



WORKING PAPER

TWELFTH AIR NAVIGATION CONFERENCE

Montréal, 19 to 30 November 2012

Agenda Item 3: Interoperability and data – through globally interoperable system-wide information management (SWIM)

3.1: Performance improvement through the application of system-wide information management (SWIM)

GLOBAL SWIM STANDARDIZATION AND HARMONIZATION

(Presented by the Civil Air Navigation Services Organisation)

SUMMARY

System-wide information management (SWIM) poses new challenges for global standardization and harmonization. To exploit the advantages of SWIM to the extent possible and facilitate CANSO's vision of achieving a globally harmonized, interoperable and efficient air navigation system, a closer cooperation with well-recognized international organizations for standardization and regional aeronautical organizations that develop technical guidance for use by regulatory authorities and industry is strongly encouraged. It is suggested that detailed technical specifications, as defined in ICAO's Assembly Resolution A37-15 – Appendix A, for the purpose of SWIM should be developed building on the work and expertise of relevant organizations, for example, EUROCAE and RTCA and integrating it into the global ISO framework.

Action: The Conference is invited to consider the recommendations contained in paragraph 5.

1. CURRENT SITUATION

1.1 Several air traffic management (ATM) research programs, for example NextGen, SESAR and CARATS, are working on the development of specifications, infrastructure and governance to enable the management of ATM information and its exchange between qualified parties via interoperable services. ATM information security is a crucial system-wide information management (SWIM) component that needs to be implemented in an interoperable way and has only been addressed regionally. These components will be the basis for SWIM implementation. ICAO has initiated first SWIM harmonization and standardization efforts within its ATM Requirements and Performance Panel (ATMRPP).

1.2 The formulation of Standards and Recommended Practices (SARPs) for SWIM will most likely have to be structured around the three-level hierarchy of requirements and specifications for complex aeronautical systems as defined in ICAO's Assembly Resolution A37-15 – Appendix A with:

¹Arabic, Chinese, English, French, Spanish and Russian versions provided by CANSO.

- a) “core” SARPs consisting of broad, high-level requirements in Annexes;
- b) technical specifications in appendices to Annexes; and
- c) related detailed technical specifications in separate documents.

1.3 Today, in specific parts of the ATM domain the development of detailed technical specifications for use by regulatory authorities and industry is mostly carried out by aeronautical organizations with regional applicability and limited representation of international stakeholders.

2. NEED FOR GLOBAL SWIM HARMONIZATION AND STANDARDIZATION

2.1 As research into the SWIM concept advances, it is increasingly evident that for a truly interoperable environment to be achieved, in particular the detailed technical specification for the SWIM components must be harmonized and standardized on a global basis in a prompt and timely manner.

2.2 CANSO considers the International Organization for Standardization (ISO) to be best placed to facilitate the consultation and approval of detailed technical specifications (in accordance with Assembly Resolution A37-15, Appendix A) for SWIM and give SWIM stakeholders an acceptable level of transparency and participation in the specification process, such that objectives for global interoperability are maintained. The expertise and work of regional aeronautical organizations that develop technical guidance for use by regulatory authorities and industry, for example EUROCAE and RTCA, need to be extensively built on and integrated into the global ISO framework (as per the ISO Directives and in particular Part 1, 1.17 Liaison with other organizations and 3.2 Publicly Available Specifications (9th edition 2012)).

2.3 The detailed technical specifications for SWIM should also extensively rely on international standards developed by other relevant standards organizations that are appropriately integrated into the ISO framework, such as for example WMO, IEC, IETF, W3C, OMG, OGC. The ISO framework creates transparency also to non-aviation stakeholders and ensures that aviation-specific specifications are in congruence with generic, open international specifications. Further, the ISO framework ensures that the legal status of ISO approved documents can be leveraged for regulatory compliance. This would help to ensure that aviation stakeholders are able to procure equipment that is interoperable and off the shelf, creating a level playing field for system providers around the world. A high degree of standardization enabling modular system architecture will not only lead to interoperability, but also to better cost efficiency through lower system procurement and integration costs and thus lower overall system costs.

2.4 Cooperation with ISO is not new to ICAO. When developing detailed technical specifications for Machine Readable Travel Documents (MRTD) as contained in Doc 9303, a liaison mechanism with ISO has been established and successfully applied not only to the endorsement of the specifications but also to the approval of amendments to these specifications. The worldwide implementation of these specifications showcases the successful use of the ISO framework with ICAO leadership.

3. POSSIBLE IMPACT ON ANNEXES

3.1 ICAO should utilize, subject to the verification of meeting the essential requirements laid down in “core SARPs”, relevant technical documentation developed through the ISO framework and reference these detailed technical specifications in ICAO Annexes and corresponding documents such as Annexes 3, 4, 11, 14, 15, Docs 4444 and 8126.

4. NEED FOR ICAO COORDINATION

4.1 It is essential that ICAO utilizes the ISO framework in its activities for developing detailed technical specifications for SWIM components and protocols. It is of utmost importance for the consistency of the global transportation system to achieve interoperability between the different SWIM solutions that are being developed, leveraging generic global specifications to the extent possible. It must be noted that the resulting SWIM system must enable the exchange and use of operational ATM data across borders in a way that supports safety-of-life applications.

5. CONCLUSION

5.1 CANSO considers the approach outlined herein, i.e. utilizing the ISO framework, beneficial for other areas as well, e.g. data handling processes in conjunction with flight management systems (FMS) and ATM applications.

Recommendation 3/x – Need for a global system-wide information management harmonization

That the Conference is invited to:

- a) note the paper and agree that detailed technical specifications for system-wide information management should be developed using the ISO framework in close collaboration with other relevant standardization bodies (as per the ISO Directives and in particular Part 1, 1.17 Liaison with other organizations and 3.2 Publicly Available Specifications (9th edition 2012));
- b) agree that the expertise and work of regional aeronautical organizations that develop technical guidance for use by regulatory authorities and industry, for example EUROCAE and RTCA, need to be extensively built on and integrated into the global ISO framework;
- c) agree that detailed technical specifications for SWIM should be open and rely on generic international standards to the extent possible;
- d) encourage States and stakeholders to contribute actively to the development of detailed technical specifications for system-wide information management as outlined in points a), b) and c) above; and
- e) task ICAO with the identification of security standards for system-wide information management and other areas where using the ISO framework in the development of detailed technical specifications would be beneficial.