



WORKING PAPER

ASSEMBLY — 41ST SESSION

TECHNICAL COMMISSION

Agenda Item 31: Aviation Safety and Air Navigation Standardization

HIGHER AIRSPACE OPERATIONS

(Presented by Czechia on behalf of the European Union and its Member States¹, the other Member States of the European Civil Aviation Conference² and EUROCONTROL)

EXECUTIVE SUMMARY

This working paper analyses and summarises the issues related to higher airspace operations (HAO) and the necessary measures to be undertaken in order to ensure a standardised globally harmonised approach to procedures and systems with the purpose to integrate these operations into the aviation system while maintaining a high level of safety and security.

Action: The Assembly is invited to:

- a) direct ICAO to continue in its role as an international forum and establish a suitable working arrangement enabling States and industry to share experiences, needs and requirements on HAO with the objective to facilitate a globally harmonised approach;
- b) request ICAO to provide guidance and, if required, review Standards and Recommended Practices (SARPs) for amendment or expansion as necessary, to facilitate HAO within a global, harmonised framework;
- c) call on its Member States to update or amend their regulations and procedures governing HAO so as to facilitate the integration of these operations, while not compromising safety and security and ensuring environmental protection and coordination of civil and military aviation operations; and
- d) support the proposed Assembly Resolution in the Appendix to this working paper.

<i>Strategic Objectives:</i>	This Working Paper relates to the Safety and Air Navigation Capacity and Efficiency Strategic Objective.
<i>Financial implications:</i>	The activities referred to in this Paper will be undertaken subject to the resources available in the 2022-2025 Regular Programme Budget and/or from extra-budgetary contributions
<i>References:</i>	Resolution A40-7 – New Entrants

¹ Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.

² Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia, Iceland, Republic of Moldova, Monaco, Montenegro, North Macedonia, Norway, San Marino, Serbia, Switzerland, Türkiye, Ukraine and United Kingdom.

1. INTRODUCTION

1.1 Technology developments are increasingly enabling operations in and through the airspace above the level of today's conventional aircraft operations. This is referred to as the higher airspace. Higher airspace operations (HAO) include space launches and returns, suborbital, hyper- and supersonic operations and operations of high altitude platform systems (HAPS). The developments will result in increased demand in terms of volume, frequency and mix of operational characteristics.

1.2 These emerging activities will have an impact on the current aviation system therefore, they would need to be accommodated and, in the longer term, integrated, while maintaining a high level of safety and security and ensuring the sustainability of associated operations. This working paper proposes the necessary actions to be undertaken in order to anticipate these developments by timely standardisation of globally harmonised procedures and systems, building on previous Resolutions.

2. DISCUSSION

2.1 HAO embraces a wide and growing range of operations both in terms of volume and operational characteristics. The anticipated demand is expected to require existing and new ways of traffic management to enable safe, cost/effective and sustainable operations without disproportionately impacting the traditional civil and military operations in the airspace below. Most operations (current and anticipated) in the higher airspace are international and inter-regional. A globally harmonised approach to developing solutions that can be integrated into the existing air traffic management (ATM) domain and which also address the phases in the airspace below the Higher Airspace is therefore needed.

2.2 Initiatives are taking place to establish arrangements for space traffic management, including space surveillance and tracking, space situational awareness, and launch and re-entry management. The frequency of space operations is increasing, requiring, therefore, the development of global consistent interfaces at the procedures and systems level to ensure safe and mutually efficient space and airspace operations.

2.3 Developing traffic management solutions for higher airspace provides opportunities for innovation due to the small number of legacy systems. Traffic management solutions for higher airspace can become an incubator for current and future evolution of ATM-based on trajectory based operations (TBO), flight and flow information for a collaborative environment (FF-ICE) and system wide information management (SWIM). In combination with artificial intelligence/machine learning (AI/ML), this could enable the adoption of greater levels of automation in future. The Global Air Navigation Plan (GANP) and Global Aviation Safety Plan (GASP) should be updated to facilitate a global harmonised and innovative approach for HAO.

2.4 HAO will require enabling infrastructures for communication, navigation and surveillance (CNS), which meet performance-based standards derived from operational needs and regulatory frameworks. Frameworks must consider interoperability, resilience, data sharing and a need for confidentiality will be required in some cases. There is also a need to timely identify spectrum requirements and protection criteria.

2.5 HAO will be a significant and diverse new airspace user to be integrated into all aspects of existing and future aviation regulatory and performance frameworks, especially for safety and the environment.

2.6 There are plans in Europe and within other regions for developing roadmaps to enable HAO. As part of this roadmap approach an exploratory research project, the European Concept for Higher Airspace Operations (ECHO) project was launched as well as an EASA task force to assess the need for regulations. An important foundation for the ConOps and possible regulations is a sound analysis of HAO demand in terms of volume of operation and vehicle characteristics.

2.7 The development of global harmonised ICAO provisions must be driven, above all else by safety and security as well as by demand, performance needs and principles. As a starting point, it is necessary to exchange and discuss information on demand and concepts on how to accommodate the demand, including security and defence requirements and needs. This can establish the basis for a global HAO concept and solutions as discussed in this working paper.

3. CONCLUSION

3.1 The emerging developments preparing for operations in the higher airspace both enable and necessitate a more precise and proactive plan of action. The Assembly is invited to consider the draft Resolution presented in the Appendix, which complements recommendations in Resolution A40-7 – New Entrants.

APPENDIX

A41-[X]: Higher Airspace Operations (HAO)

Whereas the Preamble of the Convention on International Civil Aviation stipulates that signatories thereto had “...agreed on certain principles and arrangements in order that international civil aviation may be developed in a safe and orderly manner and that international air transport services may be established on the basis of equality of opportunity and operated soundly and economically...”;

Whereas Article 3 a) of the Convention on International Civil Aviation states that “*This Convention shall be applicable only to civil aircraft, and shall not be applicable to state aircraft*” and Article 3 d) that “*contracting States undertake, when issuing regulations for their state aircraft, that they will have due regard for the safety of navigation of civil aircraft*”;

Whereas, Article 37 of the Convention provides that ICAO shall adopt and amend, as necessary, international Standards and Recommended Practices to ensure the safety, regularity and efficiency of air navigation, and whereas such standards and practices exist notably in relation to rules of the air, aircraft airworthiness, aircraft operations, personnel licensing, CNS aids, aerodromes, air traffic services, environmental protection, the safe transport of dangerous goods by air, and security;

Whereas Annex 11 to the Convention requires a Member State to determine those portions of airspace over its territory within which air traffic services will be provided and, thereafter, to arrange for such services to be established and provided;

Whereas Article 1 of the Convention on International Civil Aviation stipulates that every State has complete and exclusive sovereignty over the airspace above its territory;

Recalling that where a Contracting State accepts such responsibility of providing air traffic services over the high seas, they may apply the Standards and Recommended Practices in a manner consistent with that adopted for airspace under its jurisdiction.

Recognising that, for the purposes of this Resolution, the term “Higher Airspace Operations” refers to any operation under the jurisdiction of ICAO, carried out by various types of vehicles, taking place within or transiting through a higher portion of the airspace, above the airspace typically controlled today including the start/launch and landing/recovery phases;

Recognising that, in international law, there is currently an absence of legal delimitation between the airspace and the outer space, and that certain types of HAO are carried out up to very high altitudes;

Recognising that the safety, regularity and efficiency of new HAO need to be ensured in the Higher Airspace, as well as in the airspace below, through accommodation and in the longer term, integration into the existing ATM domain, taking due account of space operations transiting through the airspace;

Recognising that a growing number of space operations are interfacing with civil and military aviation operations and air traffic management at all airspace levels;

Recognising that there is an increasing need to facilitate, within a global, harmonised framework, operations in the Higher Airspace and that there is a large disparity in performance in the types of vehicle expected to comprise this new airspace user group;

Recognising that ICAO provisions may need amendment or expansion in order to support HAO;

Recalling that the ICAO Global ATM Operational Concept states that all airspace below the Higher Airspace, should be a usable resource, any restriction on the use of any particular volume of airspace should be considered transitory, and all airspace should be managed flexibly;

The Assembly:

Recognises ICAO as the international forum to lead the cooperation on HAO and the development of an appropriate global framework.

Directs ICAO to:

- a. establish a suitable working arrangement enabling States and industry to share experiences, lessons learned, needs and requirements on HAO with the objective to facilitate a globally harmonised approach and where necessary identify needs for ICAO provisions.
- b. provide guidance and, if required, review Standards and Recommended Practices (SARPs) for amendment or expansion as necessary, to facilitate Higher Airspace Operations within a global, harmonised framework, taking into account national and regional frameworks and practices and security and defence requirements and needs.
- c. develop specific guidance, concepts and provisions for the management of interfaces between aviation operations, including in Higher Airspace, and space operations, in close coordination and cooperation with national authorities and national or international institutions competent in space taking into account standards and initiatives for the development of Space Traffic Management services in various regions of the world.
- d. update the GANP and the GASP to facilitate globally harmonised support to HAO.

Calls on Member States to:

- a. update or amend their regulations and procedures governing HAO, in line with the updated SARPS or guidance material.
- b. ensure that the common use by all authorised users of airspace and certain facilities and services does neither adversely affect the safety and regularity of civil aviation nor military aviation operations and civil-military coordination and environmental protection.

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