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WORKING PAPER

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ASSEMBLY — 42ND SESSION

TECHNICAL COMMISSION

Agenda Item 25: Other issues to be considered by the Technical Commission

STRENGTHENING ICAO-SMO COLLABORATION TO ENHANCE SAFETY, INNOVATION AND SUSTAINABILITY IN AVIATION

(Presented by the European Organisation for Civil Aviation Equipment (EUROCAE) on behalf of EUROCAE, RTCA, Inc., Society of Automotive Engineers (SAE) International and Aeronautical Radio Inc. (ARINC))

EXECUTIVE SUMMARY

This paper underscores the importance of strengthening collaboration between ICAO and standards-making organizations (SMOs) to address current and emerging challenges in aviation safety, technological innovation, and sustainability. Achieving an even more efficient and globally harmonized standardization and regulatory framework that supports innovation requires deeper integration of SMO expertise. This paper highlights how enhanced coordination between ICAO and SMOs will:

- a) support a proactive approach to aviation safety by encouraging the early incorporation of consensus-driven standards into ICAO's standardization framework and supporting documentation;
- b) accelerate the development and regulatory recognition of state-of-the-art standards that enable innovation while fostering international harmonization and global interoperability;
- c) optimize the use of resources by reducing duplication of efforts and promoting a more agile, performance-based approach to standardization; and
- d) facilitate the global implementation of innovative, sustainability-driven technologies, particularly those aligned with the Global Air Navigation Plan (GANP), Global Aviation Safety Plan (GASP) and ICAO's Long-Term Aspirational Goal (LTAG).

Action: The Assembly is invited to:

- a) recognize industry standards as essential tools for enhancing global aviation safety, enabling innovation and sustainability, and support their integration by reference into ICAO's standardization framework, subject to validation to ensure fitness for purpose;
- b) encourage deeper engagement with standards-making organizations (SMOs) to effectively identify and integrate relevant emerging technologies and safety-critical innovations, fostering a holistic, performance-based approach to safety and security; and
- c) reinforce the ICAO Standards Roundtable (SRT) as the primary forum for aligning ICAO and SMO activities, enabling early coordination, reducing duplication, and accelerating the

¹ English, Arabic, Chinese, French, Russian and Spanish versions provided by EUROCAE.

recognition of high-quality standards that serve as the foundation for safe innovation across the sector.	
<i>Strategic Goals:</i>	This working paper relates to the Strategic Goals <i>Every Flight is Safe and Secure; and Aviation Delivers Seamless, Accessible and Reliable Mobility for All.</i>
<i>Financial implications:</i>	A closer collaboration between ICAO and SMOs will optimize resource utilization by leveraging the expertise and capabilities of all participating organizations and stakeholders.
<i>References:</i>	Previous Assembly Resolutions/AN-Conf/12 (Doc 10007), Recommendation 6/13: 6/13 Assembly Resolution 37-15; Assembly Resolution A38-11; Assembly Resolution A39-22: Formulation and implementation of Standards and Recommended Practices (SARPs) and Procedures for Air Navigation Services (PANS) and notification of differences

1. INTRODUCTION

1.1 Aviation is undergoing an unprecedented transformation, driven by technological advancements, sustainability imperatives, and evolving safety paradigms. To navigate this evolution effectively, ICAO must work closely with standards-making organizations (SMOs), which play a crucial role in developing, validating, and maintaining technical standards for global aviation. Today, hundreds of industry standards already complement ICAO publications – a testament to the robust international standardization system that aviation has built.

1.2 Several ICAO Air Navigation Conference recommendations and ICAO Assembly resolutions (as referenced above) have emphasized that ICAO should, wherever appropriate and subject to an adequate validation process, leverage the work of recognized SMOs) in the development of SARPs, Procedures for Air Navigation Services (PANS), and technical guidance material. In most cases, this is currently achieved through a note in the SARPs or other documents. These recommendations also call on ICAO to establish and lead effective coordination with these SMOs to fully leverage their expertise and capabilities.

1.3 This paper builds on prior Assembly resolutions and Air Navigation Conference recommendations, as well as on the work of the Integrated CNS and Spectrum Task Force (ICNSS TF). It advocates for a more structured, performance-based approach to standardization – one that leverages industry standards to enhance safety, accelerate innovation, and support sustainability goals.

1.4 In order to fully benefit from collaboration between ICAO and SMOs, a comprehensive standardization roadmap is needed to ensure complementarity of scope and timely publication of all relevant documents. This roadmap must be accompanied by concrete mechanisms that streamline the regulatory adoption of industry standards, enabling a more agile response to innovation.

2. DISCUSSION

2.1 Enhancing aviation safety through proactive standardization

2.1.1 As aviation evolves, a proactive and risk-based approach to standardization is essential, especially as the pace of technological innovation continues to accelerate. This need is clearly reflected in

the Global Air Navigation Plan (GANP) and the Aviation System Block Upgrades (ASBUs), which are expected for adoption at ICAO Assembly 42nd Session.

2.1.2 Many critical innovations – such as artificial intelligence (AI), advanced avionics, Advanced Air Mobility (AAM), and predictive maintenance systems – rely on industry-developed consensus standards that are continuously refined through real-world application. Understanding the upcoming update to the GANP and its ASBUs, ensuring the seamless integration of state-of-the-art technologies into the global aviation framework is essential. This underscores the importance of coordination in aligning all standards – ICAO and others – with agreed strategic objectives.

2.1.3 At the same time, the sector is facing increasingly stringent resource constraints at all levels – including regional aviation organizations, State administrations, air navigation service providers (ANSPs), flight operators, and the manufacturing industry. In this context, avoiding duplication of efforts and ensuring efficient resource allocation is critical. ICAO and SMOs must work together to ensure the optimal use of resources in developing robust, high-quality standards that meet the evolving needs of the global aviation community.

2.1.4 As a result, ICAO's standardization framework needs to align more dynamically with these trends. ICAO should reinforce the value of SMO-developed standards to accelerate the development of publications and ensure their timely adoption while maintaining independence and oversight.

2.1.5 The use of performance-based SARPs, supported by validated industry standards, offers a scalable approach that enhances safety and global interoperability without stifling technological progress. Achieving this requires close coordination of work programs, from initial proposal to publication. Such coordination enables early agreement on task allocation, ensures that SARPs and industry standards are complementary, addresses overlaps and gaps, and aligns publication timelines more effectively.

2.2 Driving innovation through early and continuous coordination with SMOs

2.2.1 The aviation sector must embrace the rapid acceleration of disruptive technologies. ICAO is already addressing new and emerging topics – for example, through various panels, as well as the AAM or the Trust Framework Study Groups – which bring together diverse stakeholders to shape the vision of the future aviation ecosystem. Enhancing collaboration between ICAO and SMO working groups, while promoting transversal standardization efforts, will help ensure that aviation fully leverages advancements in digital infrastructure, cybersecurity, and automation, thereby driving innovation across the entire industry.

2.2.2 Standards play an important role in spurring innovation and technological development, while bridging the gap between operationally validated, performance-measured research and development (R&D) outcomes and deployment, enabling a level playing field for the harmonized implementation of capabilities based on validated standards. The ever-faster pace of innovation requires stronger engagement between regulators – at global, regional and national levels – and SMOs to support the safe introduction of new technologies.

2.2.3 This critical aspect has been recognized by ICAO and the aviation community, but further coordination is necessary to capture the full potential of this integration. Without effective coordination both among SMOs, with ICAO, and within the overall standardization process, these technologies risk facing fragmented regulatory adoption, which could delay implementation and undermine international harmonization and global interoperability. Early engagement between ICAO and SMOs will help ensure

that standardization efforts are aligned with industry innovation cycles, supporting a more harmonized global approach.

2.3 Strengthening international collaboration for global standardization

2.3.1 Given the interconnected nature of the aviation ecosystem, standardization cannot occur in silos. SMOs are uniquely positioned to address the challenges of a rapidly evolving environment, marked by the frequent emergence of disruptive technologies and new stakeholders. By providing an open and transparent platform for discussion – particularly through rigorous external review processes – SMOs ensure a collaborative and inclusive approach. A consensus-based model fosters broad community acceptance while maintaining consistency with robust, internationally coordinated standards.

2.3.2 Closer coordination will enhance the quality of standards by capitalizing on the expertise of world-leading experts and the diverse membership of both ICAO and SMOs, which bring together stakeholders from across the entire aviation sector. Through broad participation and strong collaboration with regulators and industry, SMOs remain particularly aware of both regional and global aviation visions, ensuring alignment with strategic objectives. This sustained international collaboration fosters agility in addressing challenges, while delivering resilient standards that drive the safe evolution of aviation worldwide.

2.3.3 Prioritizing standardization activities will be essential to ensuring seamless global operations, enhancing safety, and improving efficiency. Given the complexity of international airspace and the diverse range of stakeholders involved, standardization efforts should be aligned with the priorities and timelines set forth in the GANP and GASP. These efforts must also be agreed upon with stakeholders to secure their buy-in and to ensure the efficient use of resources.

2.3.4 In this context, the ICAO Standards Roundtable (SRT), or any future iteration under a new name, should be reactivated and reinforced to continue the work initiated several years ago, enabling a clear mapping of ongoing and planned standardization activities at both ICAO and SMO levels. The SRT could support the identification of emerging technologies requiring early standardization consideration. It should also serve as a mechanism to establish a systematic process for referencing industry standards in ICAO publications. Additionally, it would ensure that SMO roadmaps are aligned with ICAO priorities, particularly the GASP, the GANP, and the ASBUs. The SRT could also incorporate sustainability-focused R&D-to-regulation pathways.

3. CONCLUSION

3.1 ICAO should continue to act on previous recommendations by making greater and more effective use of industry standards to pursue a more integrated approach to international standardization. This will make the overall process more agile, proactive, and forward-looking – all of which are critical for enabling innovation, safely integrating new technologies, and accommodating new entrants.

3.2 A renewed focus on the SRT and related roadmap represents a vital step toward a more efficient standardization framework. However, to fully capitalize on this momentum, ICAO must strengthen its cooperation with SMOs to ensure that safety-critical innovations progress seamlessly through ICAO's standardization process, that industry-driven standards are recognized as essential complements to ICAO publications, and that sustainability and innovation are embedded in planning from the outset.