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**Eleventh Meeting of the North American, Central American and the Caribbean Working Group
(NACC/WG/11)**

Guatemala City, Guatemala, September 21-25, 2026

Agenda Item 3: Presentation of progress on the action plans of the NACC/WG Task Forces and progress on regional activities.

PROGRESS ON THE REDESIGN OF CENTRAL AMERICAN AIRSPACE

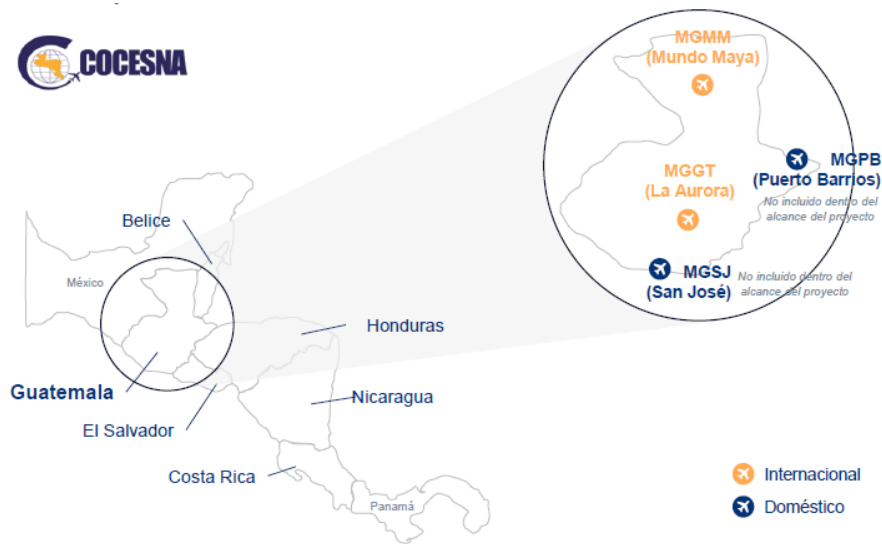
(Presented by COCESNA)

EXECUTIVE SUMMARY	
The Central American Corporation for Air Navigation Services (COCESNA), in coordination with the Directorate General of Civil Aviation (DGAC) of Guatemala, developed a project covering the diagnosis, concept of operations (CONOPS), conceptual design and validation through fast-time simulation (FTS) of Guatemala's airspace. The process identified opportunities to strengthen the integration of IFR and VFR flows, connectivity between terminal and upper airspace, and demand management. The FTS validation confirms that the proposed design improves the structuring and predictability of operations, reduces ATC workload during periods of higher demand, and provides additional capacity without significant penalties in operational efficiency or environmental performance.	
Action:	The Meeting is invited to take note of the project results and consider the experience gained as a reference for airspace optimization initiatives in the NAM/CAR Region.
Strategic: Objectives:	• Safety • Air navigation capacity and efficiency • Security and facilitation • Economic development of air transport • Environmental protection

1. Introduction

1.1 COCESNA, in coordination with its Member States, develops initiatives aimed at modernizing and optimizing Central American airspace in order to keep pace with evolving demand, improve operational efficiency and maintain appropriate levels of safety.

1.2 In this context, during 2025 and 2026, a project was developed jointly with the DGAC of Guatemala in three stages: diagnosis of the baseline operation; definition of the Concept of Operations and conceptual design; and validation of the design through fast-time simulations (FTS), following the methodological approach of ICAO Doc 9992.



1.3 The project was aimed at improving IFR accessibility, optimizing the integration of VFR operations, strengthening system capacity and promoting greater use of standard PBN procedures.

2. Diagnosis and optimization opportunities

2.1 The analysis of current operations identified priority areas in which an airspace redesign could provide greater operational benefits, particularly in the La Aurora TMA and its interaction with the upper airspace managed by COCESNA.

2.2 The La Aurora TMA operates in a particularly complex environment, mainly due to terrain conditions and the coexistence of IFR and VFR operations. The analysis identified opportunities for greater structuring and predictability of these flows, as well as for facilitating their integration into the future operational concept.

2.3 The study also identified opportunities to strengthen integration among the ATS route structure, arrival and departure procedures, and the associated airspace volumes. These considerations were incorporated into the redesign process with the aim of improving operational continuity between terminal and upper airspace and facilitating more structured flow management.

2.4 In the upper airspace, Sector 1 handles a significant proportion of the main traffic flows associated with the area under study. Accordingly, the analysis paid particular attention to its interaction with the La Aurora TMA and to workload distribution during periods of higher demand, identifying opportunities to optimize transfers and flow organization.

2.5 The Mundo Maya TMA currently has lower-density operations, which allowed the analysis to focus mainly on opportunities for standardization and evolution of procedures and the airspace structure.

3. Concept of Operations and conceptual design

3.1 Based on the diagnostic results, a new Concept of Operations was developed, aimed at greater use of standard PBN procedures, mainly RNAV 1 and RNP APCH, reducing reliance on RNP AR procedures while retaining conventional procedures as a backup for contingency situations and specific operational needs.

3.2 In the La Aurora TMA, the conceptual design reorganizes arrival and departure procedures, improves connections with the ATS route network, and seeks greater segregation of the main IFR flows. It also incorporates a new organization of VFR operations in order to reduce tactical interactions and facilitate more structured and predictable operations.

3.3 The proposal also includes adjustments to airspace volumes aimed at strengthening the correspondence between operational trajectories and controlled airspace, as well as improving integration between the TMA and upper airspace.

3.4 For Mundo Maya, a transition towards standardized PBN procedures and a more structured organization of arrival and departure flows is likewise proposed.

4. Validation through *Fast-Time Simulation* (FTS)

4.1 The conceptual design was evaluated through an FTS model that enabled comparison of the baseline situation and the redesigned scenario under equivalent demand conditions. The evaluation considered indicators related to capacity, ATC workload, sector occupancy, potential conflicts, hotspots, distance flown, fuel consumption and emissions.

4.2 Overall, the simulation confirmed the operational feasibility of the conceptual design and showed improvements in flow organization, operational predictability and the reduction of potentially conflicting interactions.

4.3 The results represent an approximate gain of three to four entries per hour in the TMA's nominal capacity, accompanied by reduced ATC workload during periods of higher demand. The analysis also demonstrates the importance of considering airspace and airport capacity in an integrated manner in order to determine the overall operational benefit that can be obtained from the proposed improvements.

4.4 At Mundo Maya, the redesign maintains low workload levels and stable operations under the demand analysed. The simulations also show sufficient headroom to accommodate future traffic increases within the scenarios considered.

4.5 In the upper airspace, the redesign partially improves interaction between the La Aurora TMA and Sector 1 through more structured transfer points and departure flows. During periods of higher demand, the use of appropriate sector configurations continues to be an important tool for distributing workload.

4.6 As part of the exercise, alternatives were evaluated to improve workload distribution between the subsectors of Sector 1. Among the configurations analysed, a vertical split using FL290 as the reference provided the most balanced workload distribution, with approximate values of 51% and 49% between the two subsectors. This result is an input for further analysis and does not, in itself, constitute an implementation proposal.

4.7 In terms of efficiency, the simulations indicate that the new design does not introduce significant penalties in fuel consumption or emissions. Some trajectories show distance variations associated with safety criteria, flow organization and terrain conditions, while remaining within parameters considered operationally acceptable in the study.

5. Considerations of regional interest

5.1 The project also highlights the importance of considering ATM capacity from a system-wide perspective, integrating the different operational and airport components in order to determine more fully the benefits associated with an airspace modification.

5.2 The simulation results represent estimates of the behaviour and theoretical capacity of the scenarios studied and should not be interpreted as declared sector capacities or as authorization for the operational implementation of the proposed modifications.

5.3 Subsequent stages should consider the corresponding operational validation, safety management and stakeholder coordination processes, assessment of the required CNS conditions, and development of the procedural amendments and aeronautical publications required prior to any eventual implementation.

6. Suggested action**6.1** The Meeting is invited to:

- take note of the progress and results achieved in the diagnosis, conceptual design and validation through FTS of Guatemala's airspace
- consider the experience and lessons learned from this project as a reference for other airspace optimization initiatives and for improving interfaces between terminal areas and upper airspace in the NAM/CAR Region.

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