



**WORKING PAPER**

**ASSEMBLY — 41ST SESSION**

**EXECUTIVE COMMITTEE**

**Agenda Item 23: Innovation in Aviation**

**POLICYMAKING AND PROCESSES FOR INNOVATION**

(Presented by the Airports Council International (ACI), the Civil Air Navigation Services Organisation (CANSO), the International Coordinating Council of Aerospace Industries Associations (ICCAIA) and the International Federation of Air Traffic Controllers' Associations (IFATCA)

**EXECUTIVE SUMMARY**

Technological and operational innovations are taking place across the full spectrum of aviation as the stakeholders strive to become both more efficient and more sustainable, and as new market segments develop. New propulsion technologies to improve sustainability are under development; new operational procedures and technologies to permit formation flying are being actively tested; new, electrically powered, unmanned vehicle concepts with new methods of automated separation and cyber-resilience continue to appear across several regions and from actors that have little experience of aviation regulation.

The multitude of innovations places an increased resource demand on the International Civil Aviation Organization (ICAO), while development timescales are increasingly compressed, driving a need for more rapid development of global Standards and Recommended Practices (SARPs) to be ready in time to facilitate entry into service.

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

- a) request ICAO to ensure that new and existing SARPs are outcomes focused and flexible to allow for rapid evolution and innovation across all disciplines and ensure that risks in other disciplines are systematically considered when developing new SARPs;
- b) request ICAO to implement mechanisms to enable a more systematic use of Direct Submission by developing a standardised, regular review process for candidate subjects that meet agreed criteria;
- c) request ICAO to make greater use of mechanisms to leverage industry expertise and resources through collaborative working to help accelerate the development of draft recommendations;
- d) request ICAO to ensure continuation of the Industry Consultative Forum as a means of strategic engagement with ICAO, and
- e) request the ICAO Council to urge member States to implement the principles of recognition of equivalence to streamline certification and audit processes.

<i>Strategic Objectives:</i>	This working paper relates to all Strategic Objectives.
<i>Financial implications:</i>	The activities referred to in this paper will be subject to the resources available in the Regular Programme Budget and/or from extra budgetary contributions.
<i>References:</i>	Doc 10140, <i>Assembly Resolutions in Force (as of 4 October 2019)</i>

<sup>1</sup> English, Arabic, Chinese, French, Russian and Spanish versions provided by ICCAIA.

## 1. INTRODUCTION

1.1 Technological and operational innovations are taking place across the full spectrum of aviation as the stakeholders strive to become both more efficient and more sustainable, and as new market segments develop. New propulsion technologies to improve sustainability are under development; new operational procedures and technologies to permit formation flying are being actively tested; new, electrically powered, unmanned vehicle concepts with new methods of automated separation and cyber-resilience continue to appear across several regions and from actors that have little experience of aviation regulation.

1.2 The multitude of innovations places an increased resource demand on the International Civil Aviation Organization (ICAO), whilst development timescales are increasingly compressed, driving a need for more rapid development of global Standards and Recommended Practices (SARPs) to be ready in time to facilitate entry into service. These challenges, when taken together, lead to a need to think differently across areas such as airworthiness, certification, cybersecurity and Air Traffic Management.

1.3 In the coming years, vehicles using new energies such as electric and hydrogen are expected to enter in operation, requiring a regulatory framework that considers operational, safety and infrastructure needs. At the same time, there are new entrants to crowded airspace, including increased use of unmanned aircraft, vehicles for urban air mobility and user of upper airspace as space travel becomes more frequent. There will also be greater connectivity between airspace users and greater autonomy, with artificial intelligence and the Internet of Things (IOT) playing a key role.

1.4 These technologies are emerging in compressed timelines, with the pace of technological development accelerating to meet the expectations of civil society. The speed, scope and volume of these innovations has the potential to overwhelm regulators and even, possibly, ICAO's capacity to develop standards and guidance. This is driving a need to innovate both in the way that policy is developed and implemented, and in the ways that industry contributes to the SARPs setting process.

1.5 While recognising the need for States decision-making to remain supreme, there is a need for process innovation in ICAO to ensure that technological innovations are enabled and integrated into the regulatory framework in a timely manner.

1.6 This paper calls on the Assembly to consider innovation in both the approach to regulation as well as working methods, to maximize the use of resources, enable innovation in aviation practices and reduce the time taken to update the regulatory framework.

## 2. DISCUSSION

2.1. There are a range of tools and working methods available to facilitate the change needed to address innovation. This paper identifies both innovation in regulatory approaches and the working methods needed to develop new frameworks.

### *Regulatory Tools*

2.2. Through the evolution of regulation toward defining outcomes rather than prescribing methods, greater flexibility in implementation allows for innovation without overburdening regulators. This approach must be accompanied by strong oversight and reporting to ensure that desired outcomes are

reached. Just one example of this is the evolution of aircraft types. Currently, requirements are often defined by mass, assuming that the mass of an aircraft is commensurate with its type of operation. However, with the evolution of aerial vehicles, it may be more desirable to rather define purpose and risk than a specific mass that will frequently need updating. By moving toward a more outcomes-focused set of standards, regulation can be made more flexible and future-proof.

2.3. Recognition of equivalence is another key tool that can help to both streamline regulation and reduce duplicative effort for regulators and industry. Examples might include the recognition of type certification of aircraft from one state to another, or recognition of the audit of a maintenance organization by a trusted partner. This approach removes administrative burden and offers opportunities to leverage experience and resources between stakeholders and States. ICAO frameworks for such recognition can assist States in making appropriate decisions, as demonstrated for One-Stop Security and the ongoing work on AMO recognition.

2.4. Digital transformation will necessitate flexible regulation that builds in cybersecurity requirements and safety outcomes for new technologies being introduced. An integrated risk management approach is needed to regulation to ensure that new SARPS are cross-cutting, taking into account safety, security, cybersecurity and environmental perspectives.

### ***Working Methods***

2.5. Greater engagement with industry will also alleviate pressure on workloads and facilitate faster development of SARPS and guidance material.

2.6. In creating the Council Aviation Recovery Taskforce (CART) to tackle the COVID-19 crisis, ICAO innovated a new, integrated, way of working with the industry. Shared expertise and integration across a multitude of stakeholders was beneficial for achieving more rapid and effective outcomes. The integrated method developed for working in the CART is a model that should not now be lost. Industry encourages building on this experience and lessons learnt.

2.7. A process that allows direct submission of Standards and Recommended Practices by industry and other standard making bodies for consideration, discussion and editing by the Air Navigation Commission (ANC) has been introduced. This process could be used more systematically to bring forward innovations for integration into the regulatory framework. This could relieve a significant burden from ICAO personnel as the planning and drafting of the documentation is conducted in advance by outside contributors. The review and redrafting of the documents would need to continue to be conducted within ICAO, compressing the process timeline whilst assisting the administrative burden. An example candidate for this process might be rules that would be required to support formation flight to reduce emissions; multi-party trails have already taken place and experience gained in the challenges and framework needed to support it.

2.8. An alternative example of a collaborative way of working that has demonstrated success is through multi-stakeholder task forces such as the Integrated Communications Navigation, Surveillance and Spectrum (ICNSS) Systems Task Force. This model could be used for other topics to expedite development of SARPs for new technologies.

2.9. New and innovative systems and technology are increasingly complex and require integration across a wide range of existing systems necessitating a new approach to applicability dates for the implementation of technical standards; namely a phased approach with checkpoints throughout, that defines several steps towards testing, certification and delivery. This would de-risk the rollout process,

ensuring that resources can be appropriately deployed without undue pressure, while still ensuring requirements are fully met.

2.10. New entrants to airspace, greater connectivity between stakeholders, more automation and autonomy, the use of Artificial Intelligence (AI) and Internet of Things (IOT) will necessitate expertise beyond the resources currently available to ICAO. Engagement with experts outside of aviation will be needed, drawing on experience from other sectors and leveraging external standards and best practices.

2.11. It will also be key to continue to regularly engage with the private sector to ensure that strategic priorities are identified and aligned. At the 40th General Assembly, Resolution A40-27: Innovation in Aviation expressed the need to innovate in the ways of working with the industry, including establishing a strategic, high-level dialogue with the private sector. Subsequently, the Council authorised the creation of the Industry Consultative Forum (ICF) to facilitate just such strategic dialogue. The continuation of this type of dialogue, along with a review of how industry interacts with ICAO is timely.

### 3. CONCLUSION

3.1. Industry congratulates ICAO on all of the activities and achievements on innovation and looks forward to continuing to actively participate in the Industry Consultative Forum and collaborative mechanisms such as the ICNSS Task Force.

3.2. A move toward outcomes focused regulation and greater use of recognition of equivalence between States to avoid duplicative audit and certification can help both industry and regulators to meet the needs of fast-paced innovation. A systematic approach to integrated risk management as part of the standards setting process is also required to ensure impacts across all areas are considered.

3.3. Greater use of external expertise will be needed to keep up with the pace of change, leveraging standards setting bodies, implementing a systematic approach to direct submission of suggested regulatory changes, using experts from within industry and drawing on specific expertise from other industries.

3.4. Experience gained in streamlining working methods by integration of expertise from States, the Secretariat and Industry during the CART process should be retained and used as a basis on which to build future methods of working together.

— END —