International Civil Aviation Organization

WORKING PAPER

THIRTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 9 to 19 October 2018

COMMITTEE A

Agenda Item 5:   Emerging issues
5.4: Cyber resilience

TRUST FRAMEWORK IN A DIGITAL ENVIRONMENT

(Presented by Brazil)

EXECUTIVE SUMMARY

Since 1944, ICAO has played an essential role in the development of a safe and efficient international civil aviation system that connects people and economies worldwide. The developed system is based on a trust framework that allows international civil aviation to operate seamlessly across boundaries. However, ICAO needs to evolve the trust framework to meet the new challenges of global digital connectivity.

Action: The Conference is invited to agree to the recommendations in paragraph 3.5.

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1.   **INTRODUCTION**

1.1   Since 1944, ICAO has played an essential role in the development of a safe and efficient international civil aviation system that nowadays connects the people and the economies of the world. ICAO oversees the development of Standards and Recommended Practices (SARPs), policies and agreements that allow States to certify the participants of the global aviation system (e.g., air navigation services providers (ANSPs), airport operators, aircraft operators, etc.). This certification, recognized by all Member States, constitutes a trust framework embedded in the *Convention on International Civil Aviation* (Chicago Convention, Doc 7300). As a result, this trust framework allows international civil aviation to operate seamlessly across boundaries. And despite conflicts, crises, and technological revolutions, under a single connected sky, it delivers levels of safety and efficiency that are compliant with expectations from society.

2.   **DISCUSSION**

2.1   Based on the needs of the aviation community, ICAO needs to evolve this historic trust framework to meet the new challenges of global digital connectivity. The aviation community is inherently conservative and therefore has been slow to embrace a widespread use of the Internet in safety-critical operations. However, some progress in this area is taking place in an incremental and fragmented manner. If the aviation system is going to continue to function as a single connected sky, a more strategic and integrated approach is required.

2.2   Some of the challenges that should drive a more comprehensive approach relate to the expected growth in demand for air transportation, the need to accommodate the new entrants, including autonomous vehicles, unmanned aircraft systems (UAS), and remotely piloted aircraft systems (RPAS).

2.3   ICAO must work to help all stakeholders to provide a system that allows these new entrants to innovate while providing enough structure to ensure that these new operations could be integrated within the legacy system. Failure to do so will lead inexorably towards fragmentation of the global system and may jeopardize the safety levels. The fast evolution pace that the aviation system is experiencing towards a digital environment in support of these more complex operations can no longer be accomplished through the existing patchwork of networks for the exchange of information.

2.4   Across the world, States, service providers and industry are undertaking initiatives to secure the myriad of components of the aviation ecosystem from cyber threats. The aviation systems are built on the precepts of identity and trust. However, if in a digital environment, hundreds – or thousands – of disparate systems of identity and trust are implemented, ie the connected global aviation system the aviation community has laboured to create, it will become incredibly complex, fragmented and inefficient with consequences that will be reflected in safety and efficiency levels.

2.5   Nowadays there are Standards for aircraft operations that all stakeholders in the civil aviation system adhere to and are validated on a regular basis. This standardization creates a level of trust in flight operations across the globe. However, all stakeholders, which produce and utilize operational information to operate the aircraft or to manage the air traffic, do not have minimum or common standards in place to ensure mutual trust and protection of the information that is exchanged, methods of inter-connectivity or methods of protection against mutual risk.

2.6   States, air navigation and communication service providers, and industry are following their own standards which adds significant complexity and cost to operate and maintain an efficient and safe system to support flight operations. Establishing a common trust framework to exchange information with minimum standards that all stakeholders follow will help ensure that risk is managed appropriately in a digital environment and provide a level of trust similar to what we currently have in the system to manage flight operations.

2.7   Without setting up a trust framework to manage identity within a digital environment, there won't be any willingness to commit to the collaborative effort needed to operate the international civil aviation system of today and tomorrow, which relies more and more on the use of digital information.

2.8   To continue the evolution of the supporting systems to air traffic management and aircraft operations, it is necessary to evolve the community-driven trust framework for a digital environment guided by the following key principles:

        a) governance;

        b) minimum operating performance standards;

        c) acceptable levels of cyber risk;

        d) inspection or methods of validation;

        e) legal polices;

        f) technical infrastructure;

        g) interoperable systems; and

h)   harmonized procedures.

2.9   With a common trust framework enabling the key capabilities and concepts identified in the *Global Air Navigation Plan* (GANP, Doc 9750), the necessary evolution of the aviation system can be achieved more quickly, easily and cost-efficiently.

3.   **CONCLUSION**

3.1   The evolution of the existing trust framework to support air operations within a digital environment has become a priority to guarantee safety and efficiency in the aviation system.

3.2   The more interconnected the aviation system becomes, the greater technical challenges and complexity are created unless mutual agreements to common standards and procedures are applied. To establish this trust, common identity management methods and appropriate levels of information protection by each stakeholder are required.

3.3   Most of the aviation stakeholders are interconnected among themselves to ensure the resilience of their infrastructure, and have both the complexity and technical challenges inherent to this interconnectivity under control. Enabling a common trusted global operating environment, which would provide connectivity among all stakeholders, would reduce the amount of external interfaces while enabling broader stakeholder communications.

3.4   For the evolution of the aviation system, it is necessary to develop a common digital platform for the whole aviation community to reliably and securely exchange information supported by a solid concept of operations as an enabler of overall international civil aviation resilience.

3.5   Based on the above, the Conference is invited to agree to the following recommendations:

That the Conference

a)   request ICAO, in collaboration with industry and service providers, to continue the development of a concept of operations for the evolution of the trust framework within a digital environment to guarantee that all stakeholders operating in the aviation ecosystem are identified and trusted;

b)   request ICAO to develop a programme to provide States with appropriate skillsets for staff (awareness, training, certification, etc);

c)   request ICAO to coordinate with the technical and governance entities of the Internet system to guarantee the appropriate use of the Internet infrastructure to support the aviation system;

d)   request ICAO, in cooperation with industry and service providers, to investigate the use of emerging technologies as enablers to future cyber resilience needs of the international civil aviation system; and

e)   request States, service providers and industry to provide the necessary support for ICAO to evolve the global trust framework as enabler of flight operations in a digitally connected environment.

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