



Agenda Item 2: ATM Developments
2.2 Follow-up on regional activities and implementations relating to
airspace organization and management (AOM)

OPTIMIZATION OF THE ATS AIRSPACE STRUCTURE

(Presented by the Secretariat)

SUMMARY

This Working Paper presents air space planning and revision criteria, considering the required navigation performance (RNP) and RNAV established in the performance-based navigation (PBN), for the optimization and efficiency in air operations.

References:

- Report of the Eleventh Air Navigation Conference (AN-Conf/11) (Montreal, Canada 22 September to 3 October 2003).
- Global ATM Operational Concept (Doc 9854).
- Report of GREPECAS/14 (San Jose, Costa Rica, 15 – 20 April 2007).

Strategic Objective:

D: Efficiency - *Enhance efficiency of aviation operations.*

1. Introduction

1.1 The Eleventh Air Navigation Conference supported the Global ATM Operational Concept vision (Doc 9854), of an interoperable and seamless airspace that contains all air operations, allowing the airspace users and service providers to achieve optimum safety, financial and efficient operations, toward a global ATM system totally integrated and harmonised.

1.2 In compliance with a harmonised regional vision, GREPECAS by its Conclusion 14/46, approved that PBN Roadmap be considered as a fundamental document for the harmonisation of PBN implementation in the CAR/SAM Regions.

2. Discussion

2.1 The air space organization and the corresponding ATS routes infrastructure, installations and ground services, defined by air navigation regional agreements and published in the ANPs, to a large extent, continues to be based in national requirements. The Caribbean Region still requires improvements in the airspace fragmentation, to harmonise national systems diversity and improvements to the airspace

segregation for military utilization and often preventing from an optimum utilization of the airspace, limiting the system's capability to meet the air operations demand.

2.2 The global seamless ATM system aims to achieve interoperability and seamlessness across regions for all users during all phases of flight; meets agreed levels of safety; provides for optimum economic operations; is environmentally sustainable; and meets national security requirements.

2.3 Interoperability may be described as the ability to transfer information or effect functionality. Interoperability is primarily associated with the need for systems, people and procedures, among other things, to operate effectively with other systems.

2.4 Continuity or "seamless" is described as the property that allows a transition across any discontinuity which from the perspective of the transiting agent does not require a considered action to facilitate the transition. The continuity related mainly with the users or operators of a system.

2.5 States should improve their efforts to optimize and redesign routes structure and airspace to accommodate the existent systems, while ensuring the emerging systems and new technological solutions can be integrated in the air navigation infrastructure. The objective should be seamless functions, procedures and operations in different air spaces.

2.6 A homogeneous ATM area is an airspace with a common ATM interest, based on similar characteristics of traffic density, complexity, air navigation system infrastructure requirements or other specified considerations wherein a common detailed plan will foster the implementation of interoperable ATM systems. Homogeneous ATM areas may extend over States, specific portions of States, or groupings of States. They may also extend over large oceanic and continental areas that are considered areas with shared interest and requirements.

2.7 A major traffic flow refers to a concentration of significant volumes of air traffic on the same or proximate flight trajectories. Major traffic flows may cross several homogeneous ATM areas with different characteristics. The north/south flow between the New York area and the Eastern Caribbean is a major traffic flow, as several are between the NAM and CAR Regions.

2.8 A routing area encompasses one or more major traffic flows, defined for the purpose of developing a detailed plan for the implementation of ATM systems and procedures. A routing area may cross several homogeneous ATM areas with different characteristics. A routing area specifies common interests and requirements among underlying homogeneous areas, for which a detailed plan for the implementation of ATM systems and procedures either for airspace or aircraft will be specified. The route networks of North America, taken together, is an example of a routing area with distinct flows, north/south and east/west wherein traffic is common to both networks, yet the underlying homogeneous area has variations in infrastructures, procedures and requirements.

2.9 With work underway to redesign WATRS and to analyze routes and flows across CAR Region, we have the opportunity to move toward the near term view of seamless international operations and the longer view of a seamless global ATM system.

Air Transport Environmental Challenges

2.10 In the CAR/SAM Regions many actions have been taken, aimed at reducing air transport environmental impact, nevertheless, the field is clear to improve the aircrafts operations management. Having ICAO goal as a background to limit or reduce the fuel emissions, States have the responsibility to analyze the impact that air transport has on global climate. This requires firm actions from the States, in order to review and improve the ATS areas and routes structures, the airspace operational management and airports.

2.11 Regarding to ICAO's Committee work on civil aviation environmental protection (CAEP) and on the methodologies for the assessment of such benefits at global and regional levels, the areas where operational improvements can be achieved are, among others, a promotion of flights planning and flexible track, RNAV and RNP continental airspace implementation, continuous descent approaches implementation, reduce of delays and airports noise, etc.

2.12 An optimum airspace utilization can be achievable only if the ATS route structure is perform according to the worldwide requirements in terms of ATM efficacy and efficiency. The planning requirements include the airspace optimization and redesign, and the civil military coordination, so the services provided can be optimum and effective in benefit of the ATM community, ensuring the interoperability and the airspace continuity.

2.13 To review airspace structure there are two fundamental types of airspace projects; one is focusing on the optimization of current structures, and the second achieves to address the airspace redesign. The main differences between the optimization and redesign efforts, are currently developing and in a timeframe for implementation.

2.14 Optimization efforts strengthen the current system; they occur in a near term through an evolution process, and concentrate on existing structures and technology.

2.15 To develop new structures incorporating technological and conceptual improvements, redesign efforts requires a greater timeframe, as they become available. During the airspace assessment process, the focus will shift from near term optimization of the present structures, to longer term redesign efforts.

2.16 A major commitment in time, effort, and financial funding, along with a collaborative approach, is necessary to a successful implementation of airspace redesign. The outcome of this approach will be a single, continually evolving vision of the airspace structure divided into specific tasks to carry out a standardized effort.

2.17 All efforts must focus, develop and maintain a regional vision ensuring an efficient outcome of the regional ATS airspace. This work requires CDM process, as major effort of team, along with a corresponding high level of support on their organizations.

2.18 Team is a set of individuals in charge serving on a collateral basis to create and drive redesign efforts, particularly those efforts devoted to the terminal, en route, and oceanic environments, which will review all available ideas and concepts for compatibility and feasibility in light of current technology and resources.

Performance-based Navigation (PBN)

2.19 It is obvious that with the implementation of RNP, there is a close connection between the criteria for the design of en-route and terminal area operational procedures and airspace and the assurance that only those aircraft, systems, and operators with certified performance be authorised to conduct such operations. All aircraft certification and operator approval requirements represent a specific safety aspect that needs to be addressed by the States.

2.20 It is deem advisable that when developing operational risk assessment requirements as well as national regulations for PBN approval of aircraft and operators, consideration be given to the guidance and operational criteria developed by ICAO and that the States/Territories/International Organizations use all possible resources for training air traffic controllers and pilots, bearing in mind the future implementation of this concept in the CAR/SAM Regions.

2.21 The PBN Roadmap approved by GREPECAS/14, establishes a strategy in a short-term (until 2010) and a medium-term (2011-2015) aimed at implementing en-route PBN and terminal area, as follows:

- a) **Oceanic and remote airspace**
 - Applicable navigation specifications: RNP 10 and RNP 4
 - Implementation strategy: 100% implementation by 2010
- b) **En-route continental**
 - Applicable navigation specifications: RNAV 5, 2, and 1, RNP 2 and 1
 - Implementation strategy: 70% by 2010; 100% by 2014
- c) **Terminal area**
 - Applicable navigation specifications: RNAV 1, 2 and RNP 1 (basic and advanced)
 - Implementation strategy: 30% by 2010; 60% by 2014; 100% by 2016
- d) **Approach**
 - Applicable navigation specifications:
 - o APV: RNP 0.3 , RNP 0.3-0.1,
 - o LNAV only: RNP 0.3
 - Implementation strategy:
 - o International aerodromes: APV at all runway ends: 10% 2008; 30% by 2010; 70% by 2014 and 100% by 2016.
 - o Domestic aerodromes (where operations with a weight category of more than 5 700 kg take place):
 - Only LNAV at all runway ends: 10% 2008; 30% by 2010; 70% by 2014 and 100% by 2016.
 - APV at all runway ends: 10% 2010; 30% by 2012; 70% by 2016 and 100% by 2018.
 - o Domestic aerodromes:

- Only LNAV at all runway ends: 10% 2010, 30% by 2012, 70% by 2016 and 100% by 2018.

3. Conclusion

3.1 The strategy to review and improve the ATS routes and space structure, requires joint actions for airspace operational management and airports. Additionally, the States should encourage the interested parties to adopt a pro-active approach in respect to environmental management and urgent measures be applied on operational management to limit or reduce the environmental aircraft engine emissions impact.

4. Suggested Action

4.1 The Meeting is invited to:

- a) take note of the information contained in this working paper;
- b) define CAR Region areas where improvements to the airspace/or ATS routes can be incorporated; and,
- c) take the necessary actions as deem convenient.