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COMMITTEE A

Agenda Item 3: Enhancing the global air navigation system
3.1: System-wide information management (SWIM)

SYSTEM-WIDE INFORMATION MANAGEMENT (SWIM) IN ASEAN DEMONSTRATION

(Presented by Singapore, Thailand, and the United States)

EXECUTIVE SUMMARY

This paper discusses one tangible way to advance system-wide information management (SWIM) development. A SWIM demonstration for the Association of South-East Asian Nations (ASEAN) and other participating States/Administrations in the Asia-Pacific Region will showcase the operational benefits of implementing SWIM and facilitate implementation for these States/Administrations.

1. INTRODUCTION

1.1 System-wide information management (SWIM) is considered as a key driver for the next bound of air traffic management (ATM) capability development. SWIM is an integral part of ICAO's *Global Air Navigation Plan* (GANP, Doc 9750), particularly the aviation system block upgrades (ASBUs), which was first adopted at the ICAO Twelfth Air Navigation Conference (AN-Conf/12) in 2012. Subsequently, SWIM was highlighted as one of the regional strategic objectives specified in the Asia/Pacific Seamless ATM Plan v2.0 approved by the Twenty-Seventh Meeting of ICAO Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/27) in 2016. Considered as the intranet for aviation, enabling the management of ATM information and its exchange between qualified parties, SWIM has been adopted as an important building block of the Seamless Association of Southeast Asian Nations (ASEAN) Sky initiative. It is a key initiative in the ASEAN ATM Master Plan approved by the ASEAN Transport Ministers in 2017.

1.2 In support of ATM modernisation in ASEAN, the United States proposed at the Thirty-Fourth ASEAN Air Transport Working Group Meeting (ATWG/34) in October 2016 to work with ASEAN Member States (AMSs) in SWIM development by providing assistance in conducting a demonstration involving all AMSs.

1.3 Following this proposal, Singapore and Thailand have been working with the United States to develop a SWIM in ASEAN demonstration aimed at showcasing the operational benefits enabled by SWIM, with the aim to conduct the demonstration in mid-2019.

2. DISCUSSION

2.1 Keeping in mind the ultimate objective to achieve the seamless ATM connectivity for not only ASEAN but also the Asia/Pacific region, this SWIM demonstrator in ASEAN is aimed at the following:

a) promote cross-border information exchange, facilitate ATM information flow among aviation stakeholders, and reinforce the value of information sharing;

b) demonstrate the principles of SWIM, which will in turn lead to a better understanding of SWIM and help accelerate the implementation;

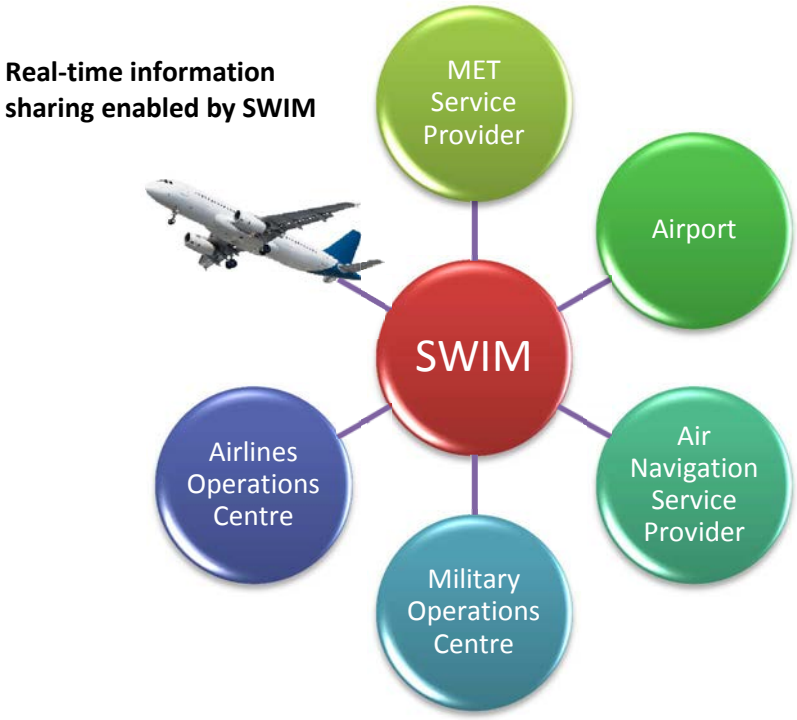
c) show the potential operational benefits of SWIM; and

d) Substantiate the vision of the ICAO Information Management Panel (IMP) and Seamless ASEAN Sky.

2.2 The lessons learnt from the demonstration will present valuable takeaways for the region, and give ASEAN the opportunity to contribute effectively to the IMP through the experience gained from the demonstration.

3. WHAT IS SWIM?

3.1 SWIM is an information-sharing infrastructure which facilitates the exchange of ATM system information, such as airport operational status, weather information, flight data, flexible use of airspace, to a wide range of ATM stakeholders in real time.



3.2 As SWIM leverages the globally-standardized information exchange models, information from various disparate systems within the Asia-Pacific region can be shared efficiently and on-demand. It connects different producers of the data (e.g. flight data information from the ANSP) to the users (e.g. the airlines) through an interface developed using the information exchange service standards also currently utilized in other information-critical businesses such as finance.

4. OPERATIONAL BENEFITS OF IMPLEMENTING SWIM IN ASEAN

4.1 The benefits of SWIM lie in improved performance of operational ATM services requiring timely and quality information conveyed using SWIM. In view of the expected growth in air traffic which will be brought about by the ASEAN Single Aviation Market (ASAM), the timely and seamless exchange of ATM information enabled by SWIM will help ASEAN achieve the following.

ICAO Key Performance Area	Benefit of SWIM
Safety	With real-time data exchange enabled by SWIM, all aviation stakeholders have access to the most up-to-date and reliable information of the current ATM environment, increasing the situational awareness as well as augmenting the decision making process. Moreover, greater automation of ATM information exchange reduces data entry errors and allows air traffic controllers to shift their focus to higher value tasks, e.g. monitoring and contingency planning.
Cost Effectiveness	Interoperable infrastructure and standardized data exchange formats, brought about by SWIM through harmonized implementation, reduce duplication in the management of the same information in multiple systems. Moreover, with data mediation able to support adaption of current data format, e.g. Air Traffic Services (ATS) message, to XML-based format, migration to SWIM environment can be done evolutionarily, no big-bang change is required. In the long run, cost saving can be expected from utilizing a streamlined system to grow as the SWIM concept matures.
Efficiency	Timely information sharing enabled by SWIM allows increased flight predictability and improved resource management among related stakeholders, e.g. better gate management by airport operators, enhanced fleet optimization by airlines.
Predictability	
Flexibility	
Environment	Availability of more robust data on traffic movement and infrastructure utilization rates within the airspace and at the airports help optimize resource usage, thereby reducing fuel burn and emission.

5. SCOPE OF THE DEMONSRATION

5.1 The demonstration was originally scoped to include only ASEAN Member States (AMSs) and the United States. However, at the First Meeting of ICAO Asia/Pacific SWIM Task Force, other Asia/Pacific States/Administrations outside of ASEAN, e.g. Australia, Hong Kong China, Japan, New Zealand, expressed their keen interest to participate in the demonstration as well. Considering significant advantages gained by including other Asia/Pacific States/Administrations in the

demonstration, i.e. (i) the higher number of scenario types which can be exhibited, (ii) more opportunities for AMSs to learn from such States, and (iii) promoting ASEAN regional leadership, the demonstration's scope was extended to also include non-ASEAN States/Administrations.

5.2 To enable the participants to experience and observe the benefits of leveraging on seamless data exchange to deliver efficient operations across Flight Information Regions, participants will exchange data with one another through a Global Enterprise Management Service (GEMS) which consists of several interconnected Enterprise Management Services (EMSs).

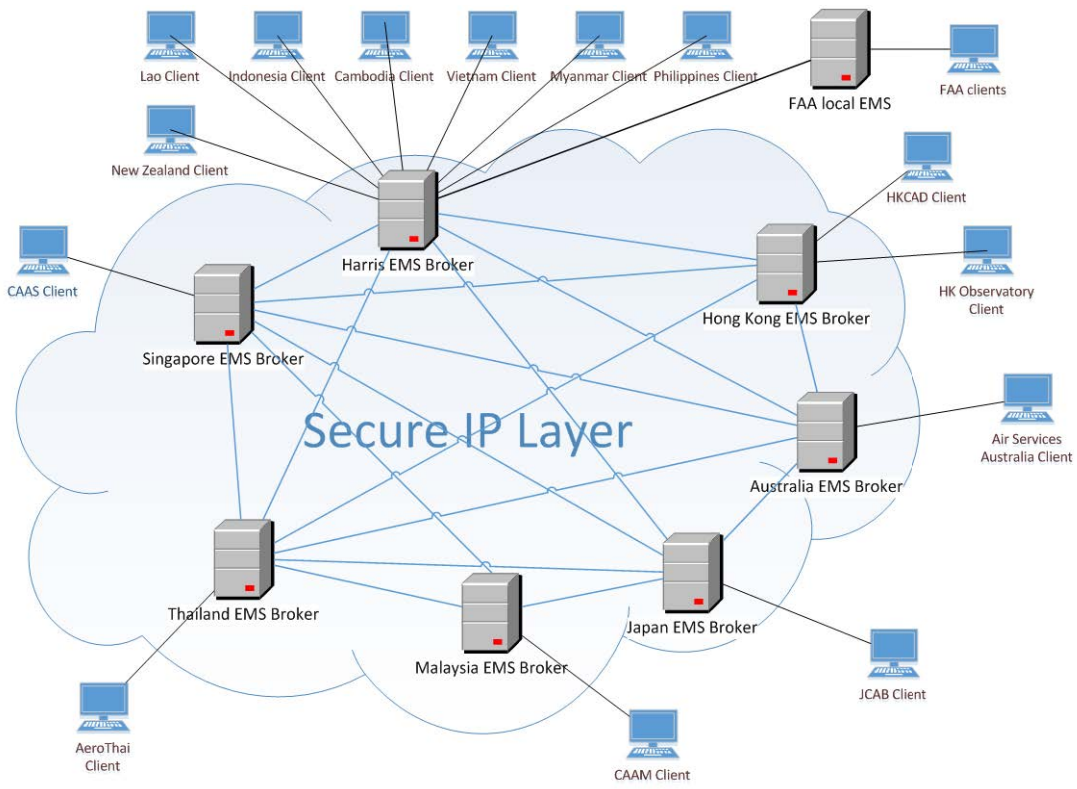
5.3 For the purpose of this demonstration, participants can use pre-recorded or simulated data for the information exchange.

5.4 In order to showcase the operational benefits of SWIM, several operational scenarios, involving the exchange of aeronautical information, flight information, and weather information, are being developed with the focus on the ATFM (Air Traffic Flow Management) operation based on the Distributed Multi-Nodal ATFM Network concept.

6. SWIM ARCHITECTURE USED FOR THE DEMONSTRATION

6.1 For this demonstration, it was decided that the architecture should comprise several interconnected EMSs to move messages within a secured IP network. This will form the GEMS to provide messaging services to the other participants in the demonstration.

6.2 The architecture is illustrated in the figure below.



6.3 This architecture allows States/Administrations that have the capability to implement an EMS the option to do so if they so choose but yet still caters to States/Administrations that do not wish to or have no capability of implementing an EMS to participate in the SWIM in ASEAN Demonstration.

7. CONCLUSION

7.1 The development of SWIM needs the active involvement of States/Administrations. One way to advance SWIM capability and for States to build confidence and play a part in its development is through a demonstrator involving States/Administrations.

7.2 The Conference is invited to

a) note the SWIM demonstrator in ASEAN and other States/Administrations in the Asia-Pacific Region; and

b) discuss the use of demonstrators as a tangible way to advance SWIM development.

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