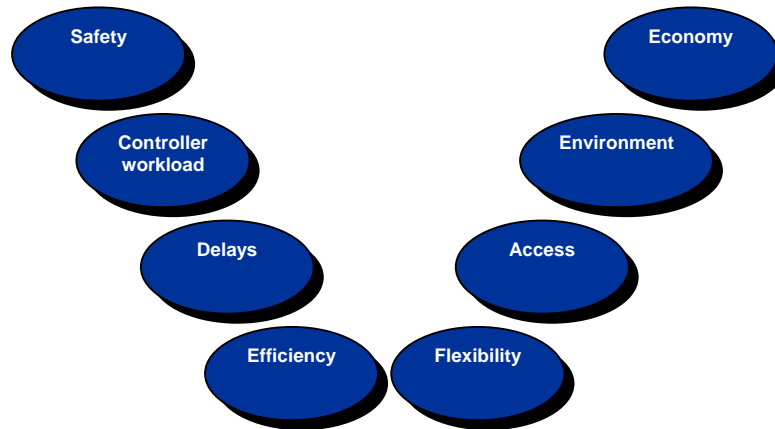
- Establish Partnerships & Collaboration
- Define Safety, Capacity and Efficiency Goals
- Determine Implementation Time Horizons
- Define Operational Domains for Implementation
- Understand Air Traffic Demand And Growth
- Define Operational Concepts for the near, mid and far terms
- Develop an Equipage Inventory
- Develop enabling criteria, standards and guidance material
- Conduct Post-Implementation Analysis
- Develop Harmonized Strategies

2.2.1 Establish Partnerships & Collaboration



2.2.1.1 Most of the RNAV/RNP stakeholders attend somehow the AP/ATM Meetings. IATA, IFALPA, Air Navigation Service Providers, Regulators and Regional Authorities, Military, etc. However, the information regarding some other important parties (Airports, General and Business Aviation, Local Communities) in the process depends on the information that is provided by AP/ATM members. Taking into consideration that the RLA 098/003 Project is about to end, the RNAV/RNP Task Force should find another way to obtain this partnership for the development of the CAR/SAM Performance Based Navigation Road Map.

2.2.2 Define Safety, Capacity and Efficiency Goals



2.2.2.1 The RNAV/RNP should find a way to establish goals and metrics in order to guide the implementation of Performance Based Navigation in the CAR/SAM Regions. Several examples of parameter that must be taken into consideration could be given:

- a) Safety – TLS 5 X 10⁻⁹ accidents per flight hour per aircraft
- b) Controller Workload – The implementation of PBN is expected to reduce the Controller Workload. However, depending on how this implementation will be done (mix of aircraft of different capabilities, for example), the Controller Workload could be increased.
- c) Economy, Efficiency and delays – These parameter must be included in the Cost-Benefit Analysis.
- d) Access and Flexibility – the implementation must take into consideration the non equipped users.

2.2.3 Determine Implementation Time Horizons

2.2.3.1 It will be necessary to the RNAV/RNP Task Force to establish near, mid and long term strategy to implement Performance Based Navigation, in accordance with safety, capacity and efficiency benefits to be obtained in each phase.

2.2.4 Define Operational Domains for Implementation

2.2.4.1 Normally the operational domains for implementation of Performance Based Navigation are En route, TMA and Approach. The Airport Operations must be taken into consideration, in order to avoid delays due to the ground infrastructure.

2.2.5 Understand Air Traffic Demand And Growth

2.2.5.1 The Air Traffic Demand and Growth is a key element of the Performance Based Navigation Road Map, taking into consideration that one of the main objectives of RNAV/RNP Operations is to attend the Air Traffic Demand and its growth. Along this lines, the collection of traffic data carried out from 1 to 15 July 2005, in accordance with Conclusion AP/ATM/10/8, started the process to obtain the actual demand in the higher airspace. The meeting should discuss if it will be necessary to expand the data collection in order to obtain traffic data from the lower airspace and the TMA. Regarding the growth of traffic, the meeting should analyze the best mean to obtain this data, probably using the GREPECAS Traffic Forecasting and Economic Planning. The planning and implementation process of Performance Based Navigation should count on Fast Time Simulation, in order to develop the best airspace structure. This kind of simulation depends on the quality of data, mainly the air traffic demand and forecast.

2.2.6 Define Operational Concepts for the near, mid and far terms

2.2.6.1 In accordance with the RNAV/RNP Task Force Working Programme, it will be necessary to develop an Operational Concept, in order to harmonize the implementation process in the CAR/SAM Regions.

2.2.7 Develop an Equipage Inventory

2.2.7.1 The collection of traffic data carried out from 1 to 15 July 2005, in accordance with Conclusion AP/ATM/10/8, was the first step to understand the traffic demand. One of the aim of the RNAV/RNP Questionnaire approved during ATM/CNS/4 meeting, as a conclusion ATM/4/2, is to obtain data about the fleet capacity to fly in RNAV/RNP environment. This questionnaire will be discussed during the meeting (WP 02), and the OPS/AIR personnel should discuss the best mean to develop an equipage inventory. Taking into consideration the air traffic data and the equipage inventory, it will be possible to obtain a clear picture of the actual status of the fleet that flies in the CAR/SAM Regions.

2.2.8 Develop enabling criteria, standards and guidance material

2.2.8.1 One of the main ICAO objectives is to harmonize the application of RNAV/RNP all over the world. Along these lines, probably, CAR/SAM Regions will apply standards and criteria already developed. One possible example is to use RNAV-5 (BRNAV) or RNAV-2 (USRNAV) for en route operations in some airspace in the CAR/SAM Regions. The adoption of specific criteria should be analyzed in deep, in order to achieve the best criteria, in accordance with CAR/SAM peculiarities.

2.2.9 Conduct Post-Implementation Analysis

2.2.9.1 The Post-Implementation Analysis Strategy should be included in the Performance Based Navigation Road Map, mainly regarding safety and efficiency, taking into consideration the need of a close follow-up of the RNAV/RNP Operations, after a new implementation.

2.2.10 Develop Harmonized Strategies

2.2.10.1 Taking into consideration that is expected a number of Performance Based Navigation Implementation Task force in the CAR/SAM Regions, it will be essential to include in the Performance Based Navigation Road Map a strategy to guarantee the Regional and Inter-Regional RNAV/RNP harmonization.

3. **Content of CAR/SAM Performance Based Navigation Road Map**

3.1 The CAR/SAM Performance Based Navigation Road Map should contain at least the following items:

- a) Background – Rationale for the Performance Based Navigation Implementation in the CAR/SAM Regions. This item should include a summary of the analysis about the need of the Performance Based Navigation Implementation.
- b) Key Terms and Concept
- c) Benefits of Performance Based Navigation.
- d) Implementation of Performance Based Navigation – This item should include:
 - Operational Domains (En route, TMA, Approach)
 - Implementation Time Horizons (near, mid and long term)

4. **Training of Experts in the ATC, OPS/AIR and SAM fields**

4.1. Taking into account that the Performance Based Navigation implementation in the CAR/SAM Regions will demand a wider restructuring of airspace, even more complex than RVSM implementation, it is important that experts in ATC, OPS/AIR and SAM fields be trained to work in restructuring the airspace, analyze the work performed by the Technical Cooperation Project, if were the case, or carry out directly the necessary tasks, mainly in the TMAs.

4.2 The ICAO initiative of carrying out the security evaluation course through a Special Implementation Project could be taken as an example for developing similar courses in the ATC field, mainly for Airspace Planners and OPS/AIR.

5. **Suggested action**

5.1 The meeting is invited to:

- a) Verify if all the information needed to the development of the Performance Based Navigation Road Map is included in the questionnaire presented in the WP 04;
- b) Discuss the strategy to guarantee the partnership and collaboration for the development of the Performance Based Navigation Road Map.
- c) Discuss the best mean to establish a training process to the people involved in the Performance Based Navigation Planning and Implementation.