Status on SWIM Planning and Deployment

ASEAN and Asia/Pacific

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ASEAN ANS Master Plan

Seamless ASEAN Sky

- ASEAN Single Aviation Market
- ASEAN Transport Strategic Plan 2016-2025
- Review cycle: 2 years
- Performance-based approach
- 5 focus areas
  - Aerodrome
  - Terminal
  - En-route
  - Civil/Military cooperation
  - Information management
ASEAN ANS Master Plan

Seamless ASEAN Sky

- 3 implementation priorities
  - Required harmonized ASEAN-wide
  - First-priority
  - Capability enhancement
- 3 implementation phases

<table>
<thead>
<tr>
<th>ASEAN Implementation Time Frame</th>
<th>ASEAN Target Completion Date</th>
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<tbody>
<tr>
<td>Phase I: 1 Jan 2018 – 31 Dec 2020</td>
<td>31 Dec 2018</td>
</tr>
<tr>
<td>Phase II: 1 Jan 2018 – 31 Dec 2022</td>
<td>31 Dec 2020</td>
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<tr>
<td>Phase III: 1 Jan 2022 – 31 Dec 2025</td>
<td>31 Dec 2024</td>
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### ASEAN ANS Master Plan

#### Information Management

- **Required-harmonized ASEAN-wide**
  - **Phase I** – Quality-assured aeronautical data and information
  - **Phase II** – Aeronautical information in AIXM v5.1
    - CRV
  - **Phase III** – Aeronautical information in AIXM v5.1
    - Digital-based NOTAM
    - CRV
    - SWIM information service provision
    - SWIM information service consumption
  - + SWIM Registry

- **First-priority**
  - ASEAN-specific SWIM governance
Scope
Purpose

To demonstrate the principles of SWIM

To show the potential benefits of SWIM

To demonstrate a model of SWIM implementation for ASEAN and APAC region
Goal

- Demonstrate operational values of SWIM
- Generate greater discussion among participants on SWIM and SWIM implementation in the region
- Achieve broad participation by ASEAN and Asia/Pacific aviation community
- Construct a Global Enterprise Messaging Service (GEMS) network

Gain consensus for ASEAN and Asia/Pacific to move forward on SWIM
High-level Technical Architecture
### Service and Application

#### Enterprise Messaging Service

<table>
<thead>
<tr>
<th>Governance</th>
<th>Validation</th>
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<tr>
<td>Routing</td>
<td>Security</td>
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#### Information Service

<table>
<thead>
<tr>
<th>Aeronautical information</th>
<th>Flight information</th>
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<tr>
<td>Meteorological information</td>
<td>ATFM Daily Plan information</td>
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#### Additional Service

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<tr>
<th>GUFI service</th>
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<tr>
<td>Flight object management</td>
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<tr>
<td>Data transformation</td>
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#### Application

<table>
<thead>
<tr>
<th>Data Governance Module</th>
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<tr>
<td>ATFM</td>
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<tr>
<td>Viewer</td>
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</table>
Standards Used

- Messaging
  - AMQP v1.0
  - Metadata
    - Current operational concept: ATS message-based
    - Transition
    - Future operational concept: FF-ICE

- In demonstration
  - Both pre-recorded and simulated data
  - Use cases involving aeronautical information, flight information, and weather information sharing among stakeholders
    - AIXM V5.1, FIXM v4.1 with APAC Extension, IWXXM v2.0
Scenarios

Demonstrating SWIM and its benefits to flight and ATM operations

Normal Flight Operations
- Gate-to-gate operations
- Airport CDM

Restricted Flight Operations
- Military activity
- Weather hazard
- Conditional route (CDR)

Enhanced flight information exchange
Cross-border ATFM, ASM, and collaboration

Current Operational Concept
Scenarios

Demonstrating SWIM and its benefits to flight and ATM operations

Normal Flight Operations

- Special Use Airspace
- Weather hazard

FF-ICE/R1 Pre-Departure Negotiation

Future Operational Concept
Lessons Learnt

- Seamless information exchange among stakeholders is critical
  - Common situational awareness
  - Predictability
  - Collaborative decision making

- Increasing need for SWIM is a fact
  - Improve current operations
  - Enable advance operations

- More distinct operational benefits can be achieved with increasing SWIM implementation

- Participation of AU’s FOC system via G/G SWIM tangibly contributes to improved ATM system performance
Lessons Learnt

- Interconnected-EMSs is a candidate model of SWIM implementation for ASEAN and Asia/Pacific region
  - Use of open standards, utilization of open-source messaging protocols
  - GEMS metadata
    - Defined format and possible values
  - Message routing
    - Standardized solution required to prevent message looping
    - Messages irregularly-continuously routed among GEMS providers
  - Relation between headers
    - Requiring defined relation between header defining message type and other related header
  - Required data elements of each message types
• Use of AIXM, FIXM, IWXXM plays an important role in achieving interoperability
  – Regional requirements - Extensions to XM Core
• Mediation is a key to bring diverse stakeholders with different technical capabilities on board
• Technical enhancement discussion without operational view is challenging
  – Clearly defined operational use cases
  – Clearly defined process
ICAO Asia/Pacific SWIM Task Force

- ICAO APAC-MID SWIM workshop
- Joint WP – Singapore, Thailand, and USA
- CNS SG/20 Decision – Establishment of SWIM TF

2016

- SWIM TF/1
  - Structure
  - Work plan
- ICAO APAC-EUR-MID SWIM workshop
- Inauguration of SWIM in ASEAN Demo

2017

- SWIM TF/2
  - APAC SWIM survey #1

2018
ICAO Asia/Pacific SWIM Task Force

- SWIM TF/3
  - Philosophy and roadmap
  - Interoperable registry model
  - APAC FIXM v4.1 Extension
  - SWIM education video
  - Service/application test platform
  - SWIM in ASEAN Demo

- SWIM in ASEAN Demo

- SWIM TF/4
  - Revised structure
  - SWIM in ASEAN Demo report
  - FF-ICE/R1 demo

- SWIM TF/5
  - Revised TOR
  - APAC SWIM survey #2
  - Expansion of implementation philosophy
  - Security service on SWIM
  - FIXM v4.2 Extension
  - APAC service overview specification
  - Discovery service demo

2019

2020

2021
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- Implementation planning
  - Regional implementation philosophy and roadmap

- SWIM infrastructure
  - Regional SWIM infrastructure
  - Security service

- Technical architecture
  - Development and maintenance of regional information exchange models

- Governance
  - Registry and other related governance policies
ICAO Asia/Pacific SWIM Task Force

- Information services
- SWIM demonstration
- SWIM service and application validation
- Monitoring of Panels’ work
- Regional coordination
- SWIM implementation education and promotion
Upcoming Activities

Hong Kong China – Singapore – Thailand Joint Efforts

- Q1/2022
  ATFM information exchange over SWIM trial
- Originally planned for 2020; new date – TBD
  SWIM over CRV demonstration
Thank you