



ATIEC 2021

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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



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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.



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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.”



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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.”



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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;



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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,



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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



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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.



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SWIM at a global level

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)



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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



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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 \(icao.int\)](#)



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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 part of the world with more regions standing up SWIM
 - Aviation System Block Upgrades (ASBU) Framework
[ASBU Elements - ICAO GANP Portal](#)



EUROCONTROL



















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SWIM at a global level

SWIM

SWIM-B2/1	Information service provision	Information	  
SWIM-B2/2	Information service consumption	Information	  
SWIM-B2/3	SWIM registry	Information	  
SWIM-B2/4	Air/Ground SWIM for non-safety critical information	Information	  
SWIM-B2/5	Global SWIM processes	Information	  
SWIM-B3/1	Air/Ground SWIM for safety critical information	Information	  



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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



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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)
- 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



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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)
- 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



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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)
- 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



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SWIM at a global level

CONCLUSION

- Re-emphasize the important 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



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SWIM at a global level

THANK YOU FOR YOUR ATTENTION!