



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)

REGIONAL SYSTEM-WIDE INFORMATION MANAGEMENT (SWIM)

(Presented by South Africa)

EXECUTIVE SUMMARY

This paper provides a brief overview of System-Wide Information Management (SWIM) as defined in the *Global Air Navigation Plan* (GANP, Doc 9750) and lists aspects stakeholders would need to take into consideration when developing plans.

Action: The Conference is invited to agree to the recommendation in paragraph 4.1.

1. INTRODUCTION

1.1 The *Manual on Air Traffic Management System Requirements* (Doc 9882) explicitly identifies the implementation of system-wide information management (SWIM) as a requirement for the future air traffic management (ATM) system.

1.2 SWIM is an integral part of achieving the Global Air Navigation Plan (GANP) Performance Improvement Area 2 – Globally Interoperable Systems and Data and is covered in a number of the Aviation System Block Upgrades (ASBU) modules.

1.3 SWIM is defined in the *Manual on System-Wide Information Management (SWIM) Concept* (Doc 10039) as: “SWIM consists of standards, infrastructure and governance enabling the management of ATM-related information and its exchange between qualified parties via interoperable services.”

2. DISCUSSION

2.1 As per the SWIM manual definition, SWIM is based on standardized data/information exchange models, infrastructure and communication networks capable of exchanging high volumes of quality and timely information.

2.2 Standardised data models identified for use within the aviation community to exchange data/information are:

- a) Flight Information eXchange Model (FIXM)
- b) Aeronautical Information eXchange Model (AIXM)
- c) ICAO Meteorological Information eXchange Model (iWXXM)

2.3 Although there are various systems/applications within South Africa such as the air traffic control system, aeronautical information management (AIM) system (both static and dynamic) and airspace/flight procedure design applications, these systems are capable of exchanging information in AIXM.

2.4 The Africa-Indian Ocean (AFI) Implementation and Infrastructure Subgroup (IIM SG) of AFI Planning and Implementation Regional Group (APIRG) has listed AIXM as one of the key projects to achieve within the AFI Region.

2.5 Some of the challenges the IIM SG is addressing within the AFI Region are:

- a) ATM applications today comprise of a variety of applications developed by different service providers and customized based on the client's requirements, which increases interoperability problems.
- b) Although standardized exchange models are being developed, the interpretation of unique identifiers, the definition of parameter sets (only distributing relevant data) for distribution seems to be different between service providers which increases manual intervention and increase the possibility for data processing delays and data inconsistencies.
- c) Current infrastructure makes it difficult and costly for one stakeholder to access, on a timely basis, information originated by another stakeholder.
- d) Message-size limitations with the present infrastructure exist (e.g. internet protocol (IP) vs aeronautical fixed telecommunications network (AFTN)).
- e) As these systems become more automated and integrated, it requires more levels of governance and coordination between stakeholders to prevent security breaches and cyber-attacks.

2.6 South Africa along with Kenya, The Agency for Air Navigation Safety in Africa and Madagascar (ASECNA) and Nigeria have previously been identified as the regional databases within the AFI Region, APIRG Conclusion 21/14 – AIXM Implementation:

CONCLUSION 21/14: AIXM IMPLEMENTATION

That, in order to comply with the schedule for AIXM implementation based on the project deliverables for the AFI-Region as defined by the IIM/SG, States are urged to comply with the migration process to the identified Regional AIS Regional Databases in accordance with the AFI-CAD Concept.

2.7 Annex 15 — *Aeronautical Information Services*, Amendment 40 now makes provision for the exchange of aeronautical information/data in digital format based on agreement between

Contracting States. This agreement for the exchange of digital data is also required for ATS interfacility data communications (AIDC) implementation between neighbouring States and should therefore be a minimum requirement between States for the exchange of information/data.

2.8 The various exchange models being developed will eventually form part of the ATM Information Reference Model (AIRM) as defined in the GANP.

2.9 The AIRM provides an implementation-neutral definition of all ATM information through harmonised conceptual and logical data models. It contains well-known elements such as aerodrome, ATS route, airspace, flight procedure and a common definition of fundamental modelling concepts including time and geometry.

3. CONCLUSION

3.1 Although all these various exchange models are being developed, data ownership, data provision and data usage rules should be facilitated by developing and implementing a SWIM governance model as interoperability affects almost all stakeholders and their interactions within the ATM system.

3.2 Rules, roles and responsibilities need to be clearly defined, per stakeholder, considering the functional criticality of the information they handle.

3.3 It is vitally important that computer systems and services utilized in the ATM network be linked to exchange information, and that both service providers and service consumers understand and interpret the exchanged information in the same manner to allow different organizations to achieve their goals.

4. RECOMMENDATION

4.1 The Conference is invited to agree on the following recommendation:

Recommendation 3.1/x – AFI Regional system-wide information management (SWIM)

That the Conference:

- a) request ICAO to develop additional guidance not currently contained in the *Manual on System Wide Information Management (SWIM) Concept* (Doc 10039) related to SWIM, specifically based on regional requirements including information services, technical infrastructure, registry and governance for information management, in the interest of globally seamless operations;
- b) request ICAO to provide guidance to States and industry to ensure that uniform specifications are available to vendors to support seamless interfacing with existing systems in the context of SWIM; and
- c) request ICAO to include in the proposed SWIM governance framework, at regional level, coordination between stakeholders to be undertaken in an effort to prevent security breaches and cyber-attacks.

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