International Civil Aviation Organization

THE SECOND MEETING OF AERONAUTCAL COMMUNICATION SERVICE (ACS) IMPLEMENTATION CO-ORDINATION GROUP OF APANPIRG (ACSICG/2)

Bangkok, Thailand, 20 - 22 May 2015

Agenda Item 7:   System Wide Information Management (SWIM)

OPTIONS TO SUPPORT SYSTEM WIDE INFORMATION MANAGEMENT (SWIM) ENVIRONMENT

(Presented by Federal Aviation Administration/USA)

SUMMARY

This Information Paper conveys the Federal Aviation Administration operational and implementation analysis to support SWIM environment between Air Navigation Service Providers (ANSPs) utilizing existing infrastructure. The existing internal infrastructure of each ANSP is different from one another.   Thus, it's impossible to recommend a common SWIM access point or gateway. The Air Traffic Services Message Handling System (AMHS) has been standardized and could allow a common access to both existing interface and to SWIM with each individual ANSP's specific SWIM Gateway.

1.   Introduction

1.1   ICAO Air Traffic Management Requirements and Performance Panel (ATMRPP) has been developing a System Wide Information Management (SWIM) Concept document (ICAO Doc. 100039).   The development is on-going.

1.2   The FAA has been providing support to ATMRPP and presented implementation issues that require resolution before implementation support and a transition system architecture can be provided.

1.3   The FAA presented and coordinated SWIM environment transition support and its associated implementation issues to the First meeting of Asia/Pacific Regional Aeronautical Communication Service Implementation Coordination Group (ACSICG/1), followed by AFSG/19 in April, 2015. The revision of the implementation issues is documented in **Appendix 1.**

1.4   It is noted that SWIM is an integral part of the Global Air Navigation Plan (GANP) and it is covered in a number of Aviation System Block Upgrade (ASBU) modules. Specifically, transition from the current environment of point-to-point Aeronautical Fixed Telecommunication Network (AFTN) and AMHS to SWIM is identified in ASBU Block 0 for beginning implementation in 2018.

1.5   It's expected that a more detailed document such as Standard and   Recommended Practice Procedure (SARP) or equivalent is developed before a global SWIM implementation plan can be completed.

2.   Discussion

2.1   SWIM is defined in the ICAO Concept document as an environment that will:

Promote interoperable, effective, and secure information exchanges among information and messaging systems (e.g. AFTN, AMHS, AIDC, and Weather System) through consistent application of SOA principles;

Deploy a robust and sustainable SOA governance framework to ensure that a common set of policies, rules, and standards for identifying, discovering, and operating ATM services is consistently applied;

Replace individual system-to-system interfaces versus a set of loosely-coupled services; and

Assume all point-to-point circuits will be changed to a global IP network.

2.2   Based on the information described in section 2.1, SWIM functionality can be defined in two parts:

a)   SWIM Goverannce which includes distribution policy and procedure;

b)   SWIM access to existing or new applications/systems.

2.3   SWIM governance and architecture is still under development by ICAO ATMRPP and is not   a subject of this paper.

2.4   SWIM access to existing applications/systems is the primary subject of this paper as ICAO regions are requested to provide implementation plan to support SWIM environment as stated in ASBU Block 0. A configuration of adopting AMHS/SWIM Gateway is depicted in **Appendix 2.**

2.5   The AMHS is in its final phase to implement their system and efforts to implement an underlying IP network are either completed or undertaken.

2.6   It is noted that SWIM environment can only be realized when ANSPs share a common IP VPN.

2.7   The AMHS is the ICAO standard for flight plan and other data communication distribution between ANSPs. However, Flight data processing and other ground to ground data communication interface are not standardized by ICAO as they are specified as intra-domain interfaces which are subjected to local control.

2.8   It is expected that not all ANSPs will implement Java Message or other commercial application program interfaces (APIs) for supported applications or other applications to support FIXM, IWIXM, AIXM standards for data format by 2018.   This environment will require a transition plan to be in place to support SWIM and non-SWIM environments.

2.9   The FAA is investigating development of an FAA SWIM gateway that could interface to AMHS, AFTN or both to support interface with other ANSPs or organizations. The SWIM Gateway is planned to provide conversion between AMHS based messages to other FAA applications/systems seamlessly. It is noted that AMHS/SWIM Gateway has not yet been developed but many legacy interfaces have been supported by FAA SWIM.

2.10   When an ANSP is ready to support SWIM operation with FAA SWIM, it can interface directly with FAA SWIM, provided that the IP underlying network is available and application access is developed and agreed (e.g. XML schema, IP address, message format, etc.) as well as procedure for message monitoring and tracking and other operational requirements allocated to FAA SWIM are specified.

2.11   The FAA envisions that other ANSPs who want to support the SWIM transition would need to develop and implement an AMHS/SWIM Gateway tailored to their legacy interfaces and would provide conversion of these interfaces to Java Message API standard and/or specific message standard to be recommended from ATMRPP.

2.12   In this scenario, the AMHS can serve as SWIM Gateway access point while continuing to support distribution of other data communication that will not support by FIXM, IWIXM, AIXM, or legacy system.

2.13   The use of AMHS/SWIM Gateway is considered the most cost effective way and lowest technical risk in supporting SWIM transition.

2.14   Since AMHS/SWIM Gateway is not developed by any ICAO Panels (e.g. CP, ATMRPP), FAA presents it as information only.   If concurrence is received by member of ACSICG, it is recommended that this option should be documented as a plan to support SWIM transition.

3.   Action by the Meeting

3.1   The meeting is invited to:

    a)   note the information; and

    b)   consider this proposed option when planning for internal SWIM service

3.2   The feedback of this paper will be presented to CNS SG/19 Meeting to be held in Bangkok, Thailand, July 2015.

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Appendix 1

Subjects	Comments
Requirements 1. Type of data/message applied for SWIM distribution 2. Data/message delivery priority 3. Data/message distribution timing 4. Message/data addressing scheme/ format	1. Flight plan/clearance/transfer/OPMET/? 2. Which type of data/message has priority in the service 3. Time delay set for each type of data/message 4. Type of address (NSAP/IP). Currently ICAO sets AFTN header and AMHS addressing schemes (CAAS/XF)
Architecture 1. Provide "SWIM access Point" requirement/architecture 2. What is underlying IP network (public internet or private IP network) 3. How is SWIM used within private domain in association with ICAO SWIM between member States?	1. How "SWIM Access Point" interfaces with local systems. Currently AFTN/AMHS serve as central point between domains that integrate data/messages between applications. Will SWIM provide a gateway to these systems? 2. The public internet is the only global network. All other private IP networks are divided by region. Integration between regional private IP networks is difficult due to different "core networks" managed by many vendors. The public internet cannot guarantee the delivery of data and performance due to many vendors' core networks. 3. Need a clear architecture as SWIM within domain is managed and operated differently from ICAO SWIM, based on individual organization local law and regulations

Governance and Management	
1. What entity/entities are authorized to manage SWIM since this service requires streamlined distribution by centralizing the service?	1. How are SWIM Governance entity/entities selected? Is it one global entity or many regional entities?
2. Ownership of data/message	2. Data/message generators or SWIM Governance entity/entities?
3. Unknown/corrupted data/message Coordination	3. Current AFTN/AMHS coordinate between AFTN/AMHS sender and receiver. Under SWIM environment, the message is distributed from SWIM server(s), SWIM Governance entity/entities will be responsible?
4. Legal Recording and Tracking of data/message	4. AFTN/AMHS requires data/message sequencing and recording up to 30 days.
5. SWIM Subscribers approval process: Who is allowed to subscribe and process to ensure identity or proper usage	5. Management of approving process and update of information in a timely manner are critical. Subscriber could sub-address or distribute user name/password to others. Subscribers could leave the organizations. The POC of each organization approving subscription could be changed without informing the SWIM Governance body/bodies.
6. Criteria to be eligible as a subscriber and type of subscribed data/message	6. Need criteria for selection and approval. Also an appeal procedure for approval reconsideration is needed.

Appendix 2 AMHS and SWIM Gateway