HIGH-LEVEL CONFERENCE ON COVID-19 (HLCC 2021)

SAFETY STREAM

Montréal, Canada, 12 to 22 October 2021

Agenda Item 2: Strategy and policy

2.2: Evolving regulatory capacity in aviation

REGULATORY CAPACITY ENHANCEMENTS

(Presented by the Secretariat)

**EXECUTIVE SUMMARY**

This paper recognizes and acknowledges the significant impact that changes in aviation as a result of innovation, emerging technologies, new business models and concept of operations have on State regulatory capacity, current processes and tools, and future competencies of aviation professionals. It also explores the unique regulatory challenges posed by these changes in the global air navigation system, which will need to be addressed by the aviation community in the years ahead as the evolution in aviation accelerates. The paper also highlights the importance of the availability of skilled workforce with enhanced competencies to professionally and efficiently operate and manage all of the new aviation systems and capabilities.

**Action:** The Conference is invited to agree to Recommendation 2.2/x — Regulatory capacity enhancement, new training approaches and improvement of current processes and tools to embrace changes in aviation in paragraph 3.

<table>
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<th>Strategic Objectives:</th>
<th>This working paper relates to the Safety and Air Navigation Capacity and Efficiency Strategic Objectives.</th>
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<td>Financial implications:</td>
<td><strong>Impact for the aviation community:</strong></td>
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<td>Financial implications are expected for the following aviation stakeholders: States, aircraft operators, ANSPs and aerodromes.</td>
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<td><strong>Impact for ICAO (relative to the current Regular Programme Budget resource levels):</strong></td>
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<td>Since development and implementation roll-out of ICAO’s current provisions (SARPs and PANS) will continue over the next triennia, additional resources are required, both financial and human, to ensure successful implementation of regulatory capacity enhancements.</td>
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<td>References:</td>
<td>Annex 1 — Personnel Licensing</td>
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<td>Doc 9750, Global Air Navigation Plan</td>
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<td>Doc 10137, Report of the Technical Commission</td>
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1. **INTRODUCTION**

1.1 The aviation industry continues to evolve since the establishment of the regulatory framework for international civil aviation, which is impacting today's regulatory environment. In many instances, these advancements are improving the safe and orderly growth of aviation; however, some are also introducing new challenges, mainly deficiencies within the regulatory framework, implementation processes and tools, and training concepts and methods. In the wake of these developments, ICAO Member States are faced with challenges on how to enhance regulatory and implementation capacity, training approaches, current processes and tools, and enforce regulations to ensure the safe and orderly development of civil aviation in line with the No Country Left Behind initiative.

1.2 To encourage innovation within the aviation sector and allow these new technologies and businesses to flourish while addressing the potential unintended consequences of the disruption to traditional regulatory approaches and practices, there is growing recognition that change is required. Considering the rate at which changes are evolving in aviation and, in order to stay relevant, regulations, implementation processes and tools as well as training concepts and methods applied today will need to be enhanced.

1.3 Under Agenda Item 3.1 on oversight and new approaches, the Conference will discuss the importance for the development of a cooperative oversight framework. This paper discusses the specific need to enhance regulatory capacity, which is mainly driven by, but not limited to, the onset of innovation.

2. **DISCUSSION**

2.1 **Changes and challenges to aviation regulations**

2.1.1 During the past ten years, there has been a significant increase in the pace of development and application of new technologies, concept of operations and business models within the aviation sector. Examples of these are the deployment of unmanned aircraft systems (UAS) traffic management systems, machine learning, artificial intelligence, additive manufacturing, etc. The new technologies are often significantly different from those used in the past. Many developers of these innovations are new to the aviation regulatory processes and often lack a good understanding and experience of the process and present a large challenge to the regulators. Existing regulatory structures are challenged to adapt to these changes, presenting significant hurdles to technology industries.

2.1.2 The assumption that prescriptive regulations can be crafted at the same pace as in the past, and then remain in place, unchanged, for long periods, has often been challenged with today's changing environment. New concept of operations, including cross-border transferability of aircraft, group operations and short-term interchange, demonstrate that the framework which was created several decades ago, is not always compatible with the current environment.

2.1.3 As a result, some of the main directions of challenges faced by Member States are:

   a) lacking enhanced regulatory and implementation capacity and infrastructure to establish and sustain regulatory oversight;

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b) harmonizing, creating or modifying regulations and enforcing them to adapt to the changes in aviation;

c) developing new training approaches, improving current processes and tools, and communicating them to the public promptly, while working within legacy frameworks and attempting to foster innovation; and

d) fostering mutual reliance and recognition and sharing of information.

2.2 Processes to address regulatory capacity enhancements

2.2.1 In adapting to meet the needs of a changing aviation industry, it is important to understand what is the right approach in developing future regulations to accommodate new innovations in aviation and new business models. The Deloitte Insight studies on the “Future of Regulations (principles for regulating emerging technologies)1” highlights the five principles below to guide the development of future regulations, which may be considered by States. These principles have the ability to facilitate and support the introduction of innovation in a timely manner and can assist in the determination of when and how to regulate and should be considered within the ICAO context.

a) Adaptive regulation – shift from “regulate and forget” to a responsive, iterative approach.

b) Regulatory ‘sandboxes’ – prototype and test new approaches by creating sandboxes and accelerators.

c) Outcome-based regulation – focus on results and performance rather than prescriptive form.

d) Risk-weighted regulation – move from one-size-fits-all regulation to a data-driven, segmented approach.

e) Collaborative regulation – align regulation nationally and internationally by engaging a broader set of players across the ecosystem.

2.2.2 ICAO is currently developing methods for the ICAO Standards-making process to keep pace with changes in aviation. Over the past decades, States, industry and research and development organizations have led innovation, validation, trials, regulation and implementation of new concepts, technologies and approaches to regulation. Where implemented, these enhancements generally bring safety, capacity, efficiency and environmental protection benefits. Leveraging and pooling, under ICAO’s umbrella, the expertise developed by lead implementers and regulators to assist States in implementing new provisions could bring significant benefits to States and the aviation community in general. ICAO should establish a means to identify the stakeholders leading the change, foster their participation from the early phase of provisions development and centralize their expertise into an ICAO pool of knowledge, which would prove useful for States seeking assistance in implementing new provisions.

2.2.3 The changes in aviation are expected to place further demands on State resources. This may require changes to traditional approaches and practices, including the conduct of surveillance activities, certification and licensing (e.g. remote- and desktop-based surveillance activities). With the support of new technologies for advanced analytics, resource-intensive tasks can be automated to improve and increase effective collection and analysis of safety data and safety information, increase efficiency and promote data-driven decision-making.
2.2.4 In addition, to ease the demand on State resources in view of changes in aviation as a result of emerging technologies, regional safety oversight organizations (RSOOs) can be natural enablers to enhance State regulatory and oversight capacity. RSOOs support the development of harmonized regulatory and legislative frameworks on a regional level, which facilitates a harmonized implementation of the rules. Furthermore, in order to support States fulfil their safety oversight obligations under the Chicago Convention, RSOOs supplement State oversight inspectors where there is a shortage of such qualified personnel thereby minimizing the demand on State resources.

2.3 Tools to address regulatory capacity enhancements

2.3.1 In the area of licensing, ICAO is developing an initiative to improve the current processes and tools for issuing and verifying Electronic Personnel Licenses (EPL) applicable to all disciplines. This initiative was a result of the 39th Session of the ICAO Assembly that encouraged ICAO to analyse the feasibility of implementing an electronic personnel licensing system into Annex 1 — Personnel Licensing with the objective of improved efficiency and security in the management of licenced personnel. The EPL initiative, when appropriately implemented, will be more effective and cost-efficient to States when issuing licenses and will not impose undue burden on other States when determining their authenticity and validity. A similar approach may be considered for other certificates, including Certificates of Airworthiness and Certificates of Registration.

2.3.2 In the area of operations, a new ICAO Web-based Aeronautical Agreements and Arrangements Registry (WAGMAR) has been created to support the implementation of new provisions in Annex 6 — Operation of Aircraft, requiring a certified true copy of the summary of Article 83 bis agreement to be carried on-board the aircraft while the agreement is in force. An agreement summary will be created by WAGMAR using information coordinated by States party to the agreement and will be available for download and be printed. This will assist States with oversight of aircraft operated under such agreements, with minimal additional impact for State regulators.

2.4 Current and new training approaches

2.4.1 The Universal Safety Oversight Audit Programme (USOAP) Continuous Monitoring Approach (CMA) has demonstrated that the effective implementation of qualified technical personnel (critical element 4) is observed in most instances to be below the average effective implementation of other critical elements, revealing that training and capacity building is a global concern. Following the adoption of Assembly Resolution A40-4, Appendix D: Qualified and Competent Aviation Personnel, ICAO has developed a training and capacity building roadmap to assist Member States in their capacity-building efforts. The roadmap requires States to prepare a structured plan of action to meet human resource capacity needs and consider the impact of new innovative developments and new concepts of operations for a State to achieve its national objectives in air transportation.

2.4.2 In addition, the increasing application of competency-based training and assessment (CBTA) can benefit States and industry by being more efficient and targeted to adapt to a changing environment as a result of technological development and innovations. A new edition of the Procedures for Air Navigation Services — Training (PANS-TRG, Doc 9868) became applicable in 2020 which, together with the associated implementation guidance material, will provide a more flexible framework that stakeholders can adapt to their local operational contexts and requirements, applying a standardized training approach that promotes the development of shared competencies in the work environment.

2.4.3 The advancement in technology and the rising cost of training have encouraged some States and industry to adopt new approaches into their current training processes. These new approaches include the use of simulation and wearable technology (e.g. augmented reality helmets/glasses) and could
provide an effective and cost-efficient way in which training is conducted to ensure that it is conducive to an acceptable level of safety. As changes evolve in aviation, the efficacy of emerging innovations in aviation training must be measured against the objectives they are designed to support prior to being fully deployed.

3. CONCLUSION

3.1 Given that changes in aviation will continue to evolve, the global aviation community needs to develop new regulatory policies and processes in accordance with international standards in order to evaluate them in a timely manner. The availability of a skilled workforce with enhanced competencies is essential for States to succeed in managing new aviation systems and capabilities in a professional and efficient manner. Therefore, enhanced collaboration between States, international organizations and industry, under the umbrella of ICAO, would be beneficial. This could include sharing information, expertise, best practices and experience in order to develop common rules and to support and manage the introduction of new technologies.

3.2 In light of the above, the Conference is invited to agree to the following recommendation:

**Recommendation 2.2/x — Regulatory capacity enhancement, new training approaches and improvement of current processes and tools to embrace changes in aviation**

That States:

a) recognize the significant impact of changes in aviation on the required competencies of regulatory aviation personnel, and include in their national aviation safety plan actions to enhance regulatory capacity development;

b) share relevant experience with the broader aviation community through ICAO on how to enhance regulatory capacity, training and improve current processes and tools (including licensing, certification, authorizations and approvals) to embrace changes in aviation; and

c) consider the use of regional safety oversight organizations (RSOOs) to enhance the regulatory capacity of States.

That ICAO:

d) continue to evolve the Standards-making process, taking into consideration changes in aviation; and

e) in collaboration with Member States, establish a means to identify the stakeholders leading the change, foster their participation in the early phases of provision development by centralizing their expertise into an ICAO pool of knowledge and share regulatory capacity enhancement solutions with other States through ICAO.

— END —