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WORKING PAPER

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Miami, United States, 28 to 31 July 2025

Agenda Item 4: **Update of the E/CAR/CATG Work Programme and Activities**
4.1 Review and Analysis of the Evaluation of the Piarco Flight Information Region Lower Airspace Design

ANALYSIS OF THE PIARCO FIR LOWER AIRSPACE

(Presented by the Secretariat)

EXECUTIVE SUMMARY

This Working Paper presents a summary of the Piarco FIR Lower Airspace Evaluation conducted as part of the project to Support Instrument Flight Procedures Design Inspection/Oversight in the Caribbean Region and provides recommendations to implement optimization initiatives to enhance the airspace structure, harmonize procedures, improving safety and efficiency across the FIR.

Action:	Suggested actions are included in Section 6.
Strategic Objectives:	• Safety • Air Navigation Capacity and Efficiency
References:	• Convention on International Civil Aviation. • ANS Related Annexes to the Convention. • Procedures for Air Navigation Services (PANS). • Preliminary report of the Piarco FIR Lower Airspace Evaluation.

1. Introduction

1.1 Provision of air navigation and aerodrome services require the combination of systems, technologies and procedures, harmonized to respond to the users' expectations, enabling the safe continuity of flight operations.

1.2 ICAO Standards and Recommended Practices (SARPs), included in the Annexes to the Chicago Convention, and the Procedures for Air Navigation Services (PANS), provide the framework that allows States to ensure compliance with their responsibilities with the Convention.

1.3 The analysis and periodic evaluation of the provision of air navigation systems, and related services, provides an objective assessment, the identification of opportunities of improvement, allowing the growth and diversification of available services.

2. Background.

2.1 The ICAO NACC Regional Office is in the process of implementing a project to Support Instrument Flight Procedures Design Inspection/Oversight in the Caribbean Region. The project has 4 phases:

- Phase 1: Piarco FIR Lower Airspace Evaluation.
- Phase 2: On-site initial PANS-OPS Basic Training – English.
- Phase 3: Remote PANS-OPS On-the-Job Training – Initial.
- Phase 4: On-site PANS-OPS Inspector Workshop.

2.2 Phase 1(Piarco FIR Lower Airspace Evaluation) was completed, providing a comprehensive evaluation of the lower airspace of the Piarco FIR, with the aim of identifying opportunities to optimize airspace structure, harmonize procedures, and improve safety and efficiency across the region.

2.3 The study was conducted in alignment with ICAO SARPs, PANS and guidance material, particularly those relevant to airspace classification, Air Traffic Services (ATS) provision, and Performance-Based Navigation (PBN).

3. Piarco FIR Lower Airspace Evaluation - Analysis.

3.1 The evaluation is structured by State or Territory, allowing for a contextualized analysis of each jurisdiction's current capabilities, limitations, and development plans. For primary international airports, a comprehensive review was conducted covering airspace structure, traffic patterns, surveillance infrastructure, and published procedures. In contrast, secondary international airports were assessed specifically in terms of published terminal procedures, focusing on the availability and design of instrument approaches, departures, and arrivals. The study concludes with a consolidated analysis of the FIR, offering strategic recommendations for regional coordination and long-term modernization.

3.2 The methodology employed for the evaluation followed a structured, multi-phase approach aligned with ICAO guidance and regional planning frameworks. The assessment was conducted in coordination with national aviation authorities, air navigation service providers, and relevant regional bodies.

3.3 The methodology comprises the following key components:

a) Data Collection: Compilation of AIP documents, NOTAMs, air traffic statistics, operational capacity reports, and aeronautical charts for each State or Territory within the Piarco FIR.
b) Stakeholder Engagement: Coordination with national authorities to validate information and clarify local operational contexts.
c) State-by-State Assessment: Each State was individually assessed across the following domains: Configuration of the primary international airport; Airspace classification; CTR and TMA structure; Navigation aids and surveillance infrastructure; Published instrument procedures for arrivals, departures, and approaches; Integration with regional ATS route structures; Air traffic volume analysis.
d) Compliance Review: Evaluation of alignment with ICAO standards related to airspace classification, ATS provision, and PBN implementation.

3.4 The evaluation provided the following results:

a) Consolidated Regional Analysis: Synthesis of individual findings to assess regional interoperability, identify structural and procedural gaps, and recommend harmonization.
b) Strategic Recommendations and Project Planning: For each State, a tailored list of strategic recommendations was developed. An integrated evaluation of the entire FIR lower airspace supported the definition of a conceptual improvement plan, including scope, timeline, and preliminary budgeting. ***These elements are intended to serve as inputs for the formulation of optimization projects***.
c) For quality assurance, standardized checklists were developed to guide the review of aeronautical charts, flight procedure design, and terrain/obstacle surveys submitted by third-party providers.

4. Strategic recommendations.

4.1 As an immediate result of the evaluation, several opportunities for improvement were identified, which were presented as strategic recommendations. These recommendations are intended to serve as inputs for the formulation of the following optimization projects:

a) Improvement of the aeronautical information system.

Support the transition from AIS to AIM, developing national competencies and improving internal processes to enhance the management of aeronautical information, to implement the service level of agreement (SLA) and to enhance the consistency of information/data publication. This will allow users of the airspace to have timely, more accurate and easier to access information to support their operations.

b) Harmonization of airspace structure and classification.

Promote the standardization of criteria for the delimitation and classification of airspace and operational procedures according to the ATS provided. This will reduce airspace fragmentation, enhance the protection of aircraft during arrivals and departures, improve flight profile predictability, standardize coordination procedures and reduce workload for crews and ATC personnel.

c) Improvement of air navigation and surveillance infrastructure.

Encourage the update of air navigation and surveillance infrastructure, by promoting the replacement of legacy navaids systems, the implementation of ATS surveillance systems or the sharing of ATS surveillance capabilities. This will increase navigation precision and harmonize with modern avionics standards, expand airspace capacity and improve ATC situational awareness. From the ATS perspective this can support more proactive air traffic flow management and improve safety margins, while enhancing airspace access during low-visibility conditions.

d) *Enhancement of terminal instrument flight procedures.*

Support the design and publication of Standard Instrument Departures (SIDs), Standard Terminal Arrival Routes (STARs) and instrument approach procedures with vertical guidance. This will facilitate standardised arrivals and departures, improve arrival flow sequencing in airports with high traffic demand, enhance access and improve safety for airports surrounded by mountainous terrain or during low visibility conditions. This will also improve continuous descent and climbing.

e) *Regional integration and ATS route connectivity.*

Enhance procedural connectivity between terminal areas and regional ATS routes allowing more consistent use of entry/exit points aligned with TMAs, standardizing vertical and lateral handoffs between adjacent TMAs. This will improve integration with regional ATS routes, reduce tactical vectoring, and facilitate seamless coordination with adjacent sectors.

f) Procedural design oversight.

Support the selection and hiring of instrument flight procedures design service providers, implementing formal tools to evaluate third-party design quality or compliance. This will ensure that instrument flight procedures published on behalf of each State are compliant with the national and international requirements.

g) Capacity building and technical training.

To ensure the sustainability and long-term effectiveness of airspace optimization efforts, it is recommended to establish a regional capacity-building initiative focused on instrument procedure design and airspace management. This could include standardized training programs, knowledge exchange workshops, recurrent courses and certification pathways aligned with ICAO guidance. Enhancing technical competencies across the region will empower States and Territories to oversee and maintain high-quality flight procedures, foster greater autonomy in airspace management, and support harmonized implementation of future performance-based navigation initiatives.

5. Conclusions.

5.1 The strategies to support the improvement of the Piarco FIR Lower Airspace face significant challenges, due to the complexity of the airspace, the number of ATS providers involved, the lack of standardized mechanisms for decision making and limited availability of resources. It is necessary to think out of the box, explore different methods and make the best possible use of resources.

5.2 In the short term, States, Territories and International Organizations collaborating for the provision of air navigation services under the Piarco FIR must adopt an enhanced regional approach for decision making, promoting more seamless service provision from the perspective of the airspace users.

5.3 Despite several factors that at first glance may seem like limitations, organizations that provide air navigation services and aerodromes in the region have a significant opportunity for development, as they are a fundamental support for the main economic activity and, consequently, for the sustainable development of their States. In other words, their airspace and privileged location are resources that must be promoted and properly managed by more efficient organizations. We need to look not only at where we are now, but also at where we need to be to achieve these goals.

6. Suggested Actions.

6.1 The Meeting is invited to:

a) endorse the strategic recommendations included in Section 4;

b) analyse the implementation of a mechanism to enhance the project proposals presented in this Working Paper;

c) request the ECAR/CATG Committees to review the different project proposals and analyse the integration of support activities to their work programme; and

d) suggest any other action deemed necessary.

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