



**WORKING PAPER**

**ASSEMBLY — 42ND SESSION**

**TECHNICAL COMMISSION**

**Agenda Item 24: Aviation Safety and Air Navigation Priority Initiatives**

**PRIORITIZATION OF MEASURES ADDRESSING UAS OPERATIONS OVER HIGH SEAS AIRSPACE**

(Presented by the United States)

**EXECUTIVE SUMMARY**

This working paper presents both long-term and interim measures to enable the safe operations of unmanned aircraft systems (UAS) over the high seas, which are currently effectively prohibited by the lack of standards recognizing the unique nature of UAS operations under the existing *Chicago Convention on International Civil Aviation* (Doc 7300) framework. This paper highlights the need for States to authorize low-risk UAS operations over high seas airspace while remaining in compliance with the Chicago Convention. It would facilitate the continued safe integration of these emerging entrants into the global aviation framework.

**Action:** The Assembly is invited to:

- a) direct ICAO to prioritize the development of new standards for unmanned aircraft systems (UAS) commensurate with the risk these operations pose but that complies with the Chicago Convention (e.g., airworthiness certificates), and
- b) direct ICAO to develop interim measures until such permanent standards become effective.

<i>Strategic Goals:</i>	This working paper relates to Strategic Goal <i>Aviation Delivers Seamless, Accessible and Reliable mobility for All</i> .
<i>Implications:</i>	The challenges of States to apply existing international standards to authorize UAS operations over the high seas stands in the way of safety, innovation, and commerce. States that adhere to the Chicago Convention are losing out competitively against States that do not, risking creating undesirable incentives. States and industry would benefit from ICAO instituting interim measures to allow near-term low risk high seas UAS operations and permanent changes to the Standards and Recommended Practices (SARPs) to enable low-risk high seas operations in the long term.
<i>References:</i>	<a href="#">AN-Conf/13-WP/56</a> : “Enabling Unmanned Aircraft Operations Over the High Seas”, presented by the United States <a href="#">LC/37-WP/2-8</a> : “Study of Legal Issues Relating to Remotely Piloted Aircraft”, presented by the United States Doc 7300, <i>Convention on International Civil Aviation</i> Annex 2 — <i>Rules of the Air</i> Annex 8 — <i>Airworthiness of Aircraft</i>

## 1. INTRODUCTION

1.1 Absent action, States are being prevented from innovative uses of unmanned aircraft systems (UAS), a relatively new entrant to the airspace, over the high seas due to the lack of ICAO standards recognizing the unique nature of UAS operations. Given advances in UAS technology, immediate action is necessary to provide a set of risk-based, fit-for-purpose provisions to enable UAS operations over the high seas. Furthermore, lacking a multilateral approach, rogue operators could be incentivized to provide UAS services without State authorization or oversight, increasing safety risk for all operations over the high seas. The inconsistency amongst these operations is itself a hazardous condition that warrants consideration of interim measures to mitigate the increasing safety risk and promote safe, innovative uses of UAS.

1.2 The *Chicago Convention on International Civil Aviation* (Doc 7300) seeks to develop international civil aviation in a safe and orderly manner. However, while States have independently developed national regulations and processes that safely enable innovation in aviation, like UAS operations in more complex airspace, the long and deliberative process of developing international standards and amending Annexes has left Member States with few, if any, viable options to authorize UAS operations over the high seas consistent with ICAO Standards that in many instances are inapplicable or unnecessary for UAS operations.

## 2. DISCUSSION

2.1 The increasing prevalence of UAS has created a previously unforeseen use-case for the airspace over the high seas. The manufacturing, certification, and operation of these aircraft are unique from the procedures and practices employed in traditional aircraft manufacture, certification, and operation which led to today's aviation system and the consistent and harmonized approach to international navigation. Attempts to align UAS operations over the high seas within the existing ICAO Standards have failed to keep pace with UAS technological innovations, with no discernible progress on developing international standards that are appropriate to the low risk posed by UAS operations and the pace of technological evolution with UAS.

2.2 States have developed their own frameworks for operations within their sovereign airspace, but the lack of international standards specific to UAS operations means there is still no viable internationally recognized pathway for UAS operations over the high seas. The use of UAS to inspect offshore oil rigs or conduct search and rescue operations, for example, is thus stymied, despite widespread agreement that these operations can be conducted safely right now.

2.3 ICAO should prioritize efforts to develop and amend SARPs to accommodate UAS operations on a permanent and long-term scale. Moreover, in order to 1) address safety risk of UAS operations operating completely outside of an international framework; and 2) support technological innovation in this area, there is also a compelling need for ICAO to develop interim measures until such amended SARPs become effective. These interim measures should consider the frameworks already developed by Member States for UAS domestic operations, including their criteria for airworthiness and personnel licensing, which may conform to the applicable Articles of the *Chicago Convention* even if they do not fully comport with existing standards developed for manned aviation. Furthermore, these interim measures can inform the long-term development of updated SARPs, using a risk-based approach that considers performance-based metrics. This risk-based approach can be iterative and informed by Member States' experiences with operations, thus allowing the eventual SARP changes to reflect the increasingly complex operational scope of which UAS are capable.

2.4 Safe operation of any aircraft is predicated on fundamental concepts—concepts restated in the Chicago Convention and generally represented by certificates issued by the Member State. An airworthiness certificate, a certificate of registration, and an airman or operator certificate are all documents that demonstrate that the State of Design, State of Registry, and the State of the Operator have assessed safety-based criteria and authorized them to operate.

2.5 While the Convention contains broad articles addressing these fundamental concepts, associated SARPs in Annexes to the Chicago Convention frequently contain much more detailed and prescriptive standards. As noted above, while appropriate for the operation of manned aircraft, those standards have not kept pace with UAS operations. Applying those standards to UAS in their current state does not create a useable framework that States can implement for UAS operations over the high seas. Instead, ICAO should consider how States may apply operational and airworthiness requirements consistent with the Articles of the Convention, namely the ones that are associated with international navigation.

2.6 Article 8 — *Pilotless Aircraft* of the Convention, acknowledges that pilotless aircraft were always a possibility within the aviation framework. Under Article 8, Member States to the Convention undertake to ensure that the flight of pilotless aircraft shall be controlled as to obviate the danger to civil aircraft.

2.7 Article 31 — *Certificate of Airworthiness*, requires that any aircraft engaged in international navigation must hold a certificate of airworthiness issued by or rendered valid by the State of Registry. There is nothing under Article 31 that would preclude a State of Registry from rendering special certificates to UAS with appropriate assurances (like a Special Flight Permit) that demonstrate that these aircraft do not pose a hazard in the airspace and are in condition for safe operation. Interim measures should authorize such special certificates until amended SARPS become effective.

2.8 Considerations relevant to the issuances of special certificates for UAS operations over the high seas may include both design aspects, e.g., weight limitations, compliance with industry consensus standards for certain aspects, or demonstration that a UAS meets certain criteria for determining that a particular aircraft configuration is reliable for a preset number of flight hours. These considerations may all be part of how the State of Registry authorizes the use of UAS aircraft for various operations over the high seas. Combined with operating limitations, such as operations being limited to certain airspace classes, altitude limitations, or other requirements, these can result in conditions for safe flight.

2.9 Under Article 32 — *Licenses of Personnel*, the operating crew of an aircraft engaged in international navigation must hold a certificate of competency and licenses issued or rendered valid by the State of Registry. Member States have issued varying types of airman certificates to demonstrate competency within their area of jurisdiction. Until such time as ICAO sets appropriate standards for UAS operations over the high seas, interim measures should permit the State of Registry to use the system it has developed for approving domestic operations, even if the certificate may not meet the Standards of the Personnel Licensing Annexes. The unique nature of UAS operations bears very little resemblance to the operation of a manned aircraft, not least of which is there is no pilot within the aircraft during operation.

2.10 Other Articles of note include Article 17: *Nationality of Aircraft*, Article 20 — *Display of Marks*, Article 29 — *Documents to Carry*, and Article 34 — *Journey Log Books*. ICAO should establish and recognize practical guidelines to comply with these requirements for UAS engaged in international air navigation, such as the use of QR codes to fulfil Article 29 and 34.

3. **CONCLUSION**

3.1 ICAO should develop both long-term changes within its authority, while at the same time developing interim measures that will allow Member States flexibility in approving UAS operations over the high seas consistent with the requirements of the Chicago Convention.

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