



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)

AN INDUSTRY VISION FOR SWIM

(Presented by the International Coordinating Council of Aerospace Industries Associations)

SUMMARY

This paper presents the aerospace manufacturing industry's view on some of the key activities required in order to support a successful and timely deployment of SWIM

Action: The Conference is invited to note the content of the paper and agree to the recommendation in paragraph 4.2.

1. INTRODUCTION

1.1 The purpose of this document is for International Coordinating Council of Aerospace Industries Associations (ICCAIA) to outline the aerospace manufacturing industry's views on certain key system-wide information management (SWIM) characteristics and how they impact service deployment. ICCAIA offers these suggestions to support the most efficient implementation of ICAO's aviation system block upgrades (ASBUs) and future air transport infrastructure upgrades on a regional and global level.

2. BACKGROUND

2.1 The air traffic management (ATM) world is very familiar with SWIM and generally understands that SWIM combines the processes and related infrastructure to optimize ATM information exchange so that users receive the right information at the right time. In Europe, the Single European Sky ATM Research Programme (SESAR) drafted a definition that helps understand its boundaries: "SWIM consists of standards, infrastructure and governance enabling the management of ATM information and its exchange between qualified parties via interoperable services".

2.2 Of course, depending on the type of information to be exchanged, the ownership rules or the type of user (an aircraft for example), the expected non-functional requirements, the rules and the architecture required to make it happen, might differ. By definition, SWIM should support the exchange of all ATM-related

information, ranging from such “simple” bits of information as an airport gate designator to more complex ones, such as the representation of a flight known in Europe as the flight object.

2.3 Although SWIM will not initially support mission critical applications, it can be used to support all data types including AIM, surveillance, flight information or weather. Eventually and gradually as the technology proves viable and achieves the required reliability levels, additional safety-critical applications may be introduced. In principle, SWIM should also include the information exchange between an aircraft and ground systems, be they air traffic control (ATC), airport, or any other. Nevertheless, the migration of safety-critical information exchange from current air-ground point-to-point standardized ways to SWIM constitutes a technical obstacle that will not be easily overcome.

2.4 What SWIM will not change is the fact that not all users have the same needs. Some will produce, consume and be the owner of information, while others will just be consumers of few pieces of information. In any case, the goal is to allow stakeholders through all kinds of devices (e.g. ATC systems, personal digital assistant (PDA)) to gain access to information for all types of end-user applications, while ensuring that only authorized users are granted that access. This would be achieved through a limited number of standardised interfaces that would make the access to information easier and cheaper.

2.5 SWIM would enable better financial performance thanks to facilitated and more efficient collaborative decision making, unlocking new opportunities. By using mainstream technologies, open formats and standardised interfaces, we expect to reduce the costs associated with the development and deployment of new applications and services. Service standardisation will facilitate the reuse of information in other contexts, thereby contributing to cost efficiency. The increased interoperability of data formats and interfaces will make possible a LEGO-like system architecture, in which ATM system stakeholders can be seamlessly connected, eliminating the need for expensive tailor-made interfaces.

3. ICAO INVOLVEMENT

3.1 As clearly explained in AN-Conf/12-WP/7 that introduces the different elements of a SWIM architecture, a successful SWIM deployment cannot be achieved if all the necessary building blocks are not in place. From an industry point of view, it is of utmost importance that a global SWIM concept is developed by ICAO that would communicate which stakeholders are involved and what information should be exchanged. Today, there seems to be an agreement on the use of SWIM for non-safety-critical information while opinions differ on the use of SWIM for safety-critical information, due to technical difficulties in addressing safety and security as well as the need to demonstrate the economic value of using SWIM for such needs. ICCAIA welcomes guidance on what services automation needs to provide, be it in the air or on the ground.

3.2 ICAO should also include in its work programme activities related to the development of the information model as a way to facilitate the provision by industry of systems supporting the SWIM deployment in a consistent manner. Airlines flying worldwide need to be sure that a piece of information is defined and understood the same way everywhere. The information exchange format is a pre-requisite to any SWIM further work.

3.3 Although it bears a global dimension, SWIM will require an evolutionary approach and cannot be deployed all at once. The simplest approach is to start small and expand based on stakeholder needs. However, as SWIM is about facilitating the exchange of information across different stakeholders regardless of their location, the SWIM deployment has to decide at the global level and be coordinated at a regional level to ensure that the solutions retained are efficient and affordable. So even if, for example, a first SWIM deployment would be between one ANSP and one airline or between two airports, the principles for that deployment need to be agreed

so that on day two when another ANSP, airline or airport is willing to participate, it will be in accordance with the architecture and processes defined for the first one. This means that on top of the ICAO provisions required in support of information access and use, there is a need for ICAO to coordinate the definition of governance rules and of the required topology/infrastructure.

3.4 A special consideration needs also to be given to bandwidth requirements to ensure that the infrastructure deployed can support not only initial needs, but can be expanded when the need arises. Air-ground SWIM will require particular attention as some of the suggested air-ground SWIM applications may involve the exchange of large amounts of information. It is therefore suggested that regular reviews of the impact of the SWIM traffic on the communication infrastructure technologies be conducted by ICAO with ICCAIA support in order to anticipate the need for technology changes with a sufficient lead time.

4. CONCLUSION

4.1 ICCAIA is fully committed to SWIM and its deployment. This is the reason why some specific areas, considered key for achieving the local, regional, and global performance improvements expected from SWIM, are highlighted.

4.2 The Conference is invited to recommend that ICAO:

- a) include in its work programme activities related to the development of a SWIM global concept as well as the related information model;
- b) include in its work programme specific activities tailored at coordinating the SWIM deployment at a local, regional and global level; and
- c) ensure that regular reviews of the bandwidth requirements resulting from SWIM deployment are conducted.

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