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WORKING PAPER

THIRTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 9 to 19 October 2018

COMMITTEE A

Agenda Item 3: Enhancing the Global Air Navigation System
3.1: System-wide information management (SWIM)

PROMOTION OF A GLOBAL SYSTEM-WIDE INFORMATION MANAGEMENT FRAMEWORK

(Presented by the United States)

EXECUTIVE SUMMARY

System-wide information management (SWIM) consists of standards, infrastructure and governance enabling the management of air traffic management (ATM) related information and its exchange between qualified parties via interoperable services. SWIM is an underlying architecture to the information management and exchange framework that connects air traffic modernization, safety and efficiency into a global endeavour.

Advanced services that are built upon safe and efficient information exchange include but are not limited to air traffic flow management (ATFM), trajectory-based operations (TBO), unmanned aircraft systems (UAS) traffic management (UTM), operations of varied aircraft above 60,000 feet as well as global tracking.

Action: The Conference is invited to agree the actions proposed in paragraph 3.2.

1. INTRODUCTION

1.1 The aviation industry is currently experiencing a technological and operational evolution in which aircraft, operators, airports and stakeholders are increasingly more dependent on digital infrastructures and innovative solutions to solve legacy era constraints. This evolution has created an interconnectivity and interdependence on the entire global aviation system.

1.2 As the demands on global aviation continue to increase in terms of predictability, capacity, efficiency, safety and operational flexibility, it is vital that States adopt globally harmonized frameworks. These frameworks and subsequent architectures need to include performance-based standards, agreed upon information exchange models and provisions for increased automation.

1.3 Historically, one of the most significant constraints in aviation is the flow of accurate, relevant and timely information. Advancements in technology have provided a wealth of data; however, the formulation of that data into efficiently communicable information remains a challenge.

1.4 Today's paradigm for exchanging messages acts as a constraint on the implementation of future, performance-enhancing operational improvements. Some of the present-day constraints include systems that have not been designed and implemented to be globally interoperable within globally-agreed parameters. Many interfaces, which were designed to support point-to-point or application-to-application exchanges, have limited flexibility to accommodate new users, additional systems, and new content or changed formats. The current environment of systems and exchange models makes it challenging to devise security frameworks across systems and stakeholders to support the increasing need for open and timely data exchange whilst at the same time respecting the legitimate security concerns of all stakeholders.

1.5 This is especially true as new and emerging technologies, such as cybersecurity, unmanned aircraft systems (UAS), associated UAS traffic management (UTM) systems and industry innovation, are developed and integrated into the legacy system.

2. DISCUSSION

2.1 The need for a global system-wide information management (SWIM) framework that utilizes the advancements and innovation of governments, the private aviation sector and other industries, which enables an interoperable exchange of information, is increasing. The framework needs to establish governance and processes that can be implemented worldwide regardless of current modernization and development status.

2.2 Global SWIM governance needs to include a set of performance-based standards, policies and processes to ensure that the information required for global interoperability is provided by reliable information services through a trusted, resilient and interconnected framework. SWIM governance will contribute to building confidence, addressing topics, such as, rights of usage of information, quality of service aspects, and trust.

2.3 The establishment of a global SWIM framework entails activities that can be applied at different levels (e.g., national, regional, global and organizational). These activities include the establishment of a common set of performance-based standards, policies and processes for SWIM information, information services and technical infrastructure; definition and establishment of governance structures; promotion of information interoperability among stakeholders; guidance material for the establishment and use of SWIM services; and definition of the transition to a SWIM environment through regional arrangements.

2.4 The interconnection of registries will also provide information consumers with a single access point at a global level to all available information services by mutual authentication and integrity of information.

2.5 A Global SWIM framework also provides the digital foundation for future aviation development. As air traffic management strives to become more predictable and efficient through trajectory-based operations (TBO), collaborative and transparent information sharing on a digital platform will reduce constraints and accommodate different users with varied capabilities and performance requirements. These users will include piloted aircraft operations, UAS, as well as futuristic new users and operations not considered today.

2.6 While governments and ICAO are capable of developing the standards and regulatory practices to institute a global framework, it is imperative that private and non-aviation industries are consulted. Non-aviation industries have already innovated and implemented global digital platforms and frameworks. Many of these advancements have direct applicability to aviation while others offer lessons learned.

3. CONCLUSION

3.1 The need for a global SWIM framework that utilizes the advancements and innovation of governments, the private aviation sector and other industries, which enables an interoperable exchange of information, to establish a globally harmonized air traffic management system is increasing. The work of this Conference can promote the establishment of global frameworks and global interconnectivity.

3.2 The Conference is invited to agree to the following recommendation:

That the Conference:

a) endorse the concept of the global system-wide information management (SWIM) framework as part of the *Global Air Navigation Plan* (Doc 9750) and the aviation system block upgrades (ASBUs);

b) work within ICAO expert groups, standards making organization, and other innovative industries to establish performance standards, governance and processes to ensure interoperability for global access to aviation-related information; and

c) agree to work within ICAO regions to develop interconnected trusted global SWIM frameworks.

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