Collaborative Use of ATM Data: System Wide Information Management (SWIM)
What is SWIM (System Wide Information Management)?

- SWIM as defined in the ICAO SWIM Manual (Doc 10039)
  - “SWIM consists of standards, infrastructure and governance enabling the management of ATM-related information and its exchange between qualified parties via interoperable services.”

- An integral part of the Global Air Navigation Plan (GANP) (Doc 9750) and is covered in a number of the aviation system block upgrades (ASBU) modules

- The Manual on Air Traffic Management System Requirements (Doc 9882) explicitly identifies the implementation of SWIM as a requirement for the future ATM System
The need for a change - SWIM

• In your organisation, what are the difficulties encountered when you need to access information from other stakeholders (e.g., airport operator)?

• How about adding a new user?
The need for a change - SWIM

• Current infrastructure make it difficult and costly for one stakeholder to access, on a timely basis, information originated by another stakeholder
  • Current systems are not designed to be globally interoperable.
  • Interfaces have limited flexibility to accommodate new users and additional systems, new content or changed formats
The need for a change - SWIM

• Message-size limitations with the present infrastructure (eg AFTN)
• Most organizations manage their ATM information in partial isolation leading to duplication and inconsistencies
What will SWIM do?

- Facilitate data-sharing within the ATM domain.
  - Implement a Service Oriented Architecture (SOA) in an ATM domain by providing Enterprise Infrastructure services that include, messaging, security, service management and interface management
  - Ensure adherence to common open standards

Example of SOA platform: eBay, Facebook
Source: www.infoworld.com
What will SWIM do?

• Allow for quick and cost-effective creation of new system interfaces
  • Loose system coupling
  • Separation of information provision and information consumption
SWIM scope

Use

SWIM

Use

SWIM-enabled Applications

Governance

Information

Services

Infrastructure

IP-based Network
**SWIM scope**

- SWIM Governance
  - Who can access the information
  - How can this access be facilitated
  - How can this service be “discovered”
  - What are the conditions for accessing the information

- SWIM Infrastructure
  - SWIM connectors / adaptors
  - Firewalls and Intrusion Protection Systems
SWIM scope

• SWIM Information
  • Type of information to be shared
  • Data models being used to carry the information
    • Flight Information eXchange Model (FIXM)
    • Aeronautical Information eXchange Model (AIXM)
    • ICAO Weather eXchange Model (iWXXM)

• SWIM Services
  • Refers to the different services that can be published on SWIM
    • Flight Plan, AIM, NOTAM, ATFM or Weather services
    • Uses the standard data models to move information
Global Interoperability Framework
Example of Flight Information Exchange

- SWIM-enabled application used to request information

- Uses Information exchange service to request

- Uses exchange model for content and format

- SWIM core services provide security, messaging, addressing

- Encoded and transmitted over global IP network
How can SWIM support your Operation needs?

• Which operational processes could be improved?
• How to achieve better situational awareness?
• What information should be exchanged?
• Who are the stakeholders?
How can SWIM support Distributed Multi-Nodal ATFM?

• Distributed Multi-Nodal ATFM Network concept
  • Challenges associated with multiple ATFM systems
  • Need to harmonize the ATFM system information exchanges - such as Calculated Take-Off Time (CTOT)
  • Messages size limitation of AFTN
  • New interfaces from new members
Current work on the harmonization

- Use of Global Information Exchange Technology and Model (SWIM and FIXM) to aid in cross-border ATFM
  - Not to re-invent the wheel
  - Wider acceptance

- Interface Control Document (ICD)
  - Operational Scenarios from Ops Trial
  - Identification of Use Cases and Data Attributes
  - Mapping to FIXM
  - Use of SWIM Concept – SOA, Consumer/Provider
Current work on the harmonization

- CTOT is not included in FIXM 4.0
- System Interconnection Demonstration between Thailand and Singapore
- Multi-Nodal ICD as input for the region
SWIM Events Past

- Mini Global I
  - Demo held 15 September 2014
  - Demonstrated the technical feasibility of a global SWIM
SWIM Events Past

• Mini Global II
  • Demo held 26 April 2016
  • Shown tangible potential operational benefits
  • Some operational scenarios between CAAS and AEROTHAI
    • Data Confidentiality with AIXM and iWXXM
    • Cross Border ATFM
  • Demonstrated the governance requirement on data confidentiality. Also validated the successful transmission and receipt of AIXM and iWXXM messages
  • Demonstrated the exchange of ATFM messages for CTOT and TTOT using FIXM messages.
SWIM Events Past

• CAAS, AEROTHAI and JCAB were strong participants in both Mini Global demos

• ICAO workshop on SWIM
  • CAAS, AEROTHAI and JCAB conducted smaller version of the Mini-Global II demonstration at this workshop held 16 – 18 May 2016.
  • Well received by attendees of the workshop.
What’s Next

• First SWIM ICAO Task Force meeting
  • To implement an Asia-Pacific SWIM
  • First meeting to be held 10 – 12 May 2017
What’s Next

• Possible ASEAN SWIM demonstration
  • Targeted in 2018 / 2019 time frame.
  • Main use case identified as ATFM
• What other ops scenarios would you like to be demonstrated?
Thank you