



WORKING PAPER

FOURTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 26 August to 6 September 2024

Agenda Item 3: Air navigation system performance improvement

3.1: Proposals to improve the efficiency of air navigation services contributing to LTAG

OPERATIONS TO AND FROM OUTER SPACE

(Presented by Chile, cosponsored by 20 Latin American Civil Aviation Commission (LACAC) Member States²)

EXECUTIVE SUMMARY

This paper identifies the problem underlying current operations making use of airspace resources during their exit into or re-entry from outer space, or when operating near the Kármán Line, highlighting their potential impact on international civil aviation resulting from increased activity in these areas. The paper underscores the importance of studying the issue proactively and adopting a harmonized approach aligned with higher airspace operations (HAO).

Action: The Conference is invited to incorporate into the ICAO Business Plan and the Air Navigation Commission Work Programme the study and development of Standards and Recommended Practices whose scope covers operations to and from outer space or near the Kármán Line.

1. INTRODUCTION

1.1 The arrival of new entrants into the global aviation system and rapid technological development have given rise to the need to re-order our Organization's priorities so as to facilitate the handling of dynamic, challenging scenarios which did not clearly appear on the visible horizon until very recently.

1.2 One of these scenarios relates to space vehicle operations and the phases associated with their launches and re-entries, whether or not they cross the Kármán Line (between 80 and 100 km above mean sea level), which have multiplied with the inclusion of commercial civilian entrants.

1.3 Given the characteristics of such operations, combined with planned higher space operations and the projected growth in flight operations below flight level 600, the conflict of interest and the stress exerted on the balance between demand/capacity and safety are looming large. Therefore, it would appear highly recommendable to explicitly include this issue in the ICAO Business Plan and the Air Navigation Commission Work Programme.

¹ Spanish version provided by Chile.

² Argentina, Aruba, Belize, Bolivia, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela (Bolivarian Republic of)

2. DISCUSSION

2.1 At the 40th Session of the ICAO Assembly in Montréal in 2019, the Member States recognized that the term “new entrants” referred to higher airspace operations (HAO) and unmanned aircraft system traffic management (UTM). At that time, the Assembly tasked ICAO with reviewing the Standards and Recommended Practices (SARPs) with a view to amending or expanding them as necessary to facilitate the operation of new entrants through a global, harmonized framework, taking into account regional frameworks and practices.³

2.2 At the 41st Session of the ICAO Assembly in Montréal in 2022, working paper A41-WP/85 TE/14 presented by Czechia on behalf of the Member States of the European Union, other members of the European Civil Aviation Conference and EUROCONTROL requested that the Assembly consider a proposed resolution to complement A40-7, requiring ICAO to develop guidance, concepts and specific provisions for the management of interfaces between aviation operations, including upper airspace operations, and space operations. Ultimately, Resolution A41-9 reaffirmed the term “new entrants” such as HAO and UTM, but it made no explicit mention of space operations making use of higher airspace during the transition to and from outer space.

2.3 Consequently, good progress has been made through significant work related to HAO and UTM, but the same cannot be said for the study and development of SARPs whose scope covers space operations.

2.4 Taking into account that the launch and re-entry phases of space operations generally occur over large oceanic areas⁴, the States that have been assigned to administer flight information regions (FIR) with oceanic areas comply with the provisions of Annex 15 — *Aeronautical Information Services* of the Chicago Convention with respect to the publications of NOTAMs requested by a third State, informing of the dates, times and coordinates of the affected airspace, no matter the duration or extent thereof.

2.5 The above will inevitably have a detrimental effect on conventional operations in oceanic airspace or other airspace designated for space operations.

2.6 In accordance with the NOTAM publications issued between 2019 and 2023 and retrieved from the Chilean air navigation services provider’s CADAS-ATS Terminal System for Air Traffic Services, the number of publications for activities relating to space operations, including the launch and re-entry of vehicles and/or debris, has increased from 20 in the year 2019 to 68 in 2023, representing an increase of 240 per cent. The increase in the requested area occupation time did not remain directly proportional to the number of publication requests received, totaling an increase of 1.594 per cent, which is equal to 138 hours requested in 2019, versus the 2 337 hours requested in 2023 (Figure 1). Although not all hours or areas were fully occupied, all were reported to the air operators to ensure that safeguards were duly taken during their flight planning.

2.7 The size of the requested areas can vary from 300 nautical miles in length up to over 2000 nautical miles, and their occupation times from 40 minutes to days. The latter case gives rise to inefficiencies in the normal flow of international civil aviation.

³ Resolution A40-7

⁴ Figure 2

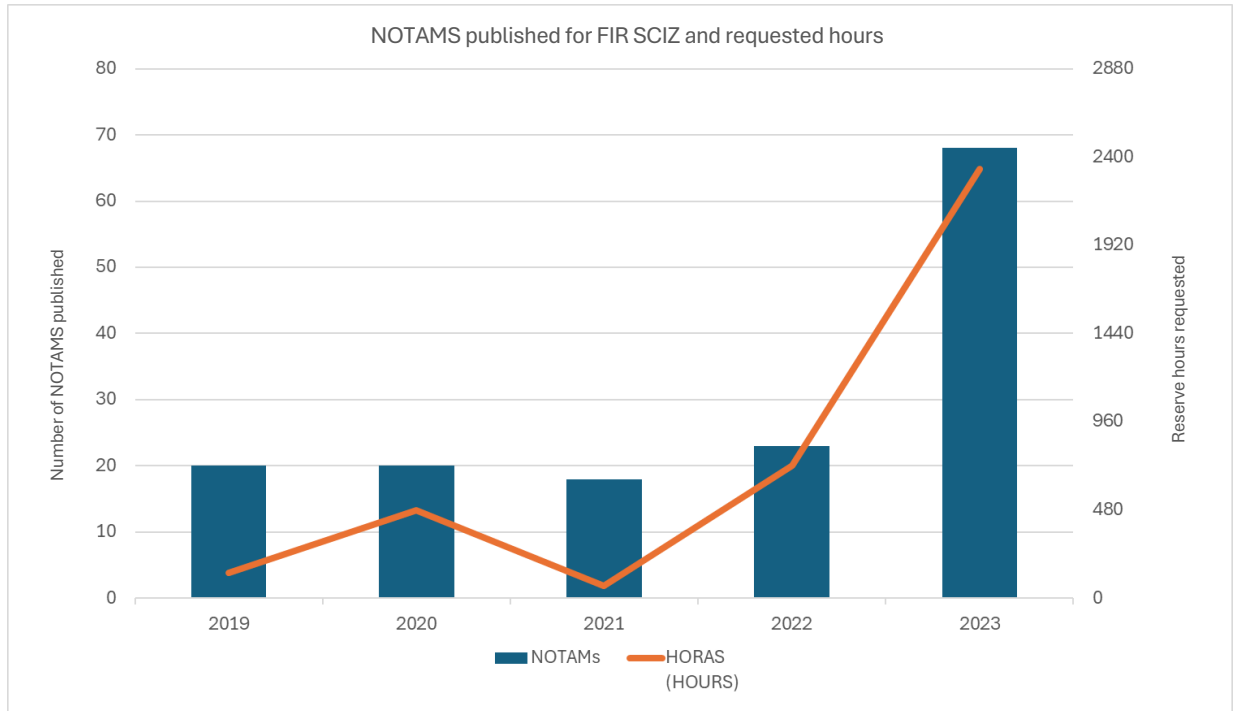


Figure 1. The graph shows the increase in publication requests for activities hazardous to aviation associated with space operations (launches and re-entries) in the Easter Island FIR.

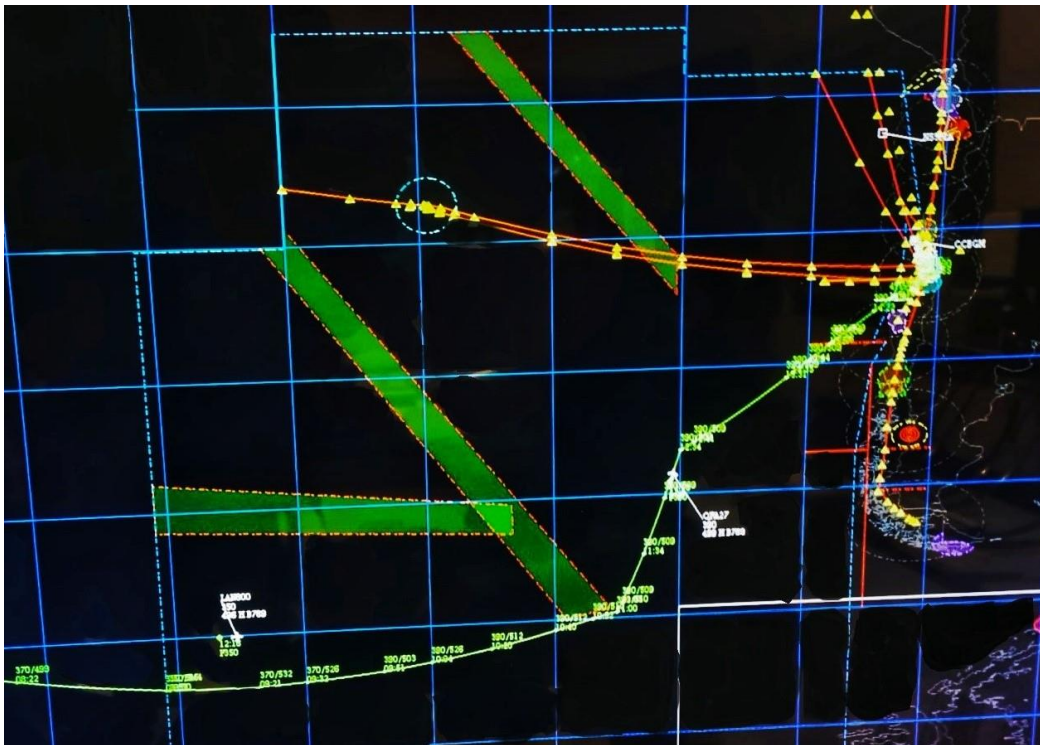


Figure 2. The image shows the Oceanic Control Area (OCA) of the Santiago Oceanic Control Area. The areas plotted and marked in green are designated “D” areas for activities hazardous to aviation associated with the launch or re-entry of space vehicles. These three do not occur on the same day. The green line shows the route of an aircraft crossing longitude 090W over the Pacific Ocean, heading east from Sydney to Santiago de Chile.

3. **CONCLUSION**

3.1 As long as air traffic continues to grow, potential impacts will arise on the efficiency and capacity of the airspace where space operations are conducted in association with launches and re-entries, whether or not they cross the Kármán Line.

3.2 There may be potential impacts on operator efficiency in such airspace.

3.3 Given resource limitations and the rapid evolution of aerospace operations and technologies, it is highly recommended to explore ways to enhance performance, enabling ICAO and States to more effectively address the space operations associated with launches and re-entries, whether or not they cross the Kármán Line, in a manner harmonized with HAO.

3.4 In light of the above, the Conference is invited to agree to incorporate into the ICAO Business Plan and the Air Navigation Commission Work Programme the study and development of Standards and Recommended Practices whose scope covers operations using airspace during their exit to or re-entry from outer space, or near the Kármán Line.

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