ATIEC 2021

SWIM at a global level

Information: Key for evolution

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SWIM at a global level

Flight Plan

- How was SWIM born?
- SWIM Pioneer initiatives
- Planning for SWIM
- Making SWIM harmonized and interoperable
- Conclusion
SWIM at a global level

How was SWIM born?

- Global ATM Operational Concept (Doc 9854)
  - Guiding principles

  "Information. The ATM community will depend extensively on the provision of timely, relevant, accurate, accredited and quality-assured information to collaborate and make informed decisions. Sharing information on a system-wide basis will allow the ATM community to conduct its business and operations in a safe and efficient manner."

- Seven ATM concept components
  - Airspace organization and management; Demand/capacity balancing; Aerodrome operations; Traffic synchronization; Conflict management; Airspace user operations and ATM service delivery management.
  - Integrated through Information services.
SWIM at a global level

How was SWIM born?

- Global ATM Operational Concept (Doc 9854)
  - Information Services
  
  “The function of information services deals with the exchange and management of information used by the different processes and services. It will ensure the cohesion and linkage between the seven concept components.”

- Information Management
  
  “Information management provides accredited, quality-assured and timely information used to support ATM operations. Information management will also monitor and control the quality of the shared information and provide information-sharing mechanisms that support the ATM community.”
SWIM at a global level

How was SWIM born?

▪ Global ATM Operational Concept (Doc 9854)

▪ Conclusion:

“The ATM community will depend on information management, shared on a system-wide basis, to make informed collaborative decisions for best business and operational outcomes.”
SWIM at a global level

How was SWIM born?

- Manual on Air Traffic Management System Requirements (Doc 9882)
  - Requirements:
    - [R70] Implement system-wide information management;
    - [R06] provide a global, common aviation data standard and reference system to allow fusion and conflation and provide comprehensive situational awareness and conflict management;
    - [R12] establish information exchange protocols and procedures to ensure that appropriate performance can be achieved within the agreed rules;
    - [R74] provide to the ATM community accredited, quality-assured and timely information meeting the identified standards of performance, including quality of services;
SWIM at a global level

How was SWIM born?

- Manual on Air Traffic Management System Requirements (Doc 9882)
  - Requirements:
    - [R75] provide information systems that identify the nature of the information in terms of timeframe — historical, current or planned;
    - [R79] ensure that a relevant validity period of ATM system information is evident to the user of that information;
    - [R78] support a reduction in transactional friction for transmission of information across systems;
    - [R123] assemble the best possible integrated picture of the historical, real-time and planned or foreseen future state of the ATM system situation and make relevant quality-assured and accredited information available to the ATM system;
    - [R07] ensure that the airspace user makes relevant operational information available to the ATM system,
SWIM at a global level

How was SWIM born?

- Manual on Air Traffic Management System Requirements (Doc 9882)
  - Requirements:
    - [R08] use relevant airspace user operational information to optimize flight operations management;
    - [R09] use relevant data to dynamically optimize 4-D trajectory planning and operation;
    - [R13] provide the status of ATM system resources;
    - [R31] make available, to the ATM system, flight parameters and aircraft performance characteristics;
    - [R157] establish standards for meteorological model accuracy and resolution and agree on performance requirements;
    - [R164] provide timely access to all relevant meteorological information; and
SWIM at a global level

How was SWIM born?

- Manual on Air Traffic Management System Requirements (Doc 9882)
  - Requirements:
    - [R127] utilize meteorological data, and information derived from it, to assist in analysis and evaluation of agreed environmental performance targets.
    - [R11] ensure mutual exchange of relevant and timely data: 
      i) for the benefit of situational awareness; 
      ii) for conflict-free trajectory management; and 
      iii) to allow collaborative decision making concerning consequences of airspace user system design changes
    - [R77] employ collaborative decision making to reconcile differences between information needs and the availability of, or access to, information.
How was SWIM born?

- Manual on Air Traffic Management System Requirements (Doc 9882)
  - Conclusion: “These requirements provide a comprehensive understanding of what was envisioned as information management, shared on a system-wide basis, for Pioneer States and ANSP to start developing and deploying SWIM initiatives.”
- SWIM Concept (Doc 10039)
SWIM at a global level

SWIM Pioneer initiatives

- SWIM implementation in the United States
- SWIM implementation by EUROCONTROL
- SWIM APAC Task Force
- SWIM implementation in China
- SWIM implementation in Singapore
- SWIM implementation in Japan
SWIM at a global level

Planning for SWIM

- Global Air Navigation Plan (Doc 9750, Home - ICAO GANP Portal)

- SWIM is key to the evolution of the Air Navigation System

- Global Strategic Level
  - Information Revolution enabled by Full connectivity towards a Total Performance Management System

Global Air Navigation Plan Strategy (EN) - THE CONCEPTUAL ROADMAP | Rise (icao.int)
SWIM at a global level

Planning for SWIM

- Global Air Navigation Plan (Doc 9750, Home - ICAO GANP Portal)
- Global Technical Level
  - SWIM is realized in various parts of the world with more regions standing up SWIM
- Aviation System Block Upgrades (ASBU) Framework
  ASBU Elements - ICAO GANP Portal
**SWIM at a global level**

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SWIM at a global level

Making SWIM harmonized and interoperable

- Draft PANS-IM (Doc XXXX) and SWIM Implementation Manual (Doc XXXX)

- SWIM principles
  - Use of interoperable information services
  - Separation of information provision and consumption
  - Loose coupling
  - Discoverability
  - Use of open standards
  - Secure information exchange
SWIM at a global level

Making SWIM harmonized and interoperable

- Draft PANS-IM (Doc XXXX) and SWIM Implementation Manual (Doc XXXX)
  - Quality Management
    - Quality of the information and of the information service
    - Quality Management System
  - Governance
    - Not mandatory
      - Implementation based on a “need” basis
    - Implementation framework
SWIM at a global level

Making SWIM harmonized and interoperable

- Draft PANS-IM (Doc XXXX) and SWIM Implementation Manual (Doc XXXX)

- Information
  - Semantic and syntactic interoperability
  - Domain-specific information exchange model
  - AIRM and standardized exchange schema
  - Metadata

- Information services
  - Information service overview
  - Information service publication
  - SWIM service registry
SWIM at a global level

Making SWIM harmonized and interoperable

- Draft PANS-IM (Doc XXXX) and SWIM Implementation Manual (Doc XXXX)

- Technical Infrastructure
  - Based on an IPS network
  - Interface bindings

- Information security framework
  - Layered approach
  - Dedicated block of IPv6 addresses
  - Impact of information security (loss of confidentiality, integrity and availability) on safety risk management
  - Performance-based information security
SWIM at a global level

CONCLUSION

- Re-emphasize the importance of SWIM and information management for future aviation
- Acknowledge the importance of the different SWIM initiatives taking place in the world
- Highlight the importance of ICAO’s provisions to ensure interoperability and harmonization at a global level
- To ensure safe operations – our implementation must include cyber security mitigation from day 1
SWIM at a global level

THANK YOU FOR YOUR ATTENTION!