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St. George's, Antigua and Barbuda, 1 to 5 June 2026**

Agenda Item 6 Seamless and Interoperable Air Navigation Services (ANS) that are Fit for the Future

Operational Challenges and Regional Coordination Considerations for Commercial Space Transport Operations in the NAM/CAR Regions

(Presented by IATA/CANSO/AMCB/TF Secretariat)

EXECUTIVE SUMMARY	
<p>This paper identifies key operational challenges experienced by Air Navigation Service Providers (ANSPs) and airspace users arising from the rapid growth of Space Transport Operations. These challenges include increased airspace closures, lack of standardized terminology and procedures, information gaps, and inefficiencies in airspace management. The paper proposes a set of recommendations for ICAO, CANSO, and IATA to support safe, efficient, and harmonized integration of space operations into the global air traffic management system.</p>	
Action:	<p>The Meeting is invited to:</p> <ul style="list-style-type: none"> a) note the information presented in this working paper; b) support the harmonization of terminology, procedures, and coordination mechanisms related to space transport operations; c) encourage States, ANSPs, and stakeholders to strengthen collaborative decision-making and cross-boundary coordination for space operations; and d) support the development of training, performance monitoring, and operational guidance related to the integration of space operations into civil aviation systems
<i>Strategic Objectives:</i>	<ul style="list-style-type: none"> • Every Flight is Safe and Secure • Aviation is Environmentally Sustainable • Aviation Delivers Seamless, Accessible, and Reliable Mobility for All • No Country Left Behind • The International Civil Aviation Convention and Other Treaties, Laws and Regulations Address All Challenges

	<ul style="list-style-type: none"> • The Economic Development of Air Transport Assures the Delivery of Economic Prosperity and Societal Well-Being for All
<i>References:</i>	<ul style="list-style-type: none"> • ICAO Global Air Navigation Plan (GANP) • ICAO Doc 9854 — Global Air Traffic Management Operational Concept • Relevant ICAO provisions related to Air Traffic Management and Airspace Management • CANSO CADENA Collaborative Decision-Making Framework

1. Introduction

1.1 Space transport operations have increased significantly in recent years, resulting in higher frequencies of launches, re-entries, and associated airspace restrictions.

1.2 This growth has led to a measurable rise in:

- The number of NOTAMs related to space activities;
- The geographic extent and duration of airspace closures; and
- Operational impacts across multiple Flight Information Regions (FIRs).

1.3 It has also resulted in increased operational complexity for both ANSPs and airspace users, including:

- More frequent airspace reconfigurations;
- Reduced predictability in flight planning due to short notice changes in airspace availability;
- Rerouting, extended flight times, and associated fuel consumption and environmental impacts; and
- Increased workload for operational personnel, including controllers, flow managers, and airline operations centers.

1.4 The integration of space operations into shared airspace presents increasing challenges for both ANSPs and airspace users, requiring coordinated international action and more dynamic, risk-based, and data-driven approaches.

2. Discussion

2.1 Overview of Operational Challenges

2.1.1 ANSP Challenges

a) Increased Operational Complexity and Workload

ANSPs must manage frequent airspace reconfigurations, issue NOTAMs, and implement tactical traffic management measures, often requiring extensive coordination efforts and additional staffing.

b) Lack of Standardized Terminology

Different terminology (e.g. Danger Area, Aircraft Hazard Area, Debris Response Area, “10⁻⁷ area”) is currently used across States, leading to inconsistent understanding and operational application.

c) Cross-Boundary Coordination Difficulties

Operations frequently span multiple FIRs, resulting in:

- Non-synchronized activation timelines;
- Inconsistent traffic management measures; and
- Increased coordination complexity.

d) Information and Data Limitations

Stakeholders face challenges with:

- Limited advance information on launch windows and contingency scenarios;

e) Human Resource Challenges

- Significant human resource strain due to repeated coordination meetings and planning cycles. Each launch requires a safety assessment and the development of an Airspace Management Plan (AMP).
- Mission scrubs increase the workload drain on ANSP staffing as the process is repeated on the alternate day.

2.1.2 Airspace User (Operator) Challenges

a) Reduced Predictability in Flight Planning

- Current practices often rely on static and conservative airspace closures that may exceed operational necessity, reducing capacity and increasing inefficiencies.
- Short-notice changes create uncertainty in route planning and scheduling.

b) Operational and Network Disruptions

Airspace closures may result in:

- Rerouting and increased flight times;
- Schedule disruptions and missed connections; and
- Reduced network efficiency.

c) Increased Fuel Burn and Environmental Impact

Rerouted flights can incur:

- 15–50 minutes additional flight time;
- Significant increases in fuel consumption and emissions.

d) Ambiguous NOTAM Interpretation

Inconsistent terminology and phrasing create uncertainty regarding whether airspace is:

- Prohibited;
- Advisory; or
- Managed tactically by ATC.

2.2 Key Systemic Issues

The challenges identified indicate broader systemic issues, including:

- Lack of harmonization in terminology and procedures;
- Insufficient integration of space operations into ATM planning processes;
- Over-reliance on tactical rather than strategic management; and
- Limited use of digital and performance-based approaches.

3. Recommendations for Regional Improvement

3.1 Harmonization of Terminology and Procedures

The Meeting is informed of the need to:

- Reinforce the proper use of “DANGER AREA” or “Aircraft Hazard Area (AHA)” to be used to define the planned hazard area - (Areas assessed to have a risk factor of 10^{-6});
- Develop standardized definitions for contingency areas (i.e areas assessed with a risk factor of 10^{-7} , (e.g. Debris Response Areas);
- ; and
- Harmonize operational terminology across the region to avoid ambiguity.

3.2 Safety Risk Assessment

- Recommend that each State/ANSP:
 - Conduct a formal safety risk assessment for space activities
 - Develop an Airspace Management Plan (AMP) covering:
 - Launch and re-entry scenarios
 - Hazard areas (trajectory-based)
 - Contingency scenarios (abort, debris dispersion)
 - Standardized terminology and definitions for space-related airspace
 - Harmonized risk acceptance criteria
 - Each airline must conduct its own risk assessment and flight plan accordingly

3.3 Standardized Information and NOTAM Content

- Define minimum information requirements for space operations, including:
 - Launch windows;
 - Airspace dimensions and activation criteria;
 - Contingency plans.
- Standardize NOTAM language to clearly indicate operational restrictions.

3.4 Enhanced Collaborative Decision-Making

- Support the structured CDM framework CADENA provides involving:
 - ANSPs;
 - Space operators;
 - Aircraft operators;
- Ensure early engagement and agreed traffic management measures

3.5 States and stakeholders are encouraged to develop harmonized procedures for:

- Synchronization of activation and deactivation timelines;
- Coordinated NOTAM publication; and
- Common traffic management measures.

3.5 Cross-Boundary Coordination

- Develop harmonized procedures for:
 - Synchronization of activation/deactivation;
 - Coordinated NOTAM publication;
 - Common traffic management measures.

3.6 Training and Competency Development

- It is recommended that ICAO, in collaboration with CANSO and IATA, develop guidance for the training and competency development of both ANSP personnel and airspace users in relation to space transport operations. This should include:
 - Standardized training programmes for air traffic controllers and flow management personnel covering space operations concepts, risk-based airspace management, and contingency procedures;
 - Awareness and operational training for airline dispatchers, flight crews, and operations control centers on space-related airspace constraints and response actions;
 - Joint simulation exercises involving ANSPs, operators, and space operators to enhance collaborative decision-making and real-time response capabilities;
 - Inclusion of space operations modules in existing ICAO training frameworks to ensure global harmonization of knowledge and practices.

3.7 Performance Monitoring

- Develop global performance indicators, including:
 - Delay metrics;
 - Additional track miles;
 - Fuel and emissions impact;
- Encourage post-event reviews to support continuous improvement.

4. Recommendations

4.1 The Meeting is invited to:

- a) support the above recommendations; and
- b) ensure the provision of adequate human resources and targeted training programs for Air Navigation Services (ANS) personnel, enabling the effective integration of space launch operations into the regional Air Traffic Management (ATM) system.