



Agenda Item 4: Report on GESEA and Subgroups activities and deliverables

**OPERATIONAL CHALLENGES AND REGIONAL COORDINATION CONSIDERATIONS FOR
COMMERCIAL SPACE TRANSPORT OPERATIONS**

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(Presented by IATA)

SUMMARY

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 (STO). 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.

References:

- 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 COMPASS-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) Cross-Border Coordination Difficulties

Operations frequently span multiple FIRs, resulting in:

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

c) Information and Data Limitations

Stakeholders face challenges with limited advanced information on launch windows and contingency scenarios.

d) 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 (cancelations) increase the workload on ANSP staffing as the process is repeated on the alternate day.

2.1.2 Airspace User Challenges

a) Reduced Predictability in Flight Planning

- Current practices often rely on static and conservative airspace closures that may exceed operational necessity, reduce capacity, and increase 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

c) Increased Fuel Burn and Environmental Impact

Rerouted flights can incur:

- 15–50 minutes additional flight time.
- 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:

- 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**

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

3.1 **Safety Risk Assessment**

- Recommend that each State/ANSP develop an Airspace Management Plan (AMP) covering ATFM procedures

3.2 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.
- Enhanced CDM Support the structured CDM platform provided through COMPASS-CADENA to facilitate the coordination among:
 - ANSPs.
 - Space operators.
 - Aircraft operators.
- Promote early stakeholder engagement to support the timely coordination and agreement of traffic management measures

3.3 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-Border 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 S T O . 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 recommendations of item 3; 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.