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INDUSTRY STANDARDS IN SUPPORT OF ICAO PROVISIONS TO ENABLE GLOBAL INTEROPERABILITY AND SUPPORT INNOVATION

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

EXECUTIVE SUMMARY

This paper presents the role of industry standards in support of ICAO provisions, in particular performance-based Standards and Recommended Practices (SARPs).

It describes how ICAO may make better use of industry standards to complement ICAO provisions, working towards a coherent, effective and efficient system of standards, making best use of the available resources and expertise, thereby improving the overall quality and efficiency of the process and supporting the implementation of ICAO provisions.

With the rapid pace of development and innovation, collaboration between ICAO and standards developing organizatios (SDOs) will become even more important in order to allow for the efficient and safe uptake and integration of new technologies within the aviation domain.

The Integrated communications, navigation, surveillance and spectrum (ICNSS) task force (TF) and other initiatives led by ICAO/Air Navigation Bureau (ANB) are welcome steps towards a closer integration of ICAO and SDO activities.

Strategic Objectives:	This working paper relates to the Safety and Air Navigation Capacity and Efficiency Strategic Objectives.
Financial implications:	A closer collaboration between ICAO and the SDOs will lead to resource efficiencies thanks to a coherent, effective and efficient system of standards, making best use of the available resources and expertise.
References:	A41-WP/58-TE/5, *New ICAO standardization initiatives to improve the effectiveness of the standards development process – the Integrated Communications, Navigation, Surveillance and Spectrum (ICNSS) project*

1. INTRODUCTION

1.1 Global interoperability and international harmonisation are crucial for aviation as a global industry. Therefore, global standardization is one of ICAO's core functions and the standards-developing organisations (SDOs) have been working since decades to support ICAO and the global aviation community in this endeavour.

1.2 Industry standards cover a broad range of systems, equipment, process, environmental and safety specifications required by the aviation community, including but not limited to the ICAO ASBUs, GANP and GASP. The value of industry standards in the overall aviation standardisation ecosystem has been recognised in several previous ICAO Air Navigation Conferences and Assemblies.

1.3 Industry standards provide a valuable source of expertise and technical knowledge and can and should be used complementary to the ICAO provisions in a performance-based approach to regulation and standardisation.

1.4 Industry standards provide guidance and details on how to comply with the high-level ICAO provisions. As such, they should be recognised as acceptable means of compliance. Industry standards are developed by international groups of experts, open to contribution from stakeholders worldwide, and benefit from these global contributions. Therefore, industry standards are often used to support implementation of ICAO provisions.

1.5 Industry standards represent industry consensus, and are developed according to transparent, consensus-based and proven processes, which are open to all stakeholders and to worldwide participation. As a result, the industry standards are recognised and applied globally. These standards therefore are the cornerstone to enable international harmonisation and global interoperability.

1.6 Industry standards are an essential vehicle to enable and support innovation and technological development. With the advent of new technology and the pace of innovation accelerating ever more, it is today clearer than ever that one organisation on its own will not be able to serve the growing community and its needs, e.g., in the areas of Advanced Air Mobility (AAM), virtualisation, digitalisation, or sustainability.

1.7 Several initiatives have been launched in the last years to streamline the SARPs and overall standardisation framework. The Integrated CNS and Spectrum Task Force (ICNSS TF) has been set up in 2020 by ICAO, to "draft an initial roadmap of CNS and Spectrum (CNSS) evolution in the medium and longer term [and to] define a new/streamlined SARPS and Standards Framework, leveraging a more performance-based approach for Annex 10 — *Aeronautical Telecommunications* and scope out models for direct Industry participation in the ICAO standards making process".[1]

2. DISCUSSION

2.1 Several ICAO Air Navigation Conference recommendations and ICAO Assembly resolutions[2] recommended that ICAO should utilize, to the maximum extent appropriate and subject to

[1] ICNSS TF Terms of Reference

[2] e.g., ANC-12 Recommendation 6/13, Assembly Resolution 37-15, Assembly Resolution A38-11, Resolution A39-22: Formulation and implementation of Standards and Recommended Practices (SARPs) and Procedures for Air Navigation Services (PANS) and notification of differences

the adequacy of a verification and validation process, the work of other recognized standards-developing organizations (SDOs) in the development of SARPs, PANS and ICAO technical guidance material as well as to establish and lead a suitable coordination with other SDOs to make the best use of the capabilities of these other SDOs. In most cases this is achieved through a note in the SARPs or other provisions.

2.2 However, such enhanced use of industry standards will necessitate a close(r) coordination of the various work programmes, from first proposal to publication of the standards. This will enable agreement on an earlier stage about the share of work between ICAO and the SDOs, how the SARPs and industry standards will complement each other, identify potential overlaps and gaps.

2.3 Some good examples exist where comprehensive mappings are maintained, but this practice will have to be encouraged in all relevant panels and WGs as well as at management level between ICAO and the SDOs, mainly via the Standards Round Table (SRT). In the context of the ICAO-led SRT, the SDOs have mapped their deliverables and activities to the ICAO work programme. This work should be continued and enhanced.

2.3.1 In this context, the ongoing development in the data communication area, air/ground safety services, should be noted, where ICAO WG-I, EUROCAE WG-108, RTCA SC-223, and AEEC's Internet Protocol Suite (IPS) Subcommittee are working collaboratively to define a suite of ATN/IPS protocols intended for aviation safety services. This includes quarterly coordination meetings, and in some cases joint meetings that produce traditional standards (SARPs, MASPS, MOPs, etc.).

2.4 The importance of ICAO-SDO collaboration is well recognised today, in the form of direct links between panels and working arrangements or more horizontal structures such as the GANP Study Group or the ICNSS TF (see WP-58).

2.5 The ICNSS TF proposes a new streamlined framework for CNS and frequency spectrum standardisation, introducing a global technical specifications (GTS) framework, including a process which allows for direct referencing into SARPs. This is very welcome and going in the right direction, making more direct reference to industry standards.

2.6 WP-58 notes some potential challenges in referencing industry standards. These can be addressed notably through a robust verification and validation process in order to guarantee the quality of deliverables and to ensure that they are fit for purpose in being referenced in ICAO provisions. This can be achieved through combination of several interrelated methods: by SDOs during the standards-development process, as well as by ICAO who should assess whether the deliverable is fit for purpose and whether it is appropriate and comprehensive enough to support the relevant ICAO provisions. The intent of this validation step is not to reopen the discussions on the content of the deliverable. Furthermore, to facilitate access to relevant standards, the SDOs and ICAO have signed a mutual commitment to make available to member states the standards, which are referenced by ICAO provisions, via a document sharing platform on the ICAO secure portal.

2.7 Standards play a major role in enabling innovation and technological development. In this context, standards bridge the gap between operationally validated and performance-measured R&D results and providing a level-playing field for harmonised implementation of capabilities applying the validated standards. The ever-faster pace of innovation requires a stronger engagement between

regulators at global, regional and national levels and the SDOs in order to accompany the safe and efficient introduction of new technologies, which has already been recognized by ICAO Assembly.[3]

2.7.1 By working together, regulators and SDOs can develop a comprehensive framework with the regulatory frame focusing on high-level essential requirements while referring to technical specifications to show compliance against these essential requirements.

2.7.2 The benefit of this approach is clear: the regulator defers to a second level of documentation, which is more flexible and can more easily adapt to a changing environment when needed, . The regulator benefits from the broad representation of experts and the expertise offered through the SDO process. In addition, the separation between the high-level essential requirements and the technical standards accelerates the development of both levels of provisions, avoids redundancy and duplications of efforts, and allocates the community's resources appropriately.

2.8 SDOs have established strong relationships with the major national and regional ATM modernisation programmes such as SESAR in Europe, NextGen in the US or CARATS in Japan. In addition, whenever possible, SDOs join their efforts to produce technically harmonised documents, which become globally applicable as they benefit from the buy-in of the global community. To this end, some of the major SDOs have put in place cooperation agreements and joint standards-development procedures amongst themselves. This ideally places the SDOs to support the technology transfer from R&D to deployment, to the benefit of the global aviation community.

3. CONCLUSION

3.1 The role of industry standards in support of ICAO provisions should evolve to use industry standards to supplement its own provisions. This will establish a coherent, effective and efficient system of standards that make best use of the available resources and expertise. This will improve the overall quality and efficiency of the process and the resulting provisions and avoid duplication of efforts and discrepancy of resulting requirements and finally support a global and harmonised implementation of ICAO provisions.

3.2 The ICNSS TF is a welcome step towards a new streamlined framework for CNS and frequency spectrum standardisation. However, it is limited in scope, focused on CNS and spectrum standards and provisions as a start. It should be considered to extend its proposals to other domains and activities in the future.

3.3 SDOs are well placed to address the challenges of a changing environment, where disruptive and new technologies emerge and new and different stakeholders enter the aviation sector. The SDOs provide an open, transparent platform for discussion and standard development. At the same time, through the participation of a wide range of stakeholders and the essential coordination efforts with the regulators and industry, the SDOs are well aware of the overall vision and strategy in aviation at global and regional levels and are key for proper alignment and execution. This promotes the acceptance and adoption of innovative solutions by the community, whilst ensuring a consistent approach.

3.4 ICAO should continue to act on its previous engagements and make more and better use of standards to benefit from this broad representation of experts, by which its own expertise will be

[3] Assembly Resolution A40-27: Innovation in Aviation

increased and the quality of the overall system of ICAO provisions and supporting material will be improved as well as enabling the development of a framework to support the effective deployment of innovative technologies and safe integration of new entrants into the aviation landscape. This should be coordinated via the Standards Round Table (SRT).

3.5 ARINC Industry Activities, EUROCAE, RTCA, SAE International therefore reiterate our support for the ANC recommendations and Assembly resolutions in force and encourage ICAO make more and better use of industry standards developed by other recognised Standards Development Organisations (SDOs). We further encourage ICAO to follow a similar performance-based approach in the development of ICAO provisions, also in other areas, by incorporating industry standards by reference, subject to validation of the standard being fit for purpose.

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