Agenda Item 2: Implementation of aeronautical information and aeronautical data exchange systems (AIXM)

Implementation of SWIM

(Presented by the Secretariat)

SUMMARY

REFERENCES

- Annex 15 to the Convention on International Civil Aviation
- Doc 9750 Global Air Navigation Plan
- Doc 9854 ATM Operational Concept
- Doc 10003 Manual on the digital exchange of aeronautical meteorological information
- Doc 10039 Manual on SWIM (Concept) (Disclaimer)

ICAO strategic objectives:	*A - Safety* *B – Air navigation capacity and efficiency* *E – Environmental protection*

1. Background

1.1 Annex 15, Chapter 3, 3.6 introduces the issue of automation, stating that it is used to enhance the timeliness, quality, efficiency, and profitability of aeronautical information services. It further states that in order to achieve data quality, automation will:

a) permit the digital exchange of aeronautical data among the parties that participate in the data processing chain; and

b) use globally interoperable aeronautical information exchange models and aeronautical data exchange models.

1.2 Doc 9750, in its fourth edition, introduces the ASBU methodology to seek block-based improvements in the entire aviation system, with four areas of operational improvements, where the second area includes interoperability between data and systems.

1.3 The Manual on SWIM (Doc 10039) provides a vision of global management of interoperable information in a mixed operational environment.

2. **Discussion**

2.1 The ATM operational concept describes the ATM system as a holistic entity consisting of seven elements, where the core of the system is information management.

2.2 Conceptually speaking, information management has a dual purpose:

a) monitor and control the quality, consistency, and usefulness of the "shared vision", which is the basis of common situational awareness; and

b) provide mechanisms to support stakeholders in managing information exchange rules, roles, and responsibilities. This determines what type of information is shared by whom, with whom, when, why, how, how much, with what frequency, with what level of quality, in what way, at what cost, responsibilities based on the circumstances, levels of security, etc.

2.3 At present, where several sources of information are available, management is difficult because of the significant efforts made to share system information with a user who needs translation from one format to another, which could introduce errors and include data from an originator who has not been validated. Normally, this effort has to be made whenever a new exchange is sought.

2.4 System-wide information management (SWIM) seeks to improve this task, eliminating conflicting and redundant data. The objective is to supplement human-to-human data distribution with machine-to-machine communications, and improve the accessibility and quality of the exchanged data. SWIM will be based on information technology (IT) and standard information exchange models.

2.5 For SWIM implementation, the States shall note that information management is closely related to the standards that define the content, format, and rules for information exchange. Some of them are described in the websites that articulate the information exchange standards applicable to aeronautical information (AIXM – aeronautical information exchange model, 2013), flight information (FIXM – flight information exchange model, 2012), meteorological information (WXXM – weather information exchange model, 2011), (IWXXM – ICAO weather information exchange model, 2013), and aviation information (AIDX – aviation information data exchange, 2012).

2.6 The Global air navigation plan, in PIA (performance improvement area) 2 – **Global interoperability of systems and data through system-wide information management**, foresees the implementation of SWIM (applications and infrastructure) in block 1, creating the aviation Intranet based on standard data models and Internet protocols to improve interoperability.

2.7 Therefore, the SWIM consists of standards, infrastructure, and governance for managing information related to air traffic management and the exchange of data and information between authorised individuals through interoperable services.

2.8 The SWIM becomes necessary because the current information exchange model hinders prospective application of future operational performance improvements. The main limitations are as follows:

a) the systems have not been designed or implemented to be globally interoperable within globally agreed parameters;

b) many interfaces, which were designed to support point-to-point or application-to-application exchanges, have a limited flexibility to accommodate new users, additional systems, new contents, or modified formats;

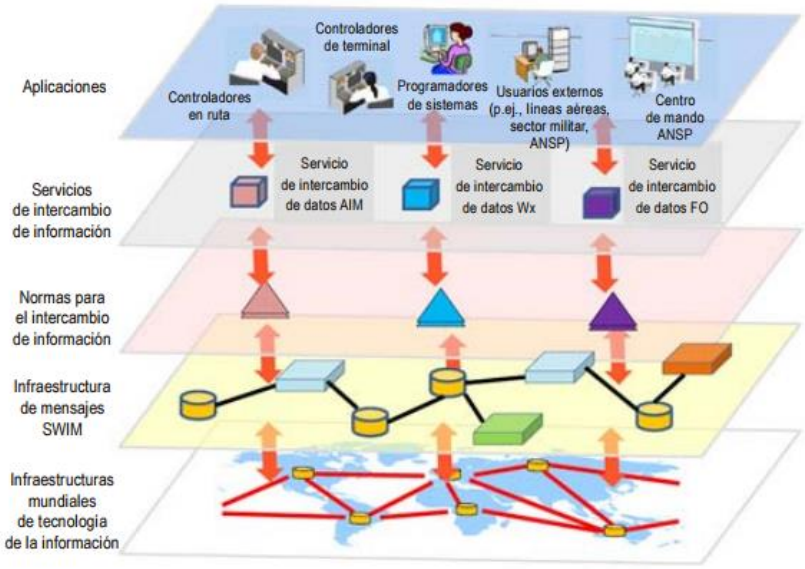
c) message size limitations and a non-scalable approach to information exchange;

d) the existing infrastructure can make it more difficult and costly for a user to access the information generated by another stakeholder on a timely manner;

e) the current variety of exchange systems and models makes it difficult to design security schemes to support the growing need for open and timely exchange of data, while accommodating the legitimate security concerns of all stakeholders; and

f) at present, most organisations manage their own ATM information in a partial and isolated manner, which leads to duplication and inconsistencies.

2.9 From the conceptual point of view of SWIM, five bidirectional levels, more or less interrelated, were identified, as shown in the following figure**:**



3. Conclusion

3.1 Accordingly, the scope of system-wide information management (SWIM) will cover all aeronautical and aviation information exchanged worldwide.

3.2 SWIM implementation will entail the implementation of applications and infrastructure, using a common methodology, for the information elements of interest, in addition to the appropriate technology and standards.

3.3 The States should consider the implementation of standard information exchange models (AIXM, WXXM, FIXM, AIDX), in addition to the communication and IT infrastructure, to expedite SWIM implementation.

3.4 The States must be aware that the implementation of ASBU Block 1, which includes the SWIM, starts in 2018.

4. Suggested action

4.1 The Meeting is invited to:

a) review the information provided in this working paper;

b) take note of the information exchange models that need to be implemented, and develop action plans for their implementation, working jointly with the areas involved; and

c) take any other action it may deem appropriate.

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