



Fifth Meeting of the Programmes and Projects Review Committee (PPRC/5)
 Mexico City, Mexico, 16 to 18 July 2019

Agenda Item 5: Review of GREPECAS Programmes and Projects and Subsidiary Groups
5.1 Projects under the PBN Programme (B0-APTA, B0-FRTO, B0-CDO and B0-CCO)

FREE ROUTE AIRSPACE

(Presented by IATA)

EXECUTIVE SUMMARY	
<p>This working paper presents a proposal to harmonize the strategy applicable to the optimization of the CAR/SAM airspace, through the application of the Free Route Airspace (FRTO-B1 / 1 Free Route Airspace - FRA), applying as transition strategy the implementation of Direct Routes (FRTO-B0 - Direct routing (DCT), as it has been done by Colombia, the Dominican Republic, Curacao and CENAMER.</p>	
Action:	<p>Harmonize the CAR/SAM airspace optimization strategy, through the application of ASBU FRTO-B1, using direct routes (FRTO-B0) as a transition.</p>
<i>Strategic Objectives:</i>	<ul style="list-style-type: none"> • Air Navigation Capacity and Efficiency • Economic Development of Air Transport • Environmental Protection
<i>References:</i>	<ul style="list-style-type: none"> • SAM/IG/23 • ATSRO/10 • ANIWG/5

1. Introduction

1.1. During the last years the application of the fixed route network concept was responsible for the complete restructuring of the regional ATS route network, which involved the implementation, realignment and elimination of several routes.

1.2. However, the natural evolution of the optimization of airspace is the use of the Free Route Airspace (FRA), as established in the Global Air Navigation Plan. The use of fixed ATS routes is no longer able to provide the efficiency required for airspace users to obtain fuel savings, flexibility and reduction of greenhouse gas emissions.

2. Free Route Airspace ‘Concept of Operations’

2.1 The 37th Session of the International Civil Aviation Organization (ICAO) Assembly (2010) directed member States to increase efforts to meet the global needs for airspace interoperability while maintaining its focus on safety. ICAO therefore introduced the “Aviation System Block Upgrades” (ASBU) initiative as a programmatic framework that:

- a) Develops a set of air traffic management (ATM) solutions or upgrades;
- b) Takes advantage of current equipment;
- c) Establishes a transition plan; and
- d) Enables global interoperability.

2.2 As part of the ASBU, four performance improvement areas (PIA) have been set up:

- a) Airport Operations
- b) Globally Interoperable Systems and Data – through globally interoperable system-wide information management
- c) Optimum Capacity and Flexible Flights – through global collaborative ATM
- d) Efficient Flight Path – through trajectory-based operations

2.3 Performance Improvement Area (PIA) 3 of the ASBU deals with “Optimum Capacity and Flexible Flights – through Global Collaborative ATM” – here we can find Block B1-FRTO (Free-Route Operations):

Improved Operations through Optimized ATS Routing Introduction of free routing in defined airspace, where the flight plan is not defined as segments of a published route network or track system to facilitate adherence to the user-preferred profile

What is ‘Free Route Airspace’?

“A specified airspace within which users may freely plan a route between a defined entry point and a defined exit point, with the possibility to route via intermediate (published or unpublished) waypoints, without reference to the fixed ATS route network, subject to airspace availability and consideration of restrictions. Within this airspace, flights remain subject to air traffic control.”

Free route airspace allows airspace users to fly an efficient preferred trajectory between a defined entry and exit point (and potentially via intermediate waypoints, if desired), subject to air traffic control, rather than fly existing fixed ATS-Routes with the result to provide operational, environmental and financial benefits for airspace users.

2.4 Free Route Airspace provides an unmatched performance in terms of flight trajectory efficiency through cooperative air traffic management.

2.5 Considerations to analyse before the B1-FRTO implementation:

- a) Publication of the ‘Free Route Airspace Concept, Requirements and Restrictions’ in the State AIP. An example of State AIP is attached as **Appendix A**.
- b) Trial period can be considered for evaluation
- c) Consider/integrate military requirements from the beginning, but also convince the military to benefit of the use of Free Route Airspace
- d) Defining the ‘Area of Applicability’ and its lateral dimensions
- e) Safety is addressed with focus on human aspects

- f) Validate that the involved ATM systems can process FPLs with LAT/LONG WPT's in FIRs boundaries not predefined on the databases.
- g) Defining the segment length restrictions of Free Route Airspace segments
- h) Trajectories shall not be planned closer than xx NM (to be defined) to the Free Route Airspace lateral border
- i) Compulsory Connecting Routes for main departure / arrival flows (marginal flows connect via any Arrival / Departure points) within the Free Route Airspace dimension to reduce complexity. High density segregated departure and arrival routes may require PBN capabilities.
- j) Generally, flights may not be planned through active Prohibited-, Restricted- and/or Danger-Areas. Intermediate points can be used to avoid the active areas.
- k) Where designated, the existing ATS route network within the 'Free Route Airspace Area of Applicability' may remain initially and in parallel during a transition period, but the ultimate goal shall be to remove the fixed ATS-Route network in its entirety in the designated area.
- l) Cooperate with neighbouring/adjacent Free Route Airspaces: The larger the Free Route Airspace area – the larger the benefits
- m) The use of a SWIM concept to share ATM dynamic information improving the establishment of Free Route Airspace

2.7 Expected benefits:

- a) Improved predictability through the "File it – Fly it" concept.
- b) Elimination of constraints caused by the fixed ATS-route network structure; congestion points will disappear.
- c) No change shall be required to existing ATC procedures
- d) Using the entire airspace as a 'resource' – traditional 'unused airspace' is made available to either civil or military users (through flexible and optimal use)
- e) Enhanced planning flexibility for operators
- f) Reduction in CO2

3. Strategy for introducing the Free Route Airspace

3.1 The SAMIG/23, ATSRO/10 and ANIWG/5 meetings have decided to begin the analysis of the implementation of the Free Route Airspace, through the development of a concept of operations, changing the current strategy of implementation of fixed routes, applying PBN "only" as one of the necessary tools for the optimization of airspace.

3.2 It is important to bear in mind that the current Concepts of PBN Operations for the Airspace of the CAR and SAM Regions, in some way present the need to implement the Free Route Airspace. However, it still addresses the use of fixed routes based on PBN as the main strategy for the optimization of the en-route phase. A complete modification of the PBN CONOPS of both Regions should be made.

3.3 Considering that the implementation of airspace for en-route operations is being carried out by the Performance Based Navigation Task Force (PBN) of the ANI / WG Working Group and by the "new" Subgroup 1 of the SAM Airspace Study and Implementation Group, it is important that both groups establish a harmonization strategy for their work, with a view to reflecting a new method of implementation of en-route optimizations based on different strategies, one of which is Free Route Airspace, taking into account that free routes must cross CAR and SAM FIR interface.

3.4 With a view to more adequately reflecting the need for a more holistic optimization of the airspace of the CAR and SAM regions, as well as establishing a framework in which the PBN becomes

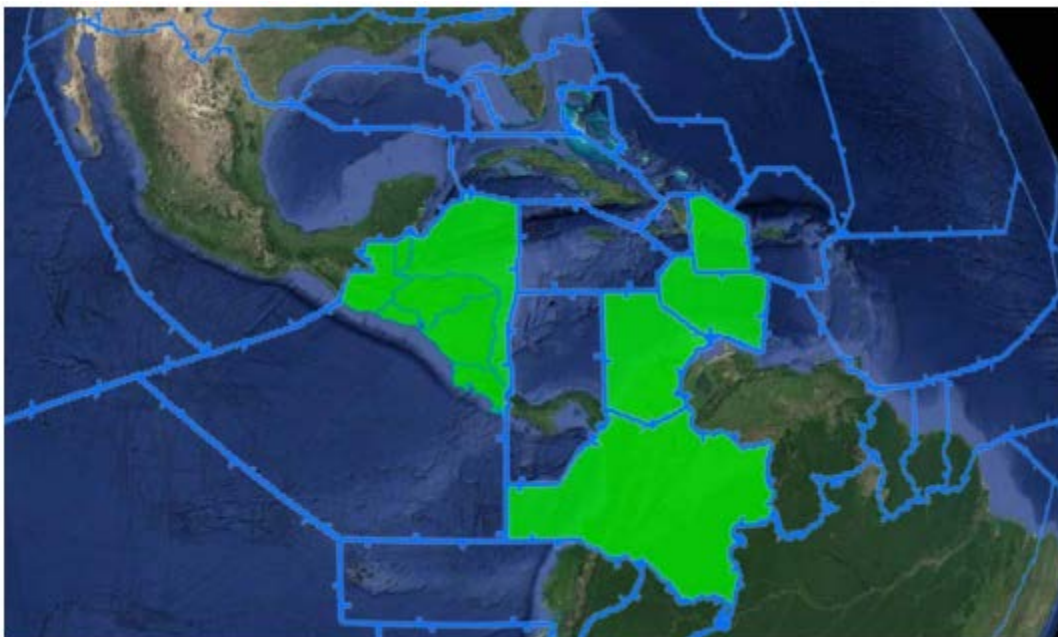
"only" one of the necessary tools for such optimization, It would be convenient to change the name of the PBN Program (B0-APTA, B0-FRTO, B0-CDO and B0-CCO) for the Airspace Optimization Program (B0-APTA, B0-FRTO, B0-CDO and B0-CCO).

4. Implementation of Direct Routing (FRTO-B0/1 Direct routing - DCT), in Colombia

4.1 Since 2018, Direct Routing is being applicable in Colombia. This concept is based on use of the any published waypoints to flight plan and operations in Bogotá and Barranquilla FIRs and could be used as a transition to the Free Route Airspace implementation.

4.2 Just for one airline (KLM) and one city pair (Guayaquil – GYE to Amsterdam-AMS), the use of Direct Routing in Colombia resulted in the 269 ton of fuel savings and 851 tons of reduction in greenhouse gas emissions.

4.3 Besides Colombia, Dominican Republic, Curazao and CENAMAER have agreed in implementing Direct Routing and trials will be initiated soon. Most of SAM States would be in position to initiate similar trials in large portions of their airspaces, which count on good Communication (VHF) and Surveillance coverages.



4.4 A full analysis of Direct Routing use in Colombian Airspace is provided by KLM in the **Appendix B** to this working paper.

4.5 An example of potential benefits that could be achieved by LATAM in the flights SPJC/MDPC/SPJC, involving Lima, Bogotá, Barranquilla, Curazao and Santo Domingo FIRs is shown in the **Appendix C**.

5. Suggested Actions

5.1 The meeting is invited to:

- a) Take note of the information provided in this working paper;
 - b) Discuss and agree on the harmonization strategy between the Performance Based Navigation Task Force (PBN) of the ANI/WG Working Group and the "new" Subgroup 1 of the SAM Airspace Study and Implementation Group, for the implementation of Free Route Airspace, based on the procedures already established in the FIRs of Bogotá and Barranquilla;
 - c) Change the name of the PBN Program name (B0-APTA, B0-FRTO, B0-CDO and B0-CCO) for the Airspace Optimization Program (B0-APTA, B0-FRTO, B0-CDO and B0-CCO)).
 - d) Establish this strategy as a high Regional priority, with a view to improving operational efficiency.
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