



WORKING PAPER

ASSEMBLY — 40TH SESSION

TECHNICAL COMMISSION

Agenda Item 30: Other Issues to be considered by the Technical Commission

TRUST FRAMEWORK FOR A DIGITAL ENVIRONMENT

(Presented by Brazil)

EXECUTIVE SUMMARY

The growth of digital aviation infrastructures and services has brought great benefits to increasing capacity and optimizing airspace while presenting a number of challenges in terms of interoperability and cyber resilience. The development of a trust framework is necessary for aviation to operate seamlessly across international boundaries.

Action: The Assembly is invited to:

- a) request ICAO to promote the concept of a trust framework and a global trusted network to avoid divergence in efforts between States and regions;
- b) recommend ICAO to continue the developments requested by the 13th Air Navigation Conference regarding a trust framework and a trusted network for exchange of safety critical information;
- c) request ICAO to include manners of logically isolating the aviation community from the public Internet as part of the trust framework;
- d) request ICAO with the support of aviation and non-aviation industry to define the architecture and requirements for a trusted network in support of exchange of information in a digitally connected environment; and
- e) recommend States to support the developments of the trust framework with the necessary resources.

<i>Strategic Objectives:</i>	This working paper relates to Strategic Objectives A – <i>Safety</i> , B – <i>Air Navigation Capacity and Efficiency</i> and C – <i>Security and Facilitation</i> .
<i>Financial implications:</i>	Training of personnel, installation of equipment and systems both terrestrial and airborne.
<i>References:</i>	Annex 17 — <i>Security — Safeguarding International Civil Aviation against Acts of Unlawful Interference</i> Doc 10075, <i>Assembly Resolutions in Force (as of 6 October 2016)</i> Doc 9896, <i>Manual on the Aeronautical Telecommunication Network (ATN) using Internet Protocol Suite (IPS) Standards and Protocols</i> Doc 9750, <i>Global Air Navigation Plan</i>

1. INTRODUCTION

1.1 We live in the information age. Increasingly, the various devices and machines are interconnected through a complex data network that decreases distances and increases the speed at which messages are exchanged. The world is getting smaller. But these facilities bring with them a great increase in threats that, unlike the past, come from everywhere in the world and are invisible.

1.2 Tackling these threats is one of the major challenges of today as they are diverse, everywhere, and capable of producing great losses in terms of human lives and financial expenditures.

1.3 In a world increasingly interconnected, there is no way for aviation to stay out of this scenario. Despite the existence of a large number of analog and isolated systems, new technologies are being implemented using digital information transiting through data networks. Concepts such as global navigation satellite system (GNSS), automatic dependent surveillance — broadcast (ADS-B), controller-pilot data link communications (CPDLC), air traffic services (ATS) interfacility data communications (AIDC), aeronautical telecommunication network (ATN), system-wide information management (SWIM), remotely piloted aircraft systems (RPAS) and others bring enormous benefits to aviation but produce new challenges in ensuring the availability, integrity, confidentiality and authenticity of the information provided by the services.

1.4 Only with strong governance can the risks inherent in the new concepts implemented be known, controlled and mitigated. For this, the starting point is the development of a trust framework capable of standardizing procedures and protocols for the management and integration of network and service infrastructures as well as for protection against cyber attacks.

2. DISCUSSION

2.1 Although the aviation technological evolution cycle is slower, the digital world is increasingly becoming part of the various systems of communication, navigation, surveillance, meteorology, air traffic management (ATM), aeronautical information management (AIM), etc. The digitization of information, the network interconnections and the automation of services require very good governance to ensure interoperability and security of operations.

2.2 The very introduction of the SWIM concept in aviation will consist of standards, infrastructure and governance that will enable the management of ATM-related information and its exchanges between qualified participants through interoperable services.

2.3 To this end, however, the various aeronautical telecommunications networks of the States should be interconnected by ensuring the circulation of information. Each State is responsible for deploying and operating its network infrastructure and ensuring its security, but to maintain seamless operations across boundaries, standards must be followed.

2.4 These standards have to be developed within the principles of the Chicago Convention, in the creation of a trust framework, capable of guaranteeing all stakeholders security in the exchange of information in a digitally connected environment.

2.5 Another aspect to be considered is the need for all stakeholders using the services and networks to have a digital certificate that guarantees their identification around the world.

2.6 The aeronautical community has always sought to physically isolate itself from external networks, which is becoming difficult, considering that data follow many different paths throughout the world, but ICAO has as a way of guaranteeing the infrastructure if it considers that it is not a local or even regional problem. It is the whole global system that needs to be safe and resilient.

2.7 In addition, as the global system is using the existing Internet infrastructure for different purposes, it is necessary the involvement of this industry with ICAO to guarantee the necessary logical isolation to increase the level of protection of the aviation system networks.

2.8 Logical isolation can be obtained in a variety of ways, provided that it is guaranteed that if a bad actor decides to do something against the aviation system in cyberspace, he is recognized as not part of the aviation ecosystem and have his access denied. This will provide an increase in the levels of system protection compatible with the agreed levels of safety being practiced by the aviation community.

2.9 It must be recognized that there is no system that can be one hundred percent protected but any bad actor will have to work harder to get into the aviation system if a logical isolation is made. A trust framework combined with a logically isolated network does not mean everybody in the network is perfectly trusted. It means that all the community has an understanding of who the participants are and what role they should be performing within the network. Besides the logical isolation, another more efficient layer of protection is to have an identity system anchored in a regulator than a thousand identity systems scattered across the industry.

2.10 During the 13th Air Navigation Conference it was discussed and agreed on the need to develop a global trust framework and to work on governance and policy provisions for a trusted network and now is time for ICAO to work with States and industry to advance developments and raise awareness on cyber threats to the safety and resilience of operations.

3. CONCLUSION

3.1 Information exchange in digital format is growing rapidly and all stakeholders are implementing measures to protect their systems digitally connected against cyber threats and to ensure resilience of air navigation systems.

3.2 The new entrants to the aviation system are innovating quickly and they need a global trust framework and a trusted network to support safety and efficiency of their operations and avoid negative safety impacts. Air navigation service providers need to be prepared for these requirements.

3.3 In addition, this requests action from ICAO to support States on their integration work that may involve stakeholders outside of aviation who govern private networks and ICAO guidance on how to deal with these matters is necessary for global harmonization of procedures and interoperability of systems.