



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)

SWIM APPLICATION AND FUTURE

(Presented by the United Arab Emirates)

EXECUTIVE SUMMARY

As many aspects of conventional data are being digitised, the aviation industry is no exception as it is predominantly among the leading fields of technology. The means by which the industry is planning to share quality information to the right people with the right systems is by using system-wide information management (SWIM).

The *Global Air Navigation Plan* (GANP, Doc 9750) information management concept includes SWIM and its elements in many of the aviation system block upgrades (ASBUs) namely B1-FICE, B1-DATM, B1-SWIM as well as B2-FICE and B2-SWIM.

This paper presents some of the benefits of SWIM architecture and the requirement for SWIM-enabled applications. Pioneering SWIM implementations will soon become operational and will evolve as first benefits are created. ICAO guidance is necessary to assure that developments will not diverge and that harmonisation is maintained while innovation is not being constrained.

Action: The Conference is invited to agree to the conclusions in 3.1.

1. INTRODUCTION

1.1 System-wide information management (SWIM) separates information management from applications in the domain of air traffic management (ATM) by assuring accessibility to data through standardised interfaces. This paradigm shift in the system landscape of ATM stakeholders contributes to enhanced information sharing for improved collaboration.

1.2 The introduction of SWIM typically comes along with the harmonisation of data presentations such as aeronautical information exchange model (AIXM), flight information exchange model (FIXM), or weather information exchange model (WXXM). The standardisation of data presentation prevents proprietary data encoding and assures that applications from different stakeholders are able to interface without major integration efforts. The SWIM accessibility and open data models form the SWIM platform.

1.3 To generate benefits from the introduction of a SWIM platform it is important that stakeholders cooperate in the definition of applications that contribute to their business objectives. Applications may be common practice such as aeronautical information management (AIM), airport collaborative decision making (A-CDM), and collaborative air traffic flow management (ATFM) or specialised applications for a limited number of participants on a national or regional level.

1.4 SWIM is considered to be a key enabler for globally interoperable systems by the *Global Air Navigation Plan* (GANP, Doc 9750), *Global Air Traffic Management Operational Concept* (Doc 9854) and the *Manual on Air Traffic Management System Requirements* (Doc 9882).

1.5 With the introduction of the first operational SWIM-enabled applications in various areas, it becomes increasingly important that the evolution of the SWIM landscape is guided by development plans that cater for the harmonisation and synchronised development of applications at the national, regional and global level.

2. DISCUSSION

2.1 In the air transportation industry, like in any other industry, most stakeholders (air traffic services units (ATSUs), airspace users, airports, etc.) operate their own data processing systems with proprietary databases. These data processing systems are optimised to the specific business processes of the stakeholder and information in the individual data silos is frequently considered as sensitive and business confidential.

2.2 At the same time all aviation stakeholders are interested to work together to continuously improve the safe, efficient and economic flow of air traffic. The GANP exhibits ICAO's strategy for a more integrated aviation planning at both state and regional level. It outlines necessary solutions by introducing a consensus-driven aviation system block upgrades (ASBU) system engineering modernisation strategy.

2.3 Advanced collaborative decision making (CDM) processes that require all involved stakeholders to have access to common high-quality information are a cornerstone for the future. Such common information may be presented in different views depending on the stakeholders' perspective to the decisions, but only the accessibility to a consistent data with intrinsically high-quality information guarantees the effectiveness of joint decisions.

2.4 Transferring the concept of common information that is accessible with different views to stakeholders is the core idea of the SWIM architecture while at the same time protecting stakeholders in safeguarding sensitive information. Stakeholders can access and share their databases in a controlled manner through the common SWIM platform.

2.5 Without the need for centralised architectures single source service provider SWIM architecture separates data storage and applications and provides standardised methods to access information from different sources. This solves the dilemma of information sharing required for an effective CDM on one side and on the other side it protects the business interests of the individual stakeholder.

2.6 The SWIM architecture serves as an enabler for numerous potential applications many of which are identified in the GANP. Seeing the potential of the SWIM architecture, a number of national and regional initiatives have been initiated by pioneering stakeholders to bring first applications into

operation to gain early benefits by harvesting low hanging fruits. Starting from such initial applications further applications will evolve.

2.7 Such pioneering has to be embraced as it is expected to be the basis for innovation and continuous evolution of new applications for collaboration by using real-world experience. The involvement of airspace users, airports and air traffic service providers will ensure that the collaborative work will assure all aspects are considered on a national or multi-national level. These initiatives will be most effective to address the specific needs on the national or multi-national level.

2.8 Such pioneering pilot implementations, however, also bear the risks to spawn technological islands that jeopardize interoperability with other regional implementations.

2.9 Cooperation on a global level is required to establish guidance and steering of SWIM implementation on various levels. Such guidance has to assure that pioneering initiatives are encouraged to allow progressive stakeholders to implement SWIM-enabled applications for the benefit of the aviation industry, but at the same time assuring that regional and global interoperability can be maintained.

3. CONCLUSION

3.1 The conference is invited to:

- a) encourage States to develop SWIM national implementation plans in alignment with regional strategies and priorities and in accordance with the ICAO strategy outlined in the Global Air Navigation Plan;
- b) encourage States to implement and enhance in close collaboration with their stakeholders, SWIM platforms including SWIM enabled applications to support CDM for the benefits of the aviation sector;
- c) request ICAO to consider an update to the GANP provisions to include progressive SWIM national implementation plans in alignment with regional strategies and priorities to facilitate a globally harmonised SWIM implementation; and
- d) request ICAO, States and international organizations to promote, plan and implement Global SWIM Demonstrations activities with various stakeholders to measure the performance benefits and share the benefits and lessons learned to the aviation community.

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