



ASSEMBLY — 40TH SESSION

TECHNICAL COMMISSION

Agenda Item 30: Other issues to be considered by the Technical Commission

NEW ENTRANTS

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

EXECUTIVE SUMMARY

This paper summarises the key issues in the rapidly evolving domains of unmanned aircraft system (UAS) traffic management (UTM) and higher airspace operations and calls for action by ICAO to support this evolution in a safe, secure and harmonised manner.

Action: The Assembly is invited to:

- a) encourage ICAO to continue in its role as an international forum that facilitates improved cooperation, collaboration and the sharing of best practices to support regional initiatives;
- b) request ICAO to provide the necessary follow-up activities that build on those regional initiatives by encouraging increased dialogue between the various types of “new entrants”, States, existing aviation stakeholders, the space community and industry;
- c) call upon States to establish regulations and procedures within a harmonised and scalable global framework, to facilitate the integration of “new entrants” operations in a manner that does not compromise safety and security, place undue burden on the environment, and does not disproportionately affect the regularity and efficiency of civil and military operations;
- d) urge ICAO to set up a process with the full involvement of States, to initiate timely review of the full range of ICAO provisions to consider the need for modifications to those provisions to address the needs of UTM and higher airspace operations; and
- e) support the proposed Assembly resolution attached to this WP.

<i>Strategic Objectives:</i>	This working paper relates to the Safety and Air Navigation Capacity and Efficiency Strategic Objectives.
<i>Financial implications:</i>	The activities referred to in this paper will be undertaken subject to the resources available in the 2020-2022 Regular Programme Budget and/or from extra budgetary contributions.

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

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

<i>References:</i>	<i>Report of the Thirteenth Air Navigation Conference (AN-Conf/13) (Doc 10115), AN-Conf/13 Recommendations 5.1/1, 5.2/1 and 5.5/3</i>
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1. INTRODUCTION

1.1 New entrants represent an increasing body of actors who are seeking to implement new aviation concepts in airspace where there is currently little managed activity. The scope covers unmanned aircraft system (UAS) traffic management (UTM), typically in airspace below 500 feet, including over cities, and higher airspace operations, in airspace above levels used by existing airspace users, typically above FL660. These actors are often new to aviation and use or intend to use new technologies and air vehicle concepts, experimental prototypes, or sometimes aircraft still in the research and development (R&D) phase (e.g. supersonic or hyper-sonic projects), manned and unmanned, for which there is currently little or no regulation, standardisation or certification requirements in place.

1.2 It is certain that all these emerging activities will, to varying degrees, have an impact on current aviation and on the air navigation system as a whole, so they must be governed appropriately in order to encourage and enable these new businesses while maintaining the high level of safety, regularity, efficiency and security for all existing airspace users. This will require creation of an innovative, collaborative and harmonised global framework. Moreover, such operations must respect the privacy of the citizen and be sustainable from an environmental perspective.

1.3 In many cases, integration of new entrants will call for increasing levels of digitalisation and automation in both vehicle operation and service provision, all of which highlight areas where ICAO currently has few provisions. Given the novel nature of some of these concepts, ICAO work will also require a review of some of the core features of the current aviation system, such as flight rules, airspace classification, liability and the role of the human.

2. UAS TRAFFIC MANAGEMENT

2.1 UTM, known in Europe as ‘U-space’³, is the name given to the evolving concept for the safe, effective and efficient management of those UAS that will require a distinct management environment to conventional manned aircraft. For convenience, the commonly-used term ‘drone’ will be used in this WP to describe the UAS in the scope of UTM. Although the scope of UTM typically covers those UAS that operate at very low level (< 500 ft), the ultimate UTM vision allows for operations at any altitude and in any airspace. At present, ICAO has informal measures in place to address UTM, such as the UAS Advisory Group (UAS-AG), created by the ICAO Secretariat, and sponsors events such as “Drone Enable” to bring together key UTM stakeholders.

2.2 As UTM matures as a result of State and regional regulatory and research initiatives, and the pace of its development and implementation increases around the world, there is a need for ICAO to take a more formal role to achieve greater State involvement. ICAO’s involvement should build on existing studies and initiatives and standardisation activities, to ensure global harmonisation and to bring the governance of drone operations formally under the aegis of the Global Air Navigation Plan (GANP). This would include ensuring coordination of UTM standards and development under the broader topic of urban air mobility (UAM) where relevant.

³ U-Space concept is constituted by a set of services conceived for unmanned highly automated vehicles allowing their integration with manned aviation. These services will also be useful for manned aviation and will support a highly digitalised/automated future for European aviation.

2.3 International UTM programmes are showing that a risk and performance-based approach to implementation of UTM is required, which is in common with ICAO's wider aviation approach. Consequently, ICAO needs to be a focal point, in cooperation with the regional offices, to harmonise a global UTM integrated safety risk assessment model, and a performance framework, that will support the safe, secure and efficient operation of drones, including addressing the protection of life and the safety of third parties. The implementation approach should consider not only how drones will operate amongst other drones, but should also address the safe operations of the airspace users most likely to be encountered at lower altitudes, especially low-level operations by military aircraft, general aviation, sports aviation and rotorcraft. The impact on the operations and security of airports should also be addressed.

2.4 The growth in the number and variety of drone operations is driven by bottom-up business needs, and the approach taken by ICAO should recognise the importance of supporting new and evolving business models to allow these nascent industries to thrive, while supporting rapidly-evolving societal demands for a digitally-connected world.

2.5 Successful implementation of UTM requires full interoperability between UTM regulations, procedures and technology, and existing ICAO provisions. Moreover, it seems likely that UTM will have an impact on many aspects of civil and military aviation, such as the Rules of the Air, airspace classification, the role of automation, liability, legal issues and the impact on the environment. As a consequence, ICAO needs to determine the best mechanism, ensuring the full involvement of States, for undertaking a review of SARPS and other provisions so that, once the UTM concept stabilises, such a review should be conducted in a timely manner to support the implementation of UTM and development of its underlying regulatory framework.

3. HIGHER AIRSPACE OPERATIONS

3.1 Higher airspace operations refer to operations that take place in airspace above where conventional instrument flight rules (IFR) operations occur. Although the upper and lower vertical limits are not formally defined, this airspace is typically above FL 660 up to space, or around 100 km.

3.2 The principles for managing and integrating all kinds of higher airspace operations are, as yet, not standardised or formally defined, but there is a wide variety of civil and military activities anticipated, from unmanned balloons to hypersonic passenger aircraft and sub-orbital flights, that will require new or modified mechanisms for airspace and air traffic management. It is necessary for appropriate provisions to be defined at ICAO level, taking advantage of and relying more on existing regional initiatives. Such ICAO provisions should be flexible and proportionate enabling creative use of the airspace to current and future uses.

3.3 The definition of all aspects of higher airspace operations is politically sensitive and so needs early global coordination to respect States' security and sovereignty while supporting a regional/global approach that enables operations without replicating the more fragmentary definition of airspace at lower levels.

3.4 The variety of operations emerging for this airspace volume is such that some form of management is envisaged, but it does not necessarily need to follow the model of ATM below it. Operators may be able to take more of a role in managing their fleets within ICAO guidelines, making use of new services and technologies. It may be possible to adapt existing or emerging ATM concepts to support such operations (for example trajectory-based operations or advanced flexible use of airspace) or

it may need an entirely new model. This could require a global framework to avoid airspace boundaries fragmentation, since some higher airspace operations involve inter-continental trajectories.

3.5 Although traffic density is unlikely to approach the levels of more conventional aviation, the disparity in performance between the emerging vehicles presents special challenges that need addressing. For example, as altitude increases the nature of flight itself changes from being dependent on atmospheric interaction to one based on orbital physics. Consequently, close coordination with the space community will be essential.

3.6 Vehicles operating in higher airspace will usually have to transit conventional airspace on their way up and down. Given that many of the vehicles will not be able to operate in the same manner as conventional aircraft during this transit phase, additional provisions may be required to accommodate this activity. However, it is essential that any such provisions have a proportional impact on civil and military operations, with no negative impact on safety and security, while not having a disproportionate impact on the performance of the ATM network as a whole.

3.7 Higher airspace operations may not be consistent with existing fundamental ICAO provisions, such as Annex 2 — *Rules of the Air*. Consequently, ICAO needs to determine how best to review all relevant ICAO provisions to identify regulatory obstacles and any need for change. This investigation should build on the work being conducted by those States that are already starting to accommodate higher airspace operations.

3.8 Any ICAO framework should enable sustainable growth of the airspace use and be constructed to minimise the environmental impact of those operations, providing a pragmatic and timely implementation matched to the airspace usage.

4. ASSEMBLY RESOLUTION

4.1 The draft Resolution in the Appendix calls for ICAO action to facilitate a harmonised approach to the integration of new entrants into the global ATM environment.

5. CONCLUSION

5.1 ICAO needs to position itself as the global focal point for the integration of new entrants. Provisions should evolve proportionately, in such a way to enable operations by new entrants without unduly impacting the wider range of civil and military airspace users. This needs to be done while maintaining aviation safety, and respecting contracting States' rights and prerogatives in terms of national security and sovereignty over airspace above their territory. Since operations by new entrants are already starting, there is a need to ensure the pragmatic and timely implementation of higher airspace operations, matched to user needs, capabilities and the anticipated volume of future activities.

APPENDIX

ICAO GENERAL ASSEMBLY RESOLUTION ON “NEW ENTRANTS”

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 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;

Recognizing that, for the purposes of this Resolution, the term “New Entrants” refers to higher airspace and unmanned aircraft system (UAS) Traffic Management (UTM) operations;

Recognizing that there is an increased demand for action from “New Entrants”, whose operations are not yet governed by ICAO provisions, and that there is a large disparity in performance in the types of vehicle expected to comprise this new airspace user group;

Recognizing that existing ICAO provisions may need to be amended in order to support operations by “New Entrants”;

Recognizing that significant progress has been made concerning “New Entrants” in regional and State initiatives;

Acknowledging the work conducted by the ICAO UAS Advisory Group; and

Recalling that the ICAO Global ATM Operational Concept states that all 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 resolves that:

1. in view of new entrants operations, the full range of ICAO provisions shall be reviewed to consider the need for modifications to those provisions including, inter alia, the rules of the air, airspace dimensions, airspace classification, liability, licencing, environment and certification;
2. the regulations and procedures established by Member States to govern the operation of “New Entrants”, as well as the common use by all airspace users of certain facilities and services, shall be arranged so as to facilitate the integration of these operations while not compromising safety and security and without placing undue burden on the environment. Such an integration shall not disproportionately affect the regularity, environmental sustainability and efficiency of civil and military operations, and that, to the extent practicable, these new operations should comply with the rules of the air in Annex 2; and
3. ICAO shall continue to serve as an international forum that plays a role in facilitating improved cooperation, collaboration and the sharing of best practices to support regional initiatives, and to provide

the necessary follow-up activities that build on those initiatives by encouraging increased dialogue between “New Entrants”, States, existing aviation stakeholders, the space community and industry.

Associated practices

Member States should seek the most efficient and economical delineation of air traffic services (ATS) airspaces, the optimum location of points for transfer of responsibility and the most efficient coordination procedures in cooperation with the other States concerned and with ICAO.

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