



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)

3.3: Service improvement through digital AIM

APPLICATION OF THE INFORMATION MANAGEMENT PRINCIPLES

(Presented by the Civil Air Navigation Services Organisation)

SUMMARY

This paper provides CANSO's support for the transition from AIS to AIM and consequently to SWIM and for the global application of the information management principles as described in this paper. It also states CANSO's commitment to the facilitation and deployment of those principles.

Action: The Conference is invited to consider the recommendations contained in paragraph 4.

1. INTRODUCTION

1.1 The future air traffic management (ATM) system, as envisioned by the Global ATM Operational Concept, will rely on the evolution to a net-centric information environment in which ground systems and aircraft will function as a series of nodes that share information and relay their intent through a network of federated systems and are supported by a host of standard-compliant and interoperable services running on a multitude of platforms. Users will be able to tailor the information they receive to their specific needs.

1.2 Ensuring a high level of integrity and security in the sharing of these data is crucial to support safety-of-life services, i.e. operational ATM applications. Operational flight trajectory and surveillance data require particularly high levels of data integrity and information security. These information as well as aeronautical information, meteorological data and data from other domains all need to be exchanged using globally harmonized information exchange models. Such standardization will create a seamless information environment, enabling cost-effective information sharing between ATM systems and airspace users (see Appendix A).

1.3 Time plays a critical role in the IM process. The objective is to share critical information in real-time. The data provided must be usable in all phases of ATM: From the Strategic flight planning phase through the pre-tactical and in-flight and eventually the post-flight phase. Thereby ATM planning, tactical operations and

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

post-flight operations are supported by a collaborative decision-making process in which every stakeholder has easy access to the required information.

1.4 ATM is becoming ever more complex – a system of many subsystems that has one common element which is information. Currently information and data is originated, collected or assembled, edited, formatted, stored, published and/or distributed and used individually in different ATM subsystems.

1.5 The need to fundamentally change the way information is managed is clearly recognised in the ICAO aviation system block upgrade (ASBU) initiative and its second performance improvement area – globally interoperable systems and data through globally harmonized information management principles.

2. TRANSITION FROM AIS TO AIM AS PART OF GLOBAL ATM TRANSFORMATION

2.1 The transition from AIS to AIM is the change from traditional paper-based and product-centric AIS to the data-centric and service-oriented aeronautical information management (AIM) that is fully integrated with other information domains in a SWIM environment.²

2.2 CANSO fully supports this initiative and is involved in the work of the ICAO AIS to AIM Study Group (AIS-AIM SG) established by the Air Navigation Commission at the eleventh meeting of its 177th Session on 20 March 2008. The ICAO AIS-AIM SG activities are being supported by CANSO through widespread coordination and communication amongst Member ANSPs and by active contribution to the development of ICAO SARPs and related ICAO guidance material. CANSO's participation in the ICAO AIS-AIM SG fosters global acceptance of all AIM-related developments not only within ANSPs, but also throughout the aviation industry as a whole.

2.3 The transition from AIS to AIM and consequently to SWIM is part of a transformation of the global ATM system. The primary goal of this transformation is a more efficient management and rapid dissemination of all information relevant to ATM. Data and information and their management are becoming more and more critical for the safety and efficiency of air navigation.

3. THE NEED FOR INFORMATION MANAGEMENT

3.1 Bearing in mind the crucial role of information in the development and operation of the ATM systems of the future, this paper supports:

- a) the evolution of information delivery from products to information-based services;
- b) the concept that quality management starts at data origination and continues throughout the life-cycle use of the data;
- c) that information services should be based on data and information facilitated by modern management principles (including security requirements);
- d) that information be exchanged between systems in a manner that does not require human intervention or interpretation in accordance with globally harmonized data handling processes to ensure reusability of the resulting information;

²Reference is made to the AN-Conf/12-WP/xx, SWIM Global Concept

- e) the adoption of globally-standardized exchange models (Aeronautical Information (AIXM), Weather (WXXM), Flight Information (FIXM), and other relevant models aligned through a common information reference model) between States and third parties;
- f) making digital aeronautical information available in a manner usable for safety-of-life applications in support of air traffic management (ATM) operations to enable the introduction of future operational concepts, e.g. trajectory-based operations; and
- g) the ability to create a common operating picture based on common operational data and rules for information management among ATM, ATC, third party service providers, and airspace users.

4. INFORMATION MANAGEMENT PRINCIPLES

4.1 In order to support the harmonization of global information services and performance-based operations, CANSO proposes the following as information management principles:

- a) data is a resource, and information is an asset;
- b) data is the foundation for all information products and services. All products and services have traceability to common data;
- c) information is aggregated and provided by accountable, authorized information services such as system-wide information management (SWIM). SWIM provides the infrastructure for information services to aviation stakeholders;
- d) this aggregated information is fit for the purpose of meeting ATM business requirements. Its quality should meet the performance requirements of the community as a whole;
- e) quality starts at the data originator. The originator is the primary entity that validates data is correct. Origination of data through its lifecycle to useful business information should be through digital mechanisms without manual intervention wherever possible;
- f) data and information are compliant with local laws and regulations;
- g) data, information, and their exchange are secure and comply with information assurance standards such as availability, integrity, authentication, confidentiality/privacy, and non-repudiation;
- h) there is a common data dictionary, vocabulary, and business rules that form the foundation for protocols, services, and product harmonization to be governed using communities of practice for each information domain; and
- i) data is not duplicated; there should be one data originator. Duplicated data creates the potential for data to be unsynchronized. In addition, duplicate data sources add costs to the system. Any duplication should be based on a solid business requirement.

4.2 Quality management is everyone's responsibility. Mechanisms to support quality management of the data should cover the entire life-cycle from the capture of the data to the delivery of business information.

5. CONCLUSION

5.1 The CANSO AIM Work Group has been working actively with ICAO to promote the key positions stated above. CANSO is an Observer on the ICAO AIS-AIM SG and has led several initiatives including the development of the competency framework for aeronautical information personnel. Multiple ANSPs have also participated in the ICAO AIS-AIM SG as State-nominated experts and have also promoted these key positions.

5.2 The delivery of information services throughout the ATM community will be critical to successful collaboration and a common operating picture as we deliver future ATM services. Global harmonization and adoption of common performance standards, business rules, and exchange models will be required to optimize our ability to deliver seamless information services

5.3 It is of paramount importance that States support the global application of the information management principles for all ICAO ASBU Blocks. This is of utmost importance for the harmonisation and interoperability between different ATM subsystems that are subject of the ASBU initiative.

Recommendation 5/x- Application of information management principles

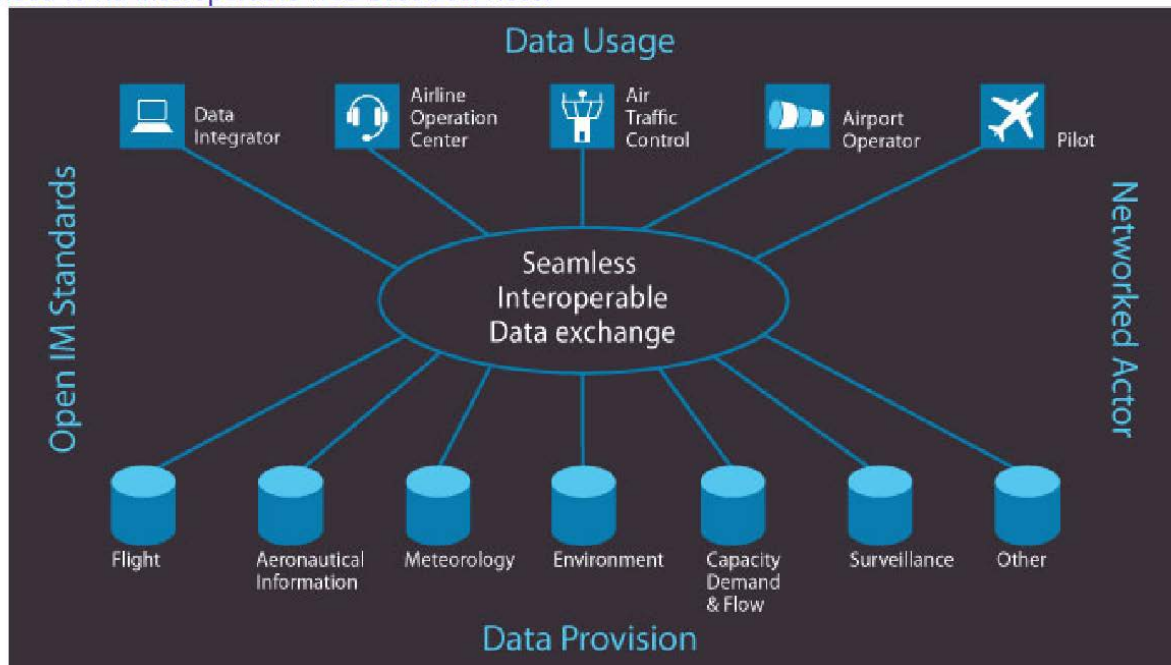
The Conference is invited to:

- a) note the paper and agree on the need for coordination and the global application of globally accepted and generic data and information management principles as outlined in paragraph 4.1;
- b) recommend that ICAO performs further work on the global implementation of those principles for all information relevant to air traffic management; and
- c) encourage States and all relevant stakeholders to contribute to this further development work.

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APPENDIX

The System Wide Information Management (SWIM) concept is about connecting the ATM world, ensuring that the various differing pieces of information are made available to all those who need it via interoperable web-based services.



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