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Agenda Item 5: Toward More Effective Implementation Support

INCREASING EFFICIENCIES IN THE SAFE INTEGRATION OF COMMERCIAL SPACE TRANSPORTATION ACTIVITIES INTO THE AIRSPACE SYSTEM

(Presented by the United States)

EXECUTIVE SUMMARY

This paper presents the United States' proposal for new guidance to integrate commercial space transportation (CST) activities in airspace systems. CST activities are increasing globally and often require coordination with multiple Air Navigation Service Providers (ANSPs). This increase requires new procedures that minimize the duration of airspace impacts and promote efficiency for integration of these activities into the airspace system. Increasing airspace system efficiency by reducing airspace impacts for all users reduces additional miles flown and additional fuel expended, leading to reduced CO2 emissions. Developing best practices for airspace integration of commercial launch and re-entry activities may increase efficiency, reduce impacts to the environment, and foster international cooperation and consistency. Improved global cooperation will also help solidify consensus approaches in the international community for safe integration of CST activities.

Action:	The Conference is invited to: a) Request that ICAO work with Member States to identify, compile, and publish best practices on facilitating the safe and efficient navigation of aircraft around CST activities to minimize miles flown and fuel used, reducing costs and the impacts on the environment; b) Recommend that ICAO develop guidance materials for ANSPs that focus on NOTAM coordination, related air traffic management procedures, and real time data-sharing for safety critical data dissemination.
Strategic Objectives:	• Safety • Air Navigation Capacity and Efficiency • Security & Facilitation • Economic Development of Air Transport • Environmental Protection

1. Introduction

1.1 At the 13th Air Navigation Conference in October 2018, the ICAO Council President stated that it was time for ICAO to position itself as a leader in global standardization for the commercial space sector. At the 40th ICAO Assembly in 2019, Resolution A40-26 reaffirmed ICAO's role in "developing policy guidance in the areas where international CST [commercial space transportation] operations intersect with international civil aviation" and for coordination to "monitor the progress and evolution of commercial space transport and to address emerging issues, including the impact on international civil aviation operations."

1.2 The increase in CST operations has demonstrated a need for airspace systems to modernize practices related to the safe integration practices of these operations. Modernization will maximize efficiency while maintaining safety of all airspace users. ICAO's mandate to increase the safety of international civil aviation means that it has a role in the safe airspace integration of CST operations. In practice, this involves the publication of Danger Areas by the State as required in various ICAO Annexes.

1.3 The Convention on International Civil Aviation (Chicago Convention) requires States to comply with Standards and Recommended Practices (SARPs) to the highest degree practicable for international civil aviation. Civil aviation operations and space operations are distinct, and space vehicles do not fit in the definition of aircraft. The United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS) was established in 1959 to review international cooperation in the use and exploration of space for the benefit of humanity and to study legal issues that may arise from space exploration. UN COPUOS has developed nonbinding recommendations with respect to space activities that many States take into consideration when designing or further developing their domestic legal and regulatory frameworks for national space activities. Developing binding standards or rules relating to commercial space transportation activities – beyond those already set out in the core treaties governing all space activities – would be premature. There is currently no practical need to seek an international legal definition or delimitation of outer space.[1] Furthermore, safety standards for commercial space launch and reentry activities beyond airspace integration should be developed in a separate multi-lateral forum with the participation of State Space Regulators.

2. Discussion

2.1 As States establish their own national regulatory frameworks, some governments are delegating roles and responsibilities for integrating CST operations into airspace systems to various organizations. This includes the State Space Regulator (SSR), Air Navigation Service Provider (ANSP), and the State Civil Aviation Authority (CAA).[2] In some cases, the SSR may organizationally be within the CAA; however, these two entities perform vastly different functions and require specialized expertise to perform job functions.

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[1] U.S. Department of State Statement to the Legal Subcommittee of UN COPUOS, Agenda Item 6(a) Definition and Delimitation of Outer Space March 21, 2023, U.S. https://vienna.usmission.gov/the-usa-at-the-62nd-session-of-the-copuos-legal-subcommittee-march-2023/

[2] See Appendix 1 for a definition regarding State Space Regulators.

[3] See Appendix 1 for a definition regarding hazard areas.

[4] Federal Aviation Administration. (2023). Airspace Integration of Launch and Reentry Operations. YouTube. https://youtu.be/92ixki92fqw

2.2 The ANSP is responsible for safely and efficiently integrating CST operations into the airspace system, consistent with applicable SARPs, regulations and policies; this includes the coordination and dissemination of hazard mitigation requirements. This is primarily done by activating SSR-approved hazard areas[3] and by working with Launch and Reentry Operators (LROs) and the SSR to minimize impacts on civil aviation operations. Additional ANSP functions include coordinating international Notices to Air Missions (NOTAMs) for CST operations and developing strategic solutions for operations, including routing considerations and airspace management tools. The ANSP should also be responsible for monitoring, evaluating, and disseminating real-time information to stakeholders about operation status.

2.3 The United States Federal Aviation Administration (FAA) has implemented procedures over the past five years to increase airspace system efficiency.[4] These procedures include the Critical Decision Window, Dynamic Launch and Reentry Windows, and Time-Based Launch Procedures.[5] These procedures encourage communication among LROs, the ANSP, and other airspace stakeholders, and have allowed the U.S. to reduce airspace impacts, including minutes flown. In the U.S. alone, updated procedures resulted in 8,467 flying minutes saved in the last 12 months and a corresponding reduction in CO_2 emissions.[6]

2.4 Implementing these procedures has allowed the U.S. to reduce impacts to the airspace system by an average of 93 minutes per launch operation in heavily saturated and high-demand airspace rather than the historical paradigm of three-to-four-hour activation times. While airspace system efficiency will vary, these procedures are examples that ICAO Member States can adopt for greater efficiency.

3. Conclusion

3.1 Adopting best practices for airspace integration of CST operations will lead to increased efficiency in the airspace system and will reduce miles flown, due to CST operations, for all airspace users.

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[5] See Appendix 1 for a definition of these terms.

[6] Statistics are from the FAA's Air Traffic Organization's internal metrics.

APPENDIX 1
SEE BELOW FOR A DEFINITION OF TERMS USED IN SECTION 2.

Critical Decision Window
If there is a likelihood a space launch or reentry may be scrubbed and rescheduled, the ANSP encourages the space operator to make the decision early before any air traffic management initiatives are implemented.

Dynamic Launch and Reentry Windows
The use of key mission triggers, such as the loading of rocket fuel and the final disposition of the booster rocket, to pinpoint when to close and reopen airspace.

Hazard Area
Hazard areas are volumes of airspace where the risk to aircraft exceeds a certain regulatory standard. They may be implemented by ANSPs through Danger Areas over the high seas, Restricted Areas over land or territorial waters, or other airspace management measures.

State Space Regulator (SSR)
For the purpose of this paper, the State Space Regulator refers to the government entity responsible for authorizing commercial space transportation operations (launch and re-entry) to ensure public safety.

Time-Based Launch Procedures
The identification and rerouting of only those aircraft directly affected by the closed airspace, allowing more aircraft to stay on their most optimal and efficient routes.

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