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Tenth Eastern Caribbean Civil Aviation Technical Group Meeting (E/CAR/CATG/10)
Fort-de-France, Martinique, 15 to 17 July 2026

Agenda Item 4: Follow-up of the activities of the E/CAR/CATG
4.3 Progress report of the Air Traffic Management (ATM) Committee

**SAFE INTEGRATION OF SPACE TRANSPORT OPERATIONS INTO
THE EASTERN CARIBBEAN REGION - IMPACT ON PIARCO FIR AND REGIONAL CONSIDERATIONS**

(Presented by Trinidad and Tobago)

EXECUTIVE SUMMARY	
This Working Paper highlights the growing impact of Space Transport Operations (STO), on Air Traffic Services (ATS) within the Piarco FIR. Recent operations, demonstrate increasing operational complexity, airspace disruptions, and coordination challenges. The paper outlines the effects on civil aviation operators, identifies systemic regional issues, and proposes actions for E/CAR States and the CATG to support safe, efficient, and harmonized integration of STO into the civil aviation system.	
Action:	Suggested actions are included in Section 4.
<i>Strategic Objectives:</i>	• Every Flight is Safe and Secure • Aviation is Environmentally Sustainable • Aviation Delivers Seamless, Accessible, and Reliable Mobility for All • No Country Left Behind
<i>References:</i>	• NACC/DCA/14 — WP/23 Operational Challenges and Regional Coordination Considerations for Commercial Space Transport Operations in the NAM/CAR Regions • AMCB/TF/2/CIIFRA/11 Summary of Discussions • E/CAR/CATG/9 — WP/15 impact of Space-X super-heavy rocket launches on ATS operations within the Piarco fir

1. Introduction

1.1 Space Transport Operations have increased significantly in frequency and geographic scope, affecting multiple FIRs across the NAM/CAR Region and directly impacting the Piarco FIR.

1.2 These operations require the establishment of hazard areas, contingency airspace, and dynamic traffic management measures to ensure safe separation between civil aircraft and space activities.

1.3 The Eastern Caribbean Sub-Region, located downstream of major launch trajectories, is increasingly exposed to risks associated with rocket ascent, debris dispersion, and contingency scenarios, requiring coordinated regional responses.

2. Discussion

2.1 Impact of STO on Piarco FIR Operations

2.1.1 The SpaceX Starship Flight 12 (22 May 2026) illustrates current operational realities:

- a) Multiple launch delays (“scrubs”) required repeated planning cycles;
- b) Airspace reservations and contingency procedures were activated and cancelled multiple times; and
- c) Risk-based areas (10^{-7}) required detailed safety assessments and publication of Airspace Management Plans (AMPs)

2.1.2 These events result in:

- a) Frequent airspace reconfiguration;
- b) Repeated NOTAM issuance and amendments;
- c) Increased workload for ATC and flow management personnel; and
- d) Significant strain on limited human resources

2.2 Effects on Civil Aviation Operators

2.2.1 STO activities and Space Debris fall-back have direct operational and economic impacts on aircraft operators:

- a) Rerouting and extended flight times;
- b) Reduced predictability in flight planning;
- c) Schedule disruptions and network inefficiencies; and
- d) Increased fuel burn and emissions

2.2.2 Airspace closures and uncertainty may result in:

- a) Holding, diversion, or return-to-origin scenarios;
- b) Ambiguity in interpreting NOTAM restrictions due to non-standard terminology; and
- c) Reduced capacity in critical air traffic corridors.

2.2.3 Historical incidents (e.g., SPACE -X Flight 7 failure, January 2025) demonstrated severe operational impacts, including:

- a) Sudden airspace closures without prior notice;
- b) Tactical ATC measures such as holding and diversions; and
- c) Immediate disruption to regional traffic flows.

2.3 Key Challenges for the Eastern Caribbean Region

2.3.1 Lack of Harmonization:

- a) Inconsistent terminology (Danger Areas, AHA, DRA, 10^{-7} areas); and
- b) Variability in NOTAM content and interpretation.

2.3.2 Cross-Boundary Coordination Gaps:

- a) Non-synchronized airspace activation timelines;
- b) Differing Traffic Management Measures (TMMs) between FIRs; and
- c) Increased coordination complexity across the region.

2.3.3 Information Limitations:

- a) Limited advance notice of launch schedules and contingency scenarios; and
- b) Insufficient real-time operational data from space operators.

2.3.4 Operational and Human Resource Constraints:

- a) Repeated AMP development requirements;
- b) High volume of coordination meetings; and
- c) Increased reliance on tactical measures rather than strategic planning.

2.4 Regional Considerations for Safe Integration of STO

2.4.1 The Eastern Caribbean Region must adopt a coordinated and proactive approach to STO integration, including:

- a) Risk-Based Airspace Management:
 - i. Transition from static closures to dynamic, risk-based methodologies; and
 - ii. Clear distinction between hazard areas and contingency areas, recognizing that while they may be defined using different methodologies (deterministic or probabilistic), they correspond to different maximum acceptable casualty risk thresholds (10^{-6} and 10^{-7} , respectively).
- b) Standardization:
 - i. Harmonized definitions and terminology for space-related airspace; and
 - ii. Standardized NOTAM formats and minimum information requirements.
- c) Collaborative Decision-Making (CDM):
 - i. Full participation of ANSPs, aircraft operators, and space operators; and
 - ii. Use of platforms such as CADENA for pre-tactical and tactical coordination
- d) Airspace Management Planning:
 - i. Mandatory development of AMPs for all STO events; and
 - ii. Inclusion of contingency procedures (e.g., debris response, abort scenarios)

e) Capacity and Training:

- i. Development of specialized training for ATC, flow managers, and operators;
- ii. Training for Pilots and STO coordinators; and
- iii. Simulation exercises for STO scenarios.

f) Performance Monitoring:

- i. Tracking delays, reroutes, and environmental impacts; and
- ii. Post-event reviews to improve procedures.

3. Conclusions

3.1 Space Transport Operations are no longer an emerging issue but a current and growing operational reality impacting the Piarco FIR and the wider Eastern Caribbean Region.

3.2 Without harmonized procedures, improved coordination, and risk-based approaches, STO will continue to pose safety, capacity, and efficiency challenges to civil aviation.

3.3 The E/CAR/CATG is uniquely positioned to drive regional alignment and ensure the safe and efficient integration of STO into the air traffic management system.

3.4 Space Debris Fall-backs that are not captured in the STO definition also need monitoring and thorough tracking back to ANSPs.

4. Proposed Actions for the CATG

4.1 The Meeting is invited to:

- a) Take note of the information provided in this Working Paper.
- b) Consider the work conducted by other regions on managing STOs.
- c) Recognize STO as a Regional Priority:
 - i. Acknowledge the increasing operational impact of space activities on the E/CAR Region;
- d) Support Harmonization Initiatives:
 - i. Develop standardized terminology for hazard and contingency airspace; and
 - ii. Promote consistent NOTAM formats across the region.
- e) Enhance Regional Coordination:
 - i. Establish a structured regional CDM framework for STO events;
 - ii. Ensure synchronized activation/deactivation of airspace restrictions; and
 - iii. Consider a collaborative study between ANSPs and STO data originators.
- f) Strengthen Airspace Management Planning:
 - i. Encourage all States/ANSPs to develop and implement AMPs; and
 - ii. Promote risk-based methodologies rather than conservative blanket closures.
- g) Establish Real-Time Coordination Mechanisms:

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- i. Implement a “live” regional coordination platform during STO events for tactical decision-making.
- h) Develop Training and Guidance:
 - i. Support ICAO, CANSO, and IATA initiatives for STO-related training;
 - ii. Consider joint sessions between ANSP and STO data originators; and
 - iii. Build regional competency frameworks.
- i) Improve Information Sharing:
 - i. Advocate for earlier and more detailed data from space operators; and
 - ii. Define minimum information requirements for STO notifications.
- j) Conduct Regional Performance Monitoring:
 - i. Establish metrics for assessing impact on civil aviation;
 - ii. Use findings to refine procedures.
- k) Provide further guidance for advancing regional harmonization and coordination for STO integration.

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