

REGIONAL FOCUS

SYSTEM WIDE INFORMATION MANAGEMENT IMPLEMENTATION IN AFRICA

Part 2 – Globally Harmonised Implementation

Thursday 14 October 2021

12:00 – 14:30 CAT



Ms. Boni Dibate

Director Africa Affairs

CANSO



Ms. Coleen Hawrysko

Operations Programme Manager

CANSO



Mr. Kevin Haggerty

VP, International Collaboration & Global Aviation Solutions

CGH Technologies

CAN SO

ICAO Information Management Panel Representatives

✓ Kevin Haggerty	Member	USA
✓ Magdalena Bankowska	Advisor	Poland
✓ Gyaawa Amponsah	Advisor	Ghana

PROCEDURES FOR AIR NAVIGATION SERVICES – INFORMATION MANAGEMENT (PANS-IM)

IM/2 reviewed, section by section, the latest version of the draft PANS-IM with suggested edits from multiple IP's & WP's.

- **IMP/2-WP/4 Revision No.1** presented the latest version of the draft PANS-IM, after informal inter-panel coordination. It also presented the latest version of the draft rationale and impact assessment, that would be part of the Proposal for Amendment, as well as the draft consequential Proposals for Amendment.
- **IMP/2-WP/5** presented some editorial proposals to the latest version of the draft PANS-IM, presented in IMP/2-WP/4. The meeting noted that the proposals were also applicable to the draft PANS-IM, presented in IMP/2-WP/4 Revision No.1, so both papers were reviewed at the same time.
- Most of the approved edits provided consistency within the PANS-IM or clarified based upon ICAO style.
- The meeting agreed that the Secretary progress the coordination process for the publication of the draft PANS-IM as amended by the meeting.
- The meeting reviewed IMP/2-WP/22 - Proposed information security framework, which presented an update to the contribution of the experts of the Trust Framework Study Group (TFSG) to address information security in the proposed amendments to the draft PANS-IM and the Safety Management Manual (Doc 9859).

PROCEDURES FOR AIR NAVIGATION SERVICES – INFORMATION MANAGEMENT (PANS-IM) CONT.

➤ INFORMATION SECURITY FRAMEWORK

- Some concerns were raised regarding the inclusion of the proposed information security provisions in PANS-IM as their scope differed from the scope of the latest version of PANS-IM provided in IMP/2-WP/4 Rev No1. This version of PANS-IM was focused on SWIM while the scope of the proposed information security framework was the exchange of information that may impact safety over an IPS-based network. Furthermore, the meeting raised some concerns regarding the perception that the audience of PANS-IM could have regarding the applicability of the proposed information security framework.
- After some discussion, the meeting agreed that it was important to address information security in PANS-IM and to manage the potential perceptions that could result from doing so by adding the following paragraph to the foreword of PANS-IM as paragraph 2.3.
- “2.3 *Information security is a fundamental aspect of information management. The loss of confidentiality, integrity and availability of the information may impact the safety and continuity of flight operations. This first edition of PANS-IM also includes requirements for an information security framework to provide end-to-end information security through a layered approach. This framework is applicable to any exchange of information over IP and not only to those performed in a system-wide information management environment.*”

PROCEDURES FOR AIR NAVIGATION SERVICES – INFORMATION MANAGEMENT (PANS-IM)CONT.

- **IPv6 addressing provisions and DNS provisions**
- The meeting discussed whether or not PANS-IM was the right place for these provisions as they related to the network layer.
- The EUROCONTROL Member expressed concerns on the inclusion of provisions in PANS-IM related to the mandatory use of specific IPv6 addresses (aviation block) and domain names.
- Fortunately, for me and you, The EUROCONTROL Member to the IM/2 is in attendance today and can explain this issue better if he so chooses.
- The meeting also reviewed IMP/2-WP/26 – End-to-end information protection within SWIM, which presented the findings and recommendations from the Enterprise Security Harmonization proof of Concept (ESHPOC), a proof of concept between the Federal Aviation Administration (FAA) and EUROCONTROL, supported by FAA Next Gen and the SESAR Deployment Manager, to address SWIM information protection. The outcome of this work resulted in some proposed amendments to draft PANS-IM presented in Appendix A to the paper and supporting guidance material.

AIRCRAFT WITH FOLDING WING TIPS

- The meeting reviewed IMP/2-WP/10 – Annex 4: Aircraft with folding wing tips, which presented a proposal for amendments to Annex 4 and to be consistent with amendment 1 to the Aeronautical Chart Manual (Doc 8697), published on 11th December 2020. The amendment to the manual provided guidance on how to depict extension locations and, additionally, ground areas where it was safe for aeroplanes with folding wing tips to operate.
- The meeting did not provide any objection or comment to the proposal for amendment or rationale, therefore the meeting agreed with the proposal for amendment to Annex 4 and rationale as presented

CBTA TRAINING METHODOLOGY

- The meeting reviewed IMP/2-WP/11 – Annex 15 and PANS-AIM: CBTA Training Methodology, which presented proposals for amendment to Annex 15 and PANS-AIM to introduce the CBTA methodology. Job Card IMP.006.01 – AIM Global Implementation Support required the development of an AIM Training Manual based on PANS-Training (Doc 9868), Amendment 5, which introduced the Competency-Based Training and Assessment (CBTA) methodology. Since AIM was not addressed in Annex 1 or PANS-TRG, high-level SARPs were required in Annex 15 and provisions for CBTA training requirements in PANS-AIM, to provide a lead-in for the CBTA methodology. A proposal for amendment to Annex 15 and PANS-AIM was provided. The paper also proposed some amendments to the AIS Manual (Doc 8126) Part I as well as some rationale and impact assessment to accompany these proposals for amendment.
- The proposals for amendment to Annex 15, PANS-AIM and the AIS Manual (Doc 8126) Part I, as well as the rationale and impact assessment, was agreed to by the meeting.

CONCLUSIONS AGENDA ITEM 2

Annexes, Procedures for Air Navigation Services and consequential amendments

- Under this agenda item, the meeting discussed the core provisions, consequential amendments, rationale and impact assessment for the implementation of the first edition of PANS-IM, which addressed system wide information management and information security.
- The meeting also discussed a series of proposals for amendment to Annex 4, Annex 15, PANS-ABC and PANS-AIM related to the operation of aircraft with folding wing tips, CBTA training methodology, consistency of data that appeared in multiple Aeronautical Information Products, processing of multi-part NOTAM, NOTAM code for hang gliding and paragliding activities, identification and annotation of non-compliant data, NOTAM code and selection criteria as well as other minor amendments.
- The meeting agreed, in principle, with the proposals for amendment for a new PANS-IM, as well as for Annex 3, Annex 4, Annex 10, Annex 15, PANS-ABC, and PANS-AIM concerning the initial implementation of SWIM and on information security provisions. The meeting recognized that it did not have the detailed expertise to review the proposed information security provisions on the proposed Appendix to PANS-IM. The meeting also concluded that the ANC should consider if the Appendix should not be located elsewhere for better visibility. The meeting also expressed some concerns regarding the cost that the implementation of the information security provisions may imply and highlighted that the requirements for the use of an IPv6 dedicated block of addresses and a fully qualified DNS should be subject to the availability of the block and the DNS at the applicability date of the provisions.

CONCLUSIONS AGENDA ITEM 3

SWIM IMPLEMENTATION MANUAL

- The meeting reviewed IMP/2-WP/6 – SWIM Manual Volume II – Implementation Guidance, which provided a summary of the main updates implemented in each chapter of the draft SWIM Manual Volume II – Implementation Guidance since IMP-WG/10. The paper also provided, a first edition of the Manual to be submitted to the Secretariat for publication, together with and in support of PANS-IM.
- The meeting then reviewed the Manual chapter by chapter looking for major comments. No major comments were provided.
- Therefore, the meeting agreed with the proposed edition of the Manual on System Wide Information Management Implementation (Doc XXXX) and that that the Secretary progress the coordination process for the proposed edition of the Manual on System Wide Information Management Implementation (Doc XXXX) to be published, together with and in support of the Procedures for Air Navigation Services – Information Management.



THANK YOU





Mr. Dennis Hart

Head Information and Cyber Unit

Eurocontrol

Supporting
European
Aviation



SWIM Activities

Dennis Hart

Head of Information & Cyber Unit, EUROCONTROL Network Manager

14 October 2021



NETWORK
MANAGER



Embarking on a journey towards information services



- Agenda
 - Global ICAO (draft) provisions
 - Regional/national/domain specific requirements
 - European (and global) stakeholders and EUROCONTROL developed specifications and guidance
 - EUROCONTROL as Standards Development Organisation
 - Specifications on:
 - SWIM Information
 - SWIM Information Service Description
 - SWIM Technical Infrastructure
 - Practical hands-on guidance/references

ICAO IMP deliverables for SWIM

Manual on SWIM - Doc10039 Volume I
SWIM Concept

PANS Information Management
SWIM

Manual on SWIM - Doc 10039 Volume II
SWIM Implementation Guidance

What is SWIM?

Which global requirements?

How to SWIM?

Doc 10039

Manual on System Wide Information Management (SWIM)

Volume I — SWIM Concept

drives

Procedures for
Air Navigation Services

Information Management

System Wide Information Management

I

drives

Doc 10039

Manual on System Wide Information Management (SWIM)

Volume II — SWIM Implementation Guidance

Common vocabulary



principles



components



ICAO PANS IM - information

requirements for information service payloads

- Information exchange requirements
- Meaning of information
- Exchange schema
- Information exchange models
- If no XM:
 - AIRM alignment
 - Standardized exchange schema

should

should

shall

should

should

shall

information service provider

information service consumer

exchange the required information

talk the same language

know how to encode/decode

recommended solution

talk the same language

know how to encode/decode

ICAO PANS IM – Information services requirements

- Information services
- Fitness for purpose
- Information service metadata
- Information service overview

shall

should

shall

shall

information service provider

use to make information available

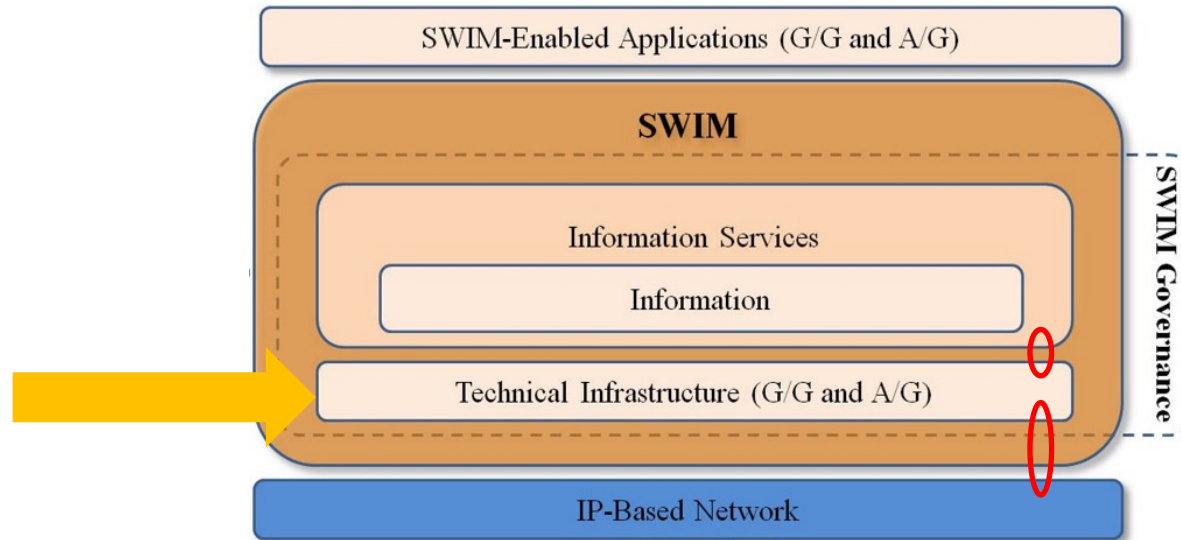
make available

provide metadata through
information service overview

information service consumer

assess

ICAO PANS IM – Technical Infrastructure



- **Interface bindings** shall be based on **standardized and widely used and supported protocols**.
 - *A specification on interface bindings is shown in EUROCONTROL Specification for SWIM Technical Infrastructure (EUROCONTROL-SPEC-170)*
- The technical infrastructure shall be based on the **Internet Protocol Suite (IPS)**.
 - *The ATN/IPS meets the requirements for the technical infrastructure*

Requirements perspectives

- IMP requirements and guidance are generic
 - Applicable globally and across domains
- Additional requirements emerge from:
 - Regional/national requirements
 - Example: European region where the Eurocontrol Specifications for SWIM complement the global provisions
 - Information domain specific requirements
 - Example: FF-ICE1 Implementation Guidance (IMP/ATMRPP Inter-panel Task Force)

European Approach to SWIM Deployment



CONCEPT

Global interoperability, information at the right time, in the right place, accurate, relevant, quality-assured,...

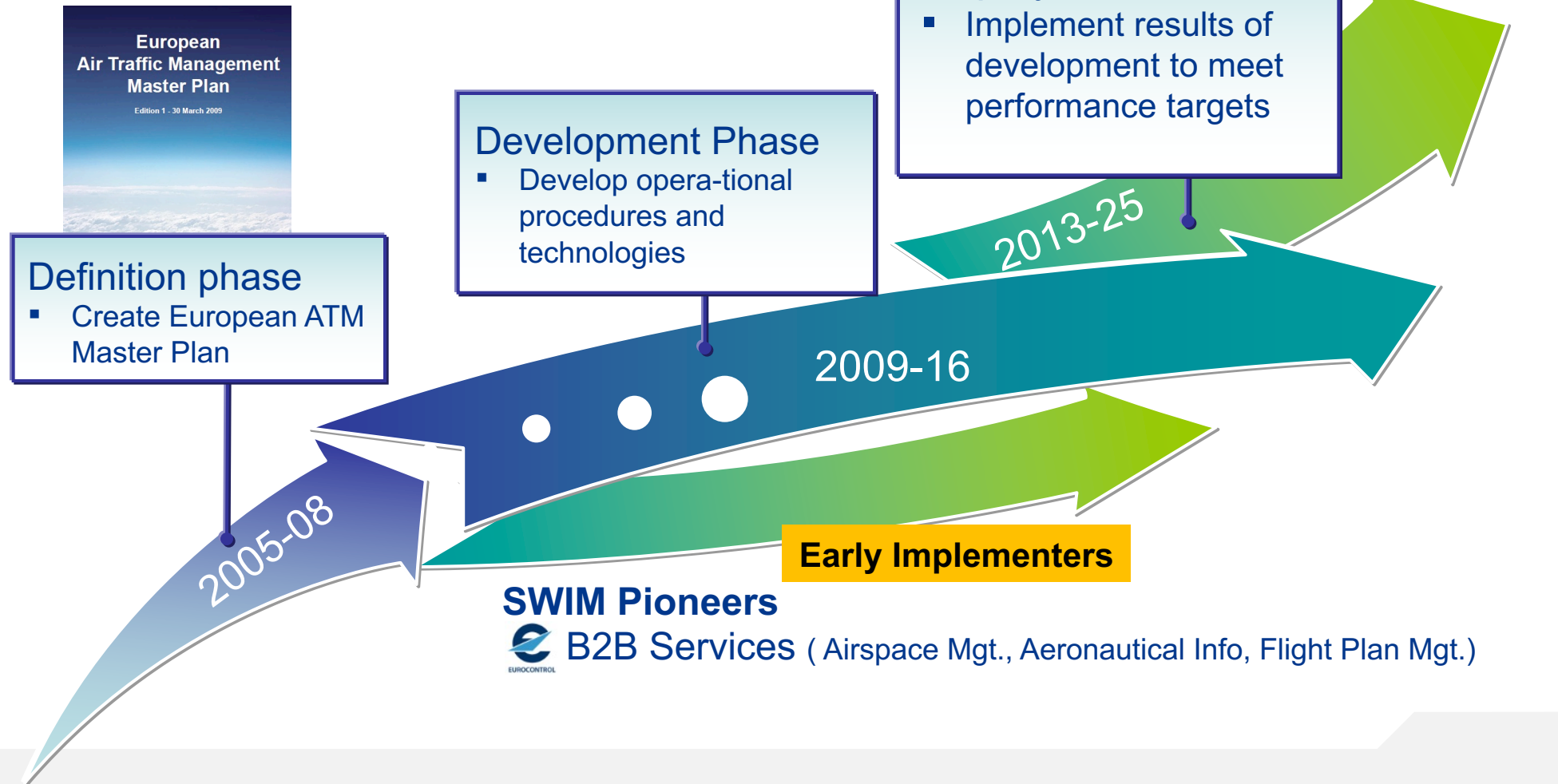


DEPLOYMENT

Concrete implementable requirements

SESAR Program

ATM System Modernization & Harmonization



Collective effort through 'SWIM communities of interest'



>100 subject matter experts

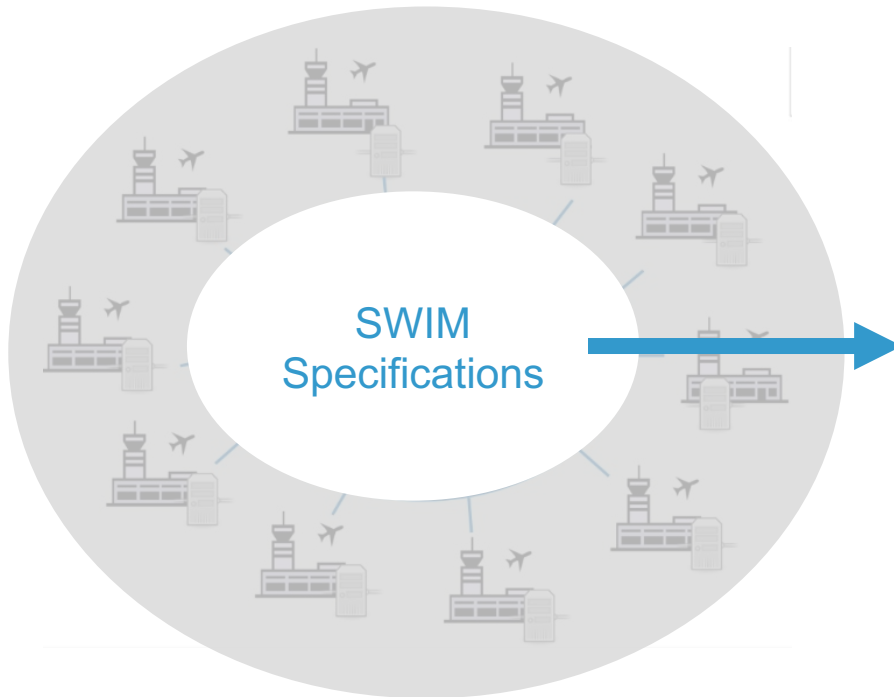
ANSPs (ATC and AIS)

Industry

Meteorological service providers

International organisations

SWIM Specification Types



SWIM Foundational Specifications

Specifications transversally applicable in all information domains and across all types of information services.

Managed by SDOs* (EUROCONTROL) supported by SWIM CoIs



SWIM Service Specifications/Definitions

Specifications applicable to a specific type of service ensuring harmonized implementation.

Managed by SDOs* (EUROCAE, EUROCONTROL), Domain CoI (AIMG)

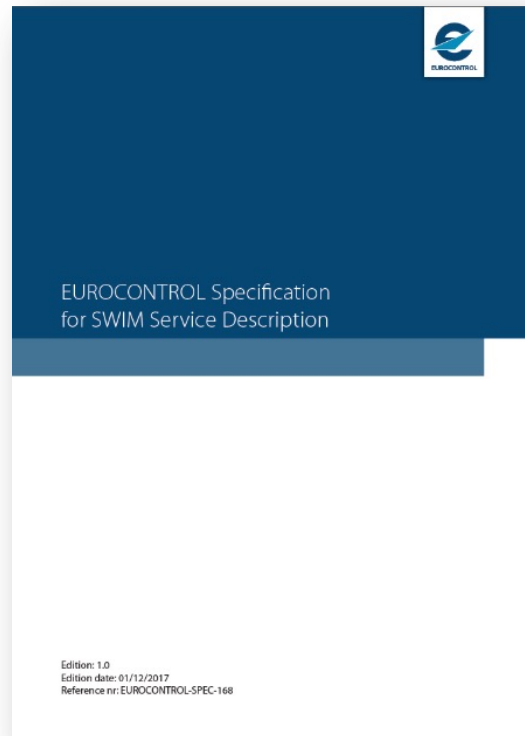
- (*) SDOs are coordinated by the EASCG Rolling Plan with stakeholder involvement.
SDOs use collaborative drafting and consultation process to ensure stakeholder involvement.

EUROCONTROL Specifications



- **SWIM Service Description:** Provides requirements for describing information services.
- **SWIM Information Definition:** Provides requirements for information exchange definitions conform the semantics of the ATM Information Reference Model (AIRM)
- **SWIM Technical Infrastructure YP:** Provides requirements for IT infrastructure capabilities and interfaces

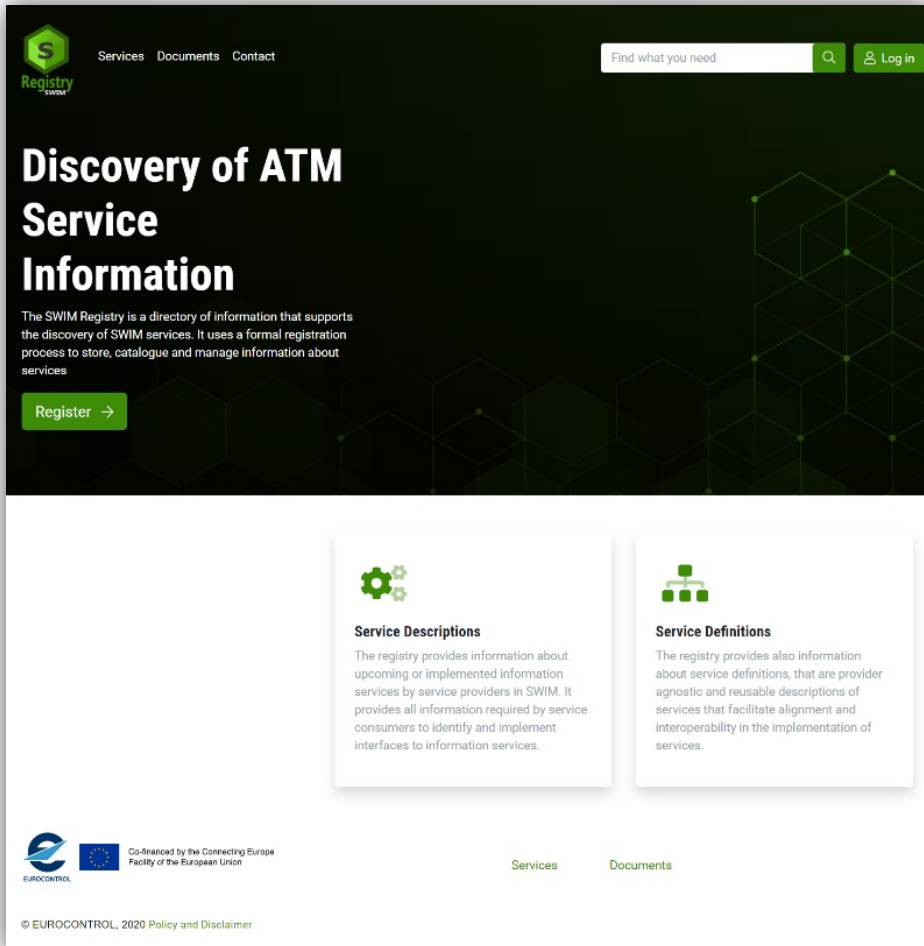
EUROCONTROL Specification SWIM Service Description



- Provides requirements for describing information services.
- Facilitates a service consumer related to discovery a service, or implementing a service consuming client

SWIM Registry

<https://eur-registry.swim.aero>



The screenshot shows the homepage of the SWIM Registry. At the top, there is a navigation bar with links for 'Services', 'Documents', and 'Contact'. A search bar with the placeholder 'Find what you need' and a 'Log in' button are also present. The main heading is 'Discovery of ATM Service Information'. Below this, a paragraph explains that the SWIM Registry is a directory of information that supports the discovery of SWIM services. A green 'Register' button is visible. The page is divided into two columns: 'Service Descriptions' and 'Service Definitions'. The footer includes the EUROCONTROL logo, the European Union flag, and text indicating it is co-financed by the Connecting Europe Facility of the European Union. It also includes a copyright notice for EUROCONTROL, 2020, and a policy and disclaimer link.

Services Documents Contact

Find what you need Log in

Discovery of ATM Service Information

The SWIM Registry is a directory of information that supports the discovery of SWIM services. It uses a formal registration process to store, catalogue and manage information about services.

Register →

Service Descriptions

The registry provides information about upcoming or implemented information services by service providers in SWIM. It provides all information required by service consumers to identify and implement interfaces to information services.

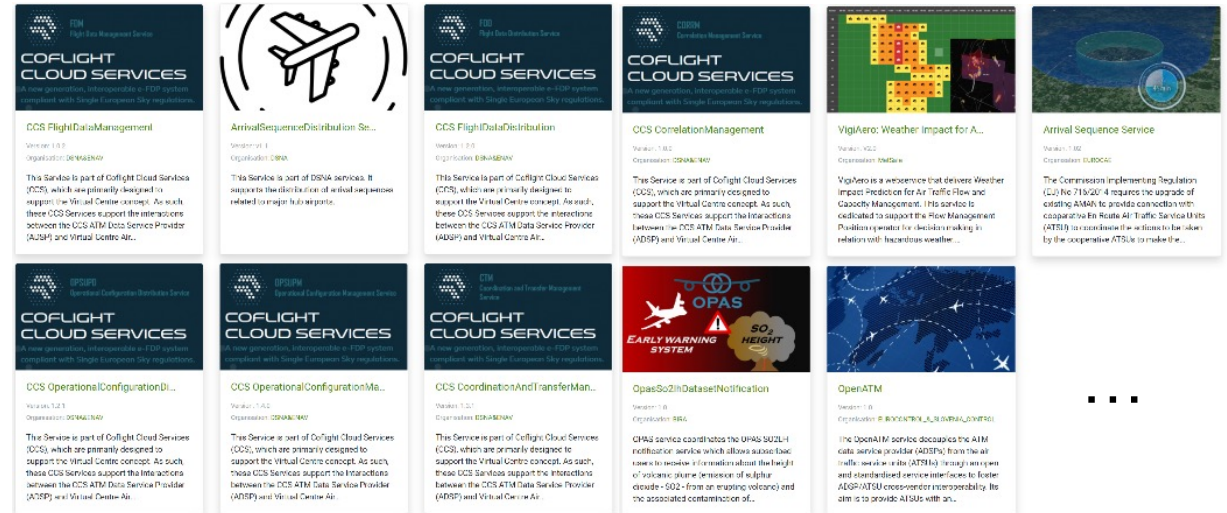
Service Definitions

The registry provides also information about service definitions, that are provider agnostic and reusable descriptions of services that facilitate alignment and interoperability in the implementation of services.

Services Documents

© EUROCONTROL, 2020 Policy and Disclaimer

- The European SWIM Registry is a directory of information that supports the discovery of SWIM services.
- The SWIM Registry uses a formal registration process to store, catalogue and manage information about services.



The image displays a grid of COFLIGHT Cloud Services. Each service card includes a title, version, organization, and a brief description. The services are categorized into various functional areas such as Flight Data Management, Arrival Sequence Distribution, Flight Data Distribution, Correlation Management, Weather Impact, Arrival Sequence Service, Operational Configuration, and OpenATM. The grid is organized into two rows, with the first row containing six cards and the second row containing six cards. The cards are color-coded and feature icons related to their respective services.

Service Name	Version	Organization	Description
CCS Flight Data Management	Version 1.0.0	Organization: EUROCONTROL	This Service is part of COFLIGHT Cloud Services (CCS), which are primarily designed to support the Virtual Centre concept. As such, these CCS Services support the interactions between the CCS ATM Data Service Provider (ADSP) and Virtual Centre Air.
Arrival Sequence Distribution Service	Version 1.0.0	Organization: EUROCONTROL	This Service is part of COFLIGHT Cloud Services (CCS), which are primarily designed to support the Virtual Centre concept. As such, these CCS Services support the interactions between the CCS ATM Data Service Provider (ADSP) and Virtual Centre Air.
CCS Flight Data Distribution	Version 1.0.0	Organization: EUROCONTROL	This Service is part of COFLIGHT Cloud Services (CCS), which are primarily designed to support the Virtual Centre concept. As such, these CCS Services support the interactions between the CCS ATM Data Service Provider (ADSP) and Virtual Centre Air.
CCS Correlation Management	Version 1.0.0	Organization: EUROCONTROL	This Service is part of COFLIGHT Cloud Services (CCS), which are primarily designed to support the Virtual Centre concept. As such, these CCS Services support the interactions between the CCS ATM Data Service Provider (ADSP) and Virtual Centre Air.
VigiAero: Weather Impact for A...	Version 1.0.0	Organization: EUROCONTROL	VigiAero is a web-based service that delivers Weather Impact Predictions for Air Traffic Flow and Capacity Management. This service is dedicated to support the Flow Management Function (FMF) in decision-making in relation with hazardous weather.
Arrival Sequence Service	Version 1.0.0	Organization: EUROCONTROL	The Commission implementing Regulation (EU) 2015/240 requires the upgrade of existing ATM/Air Traffic Service Units (ATSU) to coordinate flow-control in the value by the cooperative ATSU to make the...
CCS Operational Configuration Di...	Version 1.0.0	Organization: EUROCONTROL	This Service is part of COFLIGHT Cloud Services (CCS), which are primarily designed to support the Virtual Centre concept. As such, these CCS Services support the interactions between the CCS ATM Data Service Provider (ADSP) and Virtual Centre Air.
CCS Operational Configuration Ma...	Version 1.0.0	Organization: EUROCONTROL	This Service is part of COFLIGHT Cloud Services (CCS), which are primarily designed to support the Virtual Centre concept. As such, these CCS Services support the interactions between the CCS ATM Data Service Provider (ADSP) and Virtual Centre Air.
CCS Coordination and Transfer Man...	Version 1.0.0	Organization: EUROCONTROL	This Service is part of COFLIGHT Cloud Services (CCS), which are primarily designed to support the Virtual Centre concept. As such, these CCS Services support the interactions between the CCS ATM Data Service Provider (ADSP) and Virtual Centre Air.
OpasSo2hDatasetNotification	Version 1.0.0	Organization: EUROCONTROL	OpasSo2h service coordinates the OPAS So2h notification service which allows states to know to resolve information about the flight of volcanic plume emission of sulphur dioxide (SO2) from an erupting volcano) and the associated contamination of...
OpenATM	Version 1.0.0	Organization: EUROCONTROL	The OpenATM service decouples the ATM Data Service Provider (ADSP) from the air traffic service in the (ATN) through open and standardised service interfaces to foster ADSP/ATN cross-vendor interoperability. Its aim is to provide ATN with an...

EUROCONTROL Specification SWIM Information Definition




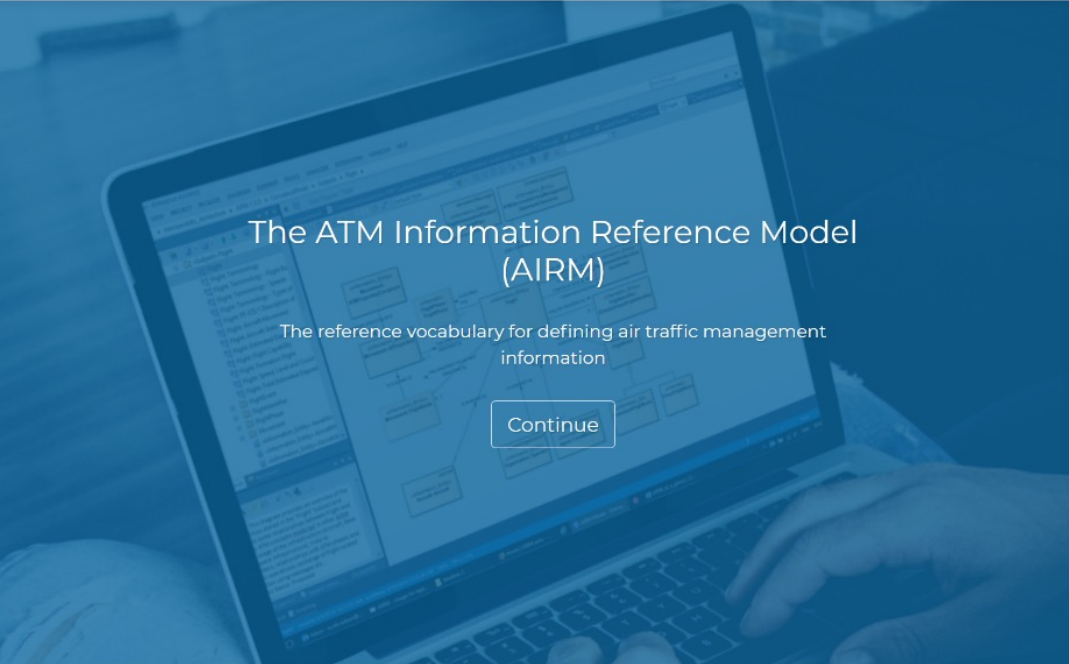
- Provides requirements for information exchange definitions conform the semantics of the ATM Information Reference Model (AIRM)
 - www.airm.aero
- Contributes to the semantic interoperability of information.

AIRM

<https://airm.aero>



HOME AIRM VIEWER COMMUNITY DOCS FAQ DEVELOPERS



The ATM Information Reference Model (AIRM)

The reference vocabulary for defining air traffic management information

[Continue](#)


What is the AIRM?

The ATM Information Reference Model (AIRM) is the ATM system-wide reference vocabulary for defining ATM information.

Semantic Correspondences

Under Maintenance

Explore how concepts are connected by the AIRM.

HOME AIRM SEARCH COMMUNITY DOCS FAQ DEVELOPERS

[Semantic Correspondences](#) / [FIXM 4.2.0 to AIRM 1.0.0](#)

[Semantic Correspondences](#) / [FIXM 4.2.0 to AIRM 1.0.0](#) / [AerodromeReferenceType](#)

locationIndicator

fb:AerodromeReferenceType:locationIndicator

A four-letter code group formulated in accordance with rules prescribed by ICAO and assigned to the aerodrome. [Specialised from ICAO Annex 10] The list of ICAO location indicators is provided by ICAO Doc 7910. [FIXM]

Type: [LocationIndicatorType](#)

Info

Act

Act

Aer

AerodromeReferenceType

AerodromeReferenceType

AerodromeReferenceType

AerodromeReferenceType

AircraftApproachCategoryType

AircraftApproachCategoryType

Aerodrome@locationIndicator

locationIndicatorICAO

urn:aero:airm:1.0.0:LogicalModel:Subjects:BaseInfrastructure:AerodromeInfrastructure:Aerodrome@locationIndicator

A four-letter code group formulated in accordance with rules prescribed by ICAO and assigned to the aerodrome. [Specialised from ICAO Annex 10] The list of ICAO location indicators is provided by ICAO Doc 7910. [FIXM]

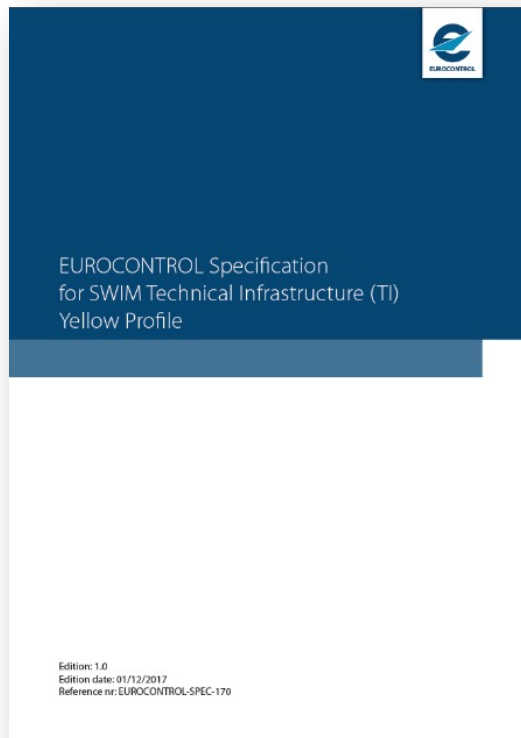
Type: [CharacterString](#)

[Show correspondences](#)

Model	Concept
AIXM 5.1.1	locationIndicatorICAO
FIXM 4.2.0	locationIndicator
AMXM 2.0.0	idarp

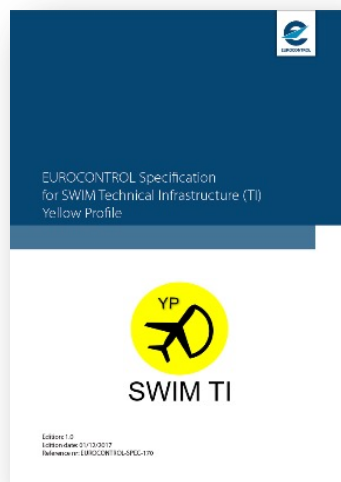
Showing 1 to 10 of 674 entries

EUROCONTROL Specification SWIM Technical Infrastructure Yellow Profile

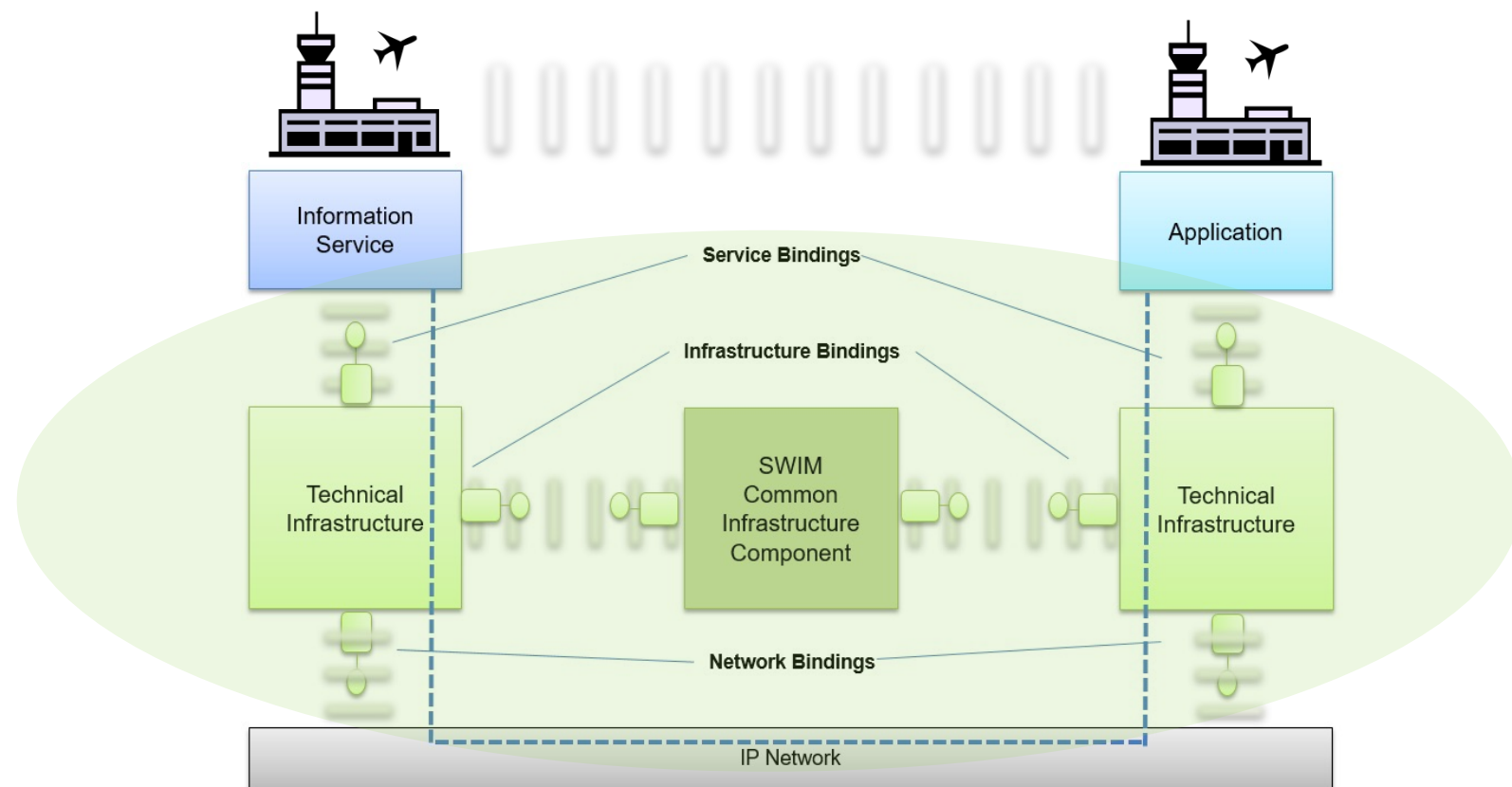


- Provides requirements for IT infrastructure capabilities and interfaces
- Facilitates the reliable, secure and efficient exchange of information. Contributes to technical interoperability.

SWIM TIYP Overview



EUROCONTROL Specification for SWIM TI Yellow Profile



Various profiles considered in SESAR R&D

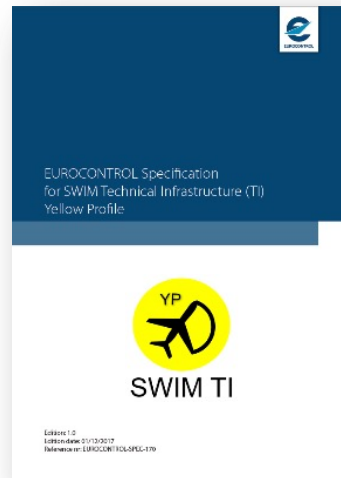


SWIM TIYP Requirements

<https://www.eurocontrol.int/sites/default/files/2020-07/eurocontrol-swim-spec-tiyp-1-1.pdf>

Interoperability Requirements
One size does not fit all

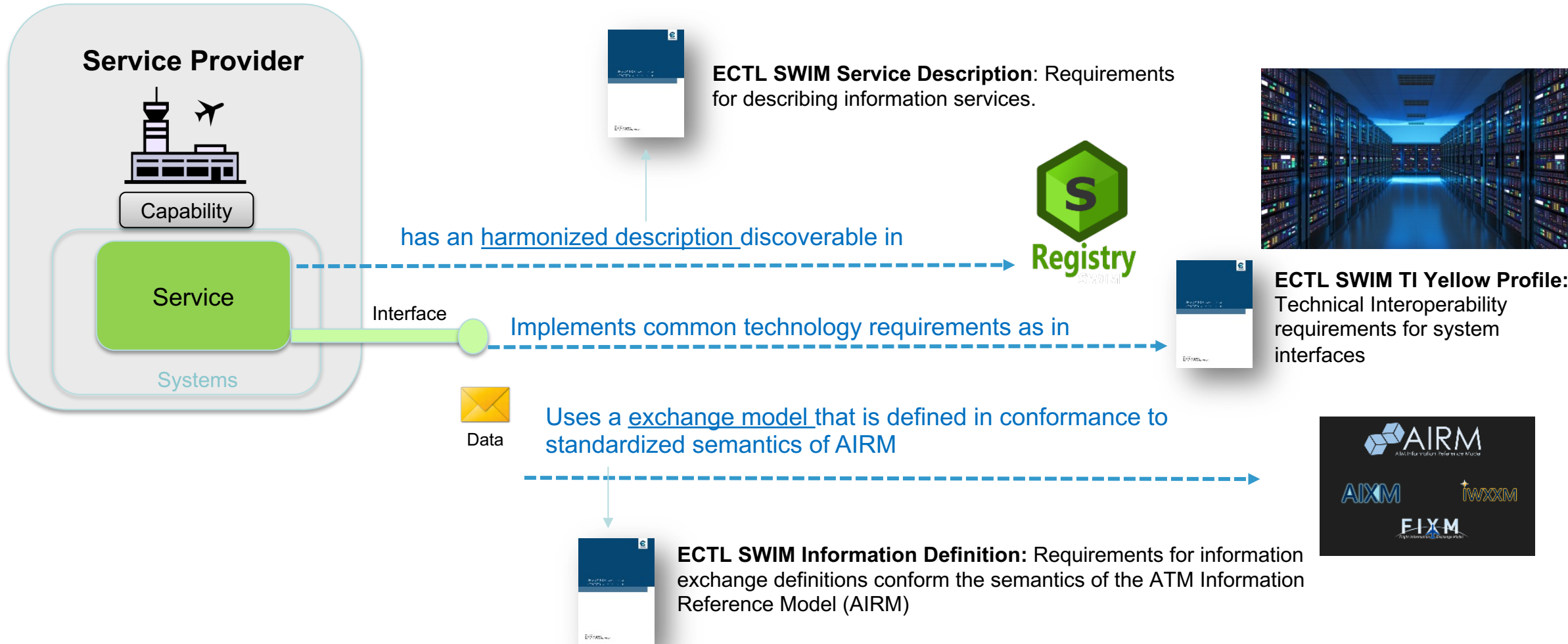
Infrastructure Requirements
Minimum + Optional



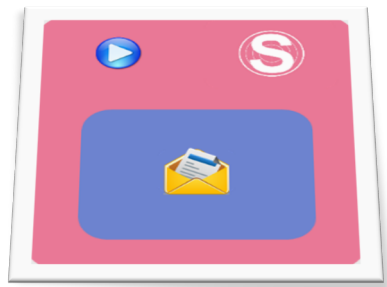
	MEP		Performance		Security			Binding
	Pattern Supported ¹	Pattern Specified	Messaging QoS Capability	Bandwidth Efficiency	Confidentiality	Integrity	Authentication	
HTTP	R/R	R/R	No	++	Transport	Transport	Transport (X.509 Server or X.509 Mutual)	WS Light
SOAP WS	R/R	R/R	Yes	+	Transport	Transport	Transport (X.509 Server or X.509 Mutual)	WS SOAP
					Transport	Transport	Transport (X.509 Server or X.509 Mutual) Message (Username/Password)	WS SOAP with Basic Message Security
					Message (Optional)	Message	Message (X.509)	WS SOAP with Message Security
					Message (Optional)	Message	Message (X.509 or SAML)	WS SOAP with Federated Security
SOAP WS-N	P/S	P/S	Yes	+	Transport	Transport	Transport (X.509 Server or X.509 Mutual)	WS-N SOAP
					Transport	Transport	Transport (X.509 Server or X.509 Mutual) Message (Username/Password)	WS-N SOAP with Basic Message Security
					Message Optional	Message	Message (X.509)	WS-N SOAP with Message Security
					Message Optional	Message	Message (X.509 or SAML)	WS-N SOAP with Federated Security
AMQP	(a)R/R, P/S, FF	FF	Yes	+++	Transport	Transport	Transport (X.509 Server with SASL Client or X.509 mutual)	AMQP Messaging



SWIM Foundational Specifications



Embarking on a journey towards information services



Your SWIM requirements



Your journey



Which steps should I take?

Which enablers can I use?

Is my result fitting the bigger picture?

What do I have to do to implement SWIM?

- 3 scenarios

Scenario	Perspective	Purpose
Scenario 1: Using an existing digital on-line service.	Service Provider.	Qualify my existing digital on-line service as an information service.
Scenario 2: Providing a new digital on-line information service.	Service Provider.	Provide a new information service that is re-usable and fulfils an information need.
Scenario 3: Becoming an information service consumer.	Service Consumer.	Consume an information service that meets my information need.

Using an existing digital on-line service

Information service **provider**

Step #	Activity	Service	TI	Information
1	Collect information about the service.	x		
2	Collect applicable SWIM requirements.	x		
3	Check the interface protocols used to perform the service.		x	
4	Check the information provided by the service.			x
5	Complete the information service description/overview.	x		
6	Make the information service known to SWIM stakeholders.	x		

Providing a new digital on-line service

Information service **provider**

Step #	Activity	Service	TI	Information
1	Build a team with service orientation skills.	x	x	x
2	Collect the applicable SWIM requirements.	x	x	x
3	Document the overall service orientation process steps deemed viable to you.	x	x	x
4	Perform service orientation.	x	x	x
5	Complete the information service description/overview.	x		
6	Make the information service known to SWIM stakeholders.	x		

Becoming an information service consumer

Information service **consumer**

Step #	Activity	Service	TI	Information
1	Define the application requirements and information needs.	x	x	
2	Find information services.	x		
3	Assess the feasibility to consume the information service.	x		
4	Make implementation choices.	x	x	x
5	Adapt business processes.	x		
6	Participate in the SWIM stakeholder community.	x		

More information on SWIM

<https://reference.swim.aero>



The screenshot shows the SWIM Reference website. At the top is a navigation bar with links: HOME, WHAT IS SWIM, ESSENTIALS, KNOWLEDGE, RESOURCES, and FAQ. The main content area features a dark background with a glowing orange network of lines representing air traffic. A text box asks 'What is SWIM?' and states 'SWIM is the answer to achieving global interoperability and service orientation in air traffic management.' Below this is a 'Learn more' button. At the bottom, there's a 'Getting into SWIM' section with the purpose of the website. A footer contains four categories: What is SWIM, Essentials, Knowledge, and Resources, each with a brief description.

SWIM REFERENCE

HOME WHAT IS SWIM ESSENTIALS KNOWLEDGE RESOURCES FAQ

What is SWIM?

SWIM is the answer to achieving *global interoperability* and *service orientation* in air traffic management.

[Learn more](#)

Getting into SWIM

The purpose of this website is to help you understand the basics of SWIM. Go ahead and explore!

What is SWIM
A page to answer the big question. Enter here and dive in

Essentials
The essentials of SWIM constitute the key concepts which make SWIM possible.

Knowledge
A set of dedicated articles to clarify key topics.

Resources
SWIM-savvy experts will find useful materials in the resources area.





THANK YOU



PANEL DISCUSSION

PANELLISTS



Mr. Mark Libant

Manager, Flight & ATFM Services
NAV CANADA



Mr. Wayne Osse

Chief Architect, Global Aviation
and Transportation
Solace



Mr. David Leow

Head Air Traffic Management
Software Engineering
CAAS

AGENDA

- **Preamble**

- SWIM Foundation
 - SWIM Regulations (ICAO, ATMRPP,)
 - ICAO Asia Pacific SWIM Task Force
 - CANSO SWIM WG
- Wayne
 - Mark
 - David
 - Wayne
 - Mark, David, Wayne

SWIM CONCEPT

- **Global Interoperability**

- Information
- Information Services
- Technical Infrastructure
- Governance

SWIM CORE PRINCIPLES

- Separation of Information Provision and Consumption
- Loose Coupling
- Open Standards
- Interoperable Services
- Service Discovery

SWIM REGULATIONS

- **Regulations – Co-Chair: Mark Libant**
- **ICAO Panels**
 - Information Management (IMP)
 - Air Traffic Management Requirements and Performance Panel (ATMRPP)
- **Standardization Bodies**
 - RTCA
 - EUROCAE

IMP

- **IMP/2 meeting September 27th - October 1st**
 - Draft PANS-IM discussed
 - ANC Presentation March 2020
 - State Letter June 2022
 - Publication June-July 2023
 - Applicability November 2024

IMP

- Manual on System Wide Information Management (SWIM) Concept (Doc 10039)
 - Currently being reviewed by Secretariat
 - The original document available from ICAO

IMP

- **Future work (new proposed job cards)**
 - Information Services for Air/Ground SWIM
 - Information Security Framework
 - SWIM Governance enhancements
 - SWIM Service Registry Interoperability
 - Information Service Definition
 - Information Management Vocabulary
 - SWIM implementation support

ATMRPP

- The Manual on Flight and Flow – Information for a Collaborative Environment (FF-ICE) (Doc 9965) consists of two parts:
 - Volume I – FF-ICE Concept
 - Volume II – FF-ICE Implementation Guidance
 - Needs to be updated

ATMRPP

- **Information Services provide access to domain specific information (aeronautical, meteorological, flight, etc.)**
 - AIXM, FIXM, iWXXM
- **Information Services need to support FF-ICE and TBO**
 - Flight Planning Evaluation Service
 - GUFI & Flight Plan Association
 - Flight Plan Filing / Update / Cancellation
 - Route & Trajectory Information

ATMRPP

- **Inter Panel Task Force (IPTF)**
 - A multi-disciplinary task force including members and advisors of ATMRPP, CP, and IMP formed in April 2018
 - Reviewing Chapter 2 : Implementation Considerations
 - Investigate potential use of AMHS
 - Issue recommendation about communication infrastructure

RTCA & EUROCAE

- **RTCA**

- No particular group is dealing with the topic

- **EUROCAE**

- WG 104 deals directly with SWIM
- Already published a SWIM Service Specification for Extended Arrival Manager (ED-254)
- Currently finalizing SWIM Service Specification Template and Methodology (ED-294)
- Furthermore, they published report ER-018: SWIM Service Standardization Package

ICAO ASIA PACIFIC SWIM TASK FORCE

- Formed in May 2017
- Objective of the task force is SWIM implementation in the Asia-Pacific region
- Complex issue as the Asia-Pacific region is made up of many states, each with their own needs and constraints
- Important Concepts
 - Operational use cases drive the development of SWIM and help provide justification for SWIM implementation
 - Adopt a bottom-up approach for SWIM implementation
 - Multiple interconnected Service Registries
 - Cyber security across the regional implementation of SWIM
 - Bilateral / Multilateral data sharing agreements

ICAO ASIA PACIFIC SWIM TASK FORCE

- **Current Co Chairs**

- Dr Amornrat Jirattigalachote (Thailand)
- Ms Kristin Cropf (USA)

- **Task Groups**

- Implementation Planning
- SWIM Infrastructure
- Technical Architecture
- Governance
- Information Services
- Validation and Demonstration
- Coordination and Promotion

ICAO ASIA PACIFIC SWIM TASK FORCE

- 5th meeting of the Task Force was held in August 2021
- Several interesting developments
 - Japan, Thailand and USA presented a technical implementation of SWIM security using Public Key Infrastructure
 - Work done to extend the FIXM 4.2 data model to include the ATFM data fields needed by the region
 - SWIM Discovery Service was presented as a way for registries to exchange information
 - SWIM Interoperability Assessment Matrix (SIAM) was presented as a way to help with requirements articulation and support planning and validation of SWIM components
 - Proposal for an APAC version of Service Overview. An extension of the one described in the ICAO SWIM Manual (Doc 10039)

CANSO OSC SWIM WORKGROUP

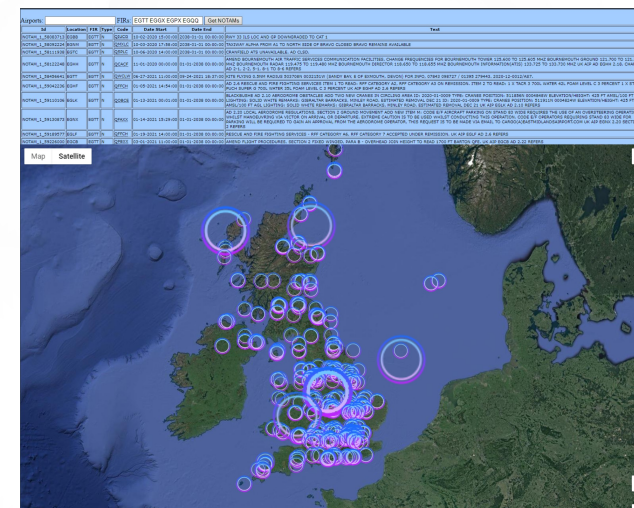
***Acting as the CANSO Focal Point for all SWIM matters,
the CANSO SWIM WG will support members to
achieve successful SWIM implementation***



***50+ Members
20+ ANSPs, 10+
Industry***

The SWIM Kit

- Get ANSPs started with SWIM quickly
- Compact guidance for minimal SWIM
- Tools to explore use cases (SWIM Sandbox)
- Demos: NOTAM Search/Updates, Tracking



REQUIREMENTS FOR SUCCESSFUL SWIM

- Are ICAO SWIM regulations very prescriptive?
- How did you justify your SWIM project?
- What do you mean by a Bottom-Up approach?
- Is automating manual processes a good use case for SWIM?
- Is a QMS required?
- Data collection requirements are by information domain?

REQUIREMENTS FOR SUCCESSFUL SWIM

- How do you separate information service providers & consumers?
- Are bandwidth requirements a concern with the XMs?
- What service bindings do you use for interoperability?
- Is a service registry required?
- How do cybersecurity requirements impact SWIM efforts?
- Are there tools to help refine SWIM use cases & requirements?

CONCEPT AND CORE PRINCIPLES

- **Information**

- Do XMs require additional fields globally, regionally, locally?
- Do you only use AIXM, FIXM or iWXXM?
- Can JSON and protocol buffers be used instead of XML format?

- **Information Services**

- Do you modify applications or create new services?
- Who interprets information payloads in SWIM?

CONCEPT AND CORE PRINCIPLES

- **Information Service Providers**
 - What metadata is involved in this role?
- **Information Service Consumers**
 - They want “clean” information, where is this done?
- **SWIM TI**
 - Can Information distribution occur without a central SWIM Node?
 - Information filtering
 - Cybersecurity

BENEFITS OF SWIM - EXPECTED

- Do you see improved safety?
- Do you add information providers & consumers more efficiently?
- Are you able to identify and take advantage of new opportunities more easily?
- Is ongoing development simpler, faster or less costly?
- Is information delivery more timely?
- Can you deliver new services faster?

BENEFITS OF SWIM - EXPECTED

- Are new collaboration opportunities created?
- Are flight delays reduced?
- Can a SWIM notification of a flight delay prevent further delays for that same flight?
 - Notice of arrival delays for oceanic flights and possible role of ADS-B

BENEFITS OF SWIM - UNEXPECTED

- Do you see higher reliability or scalability?
- Are any of the following benefits?
 - Leveraging cloud infrastructure when appropriate
 - Creating actionable knowledge by more easily delivering information to analytics, predictive models, risk and audit systems
- Are there unexpected sustainability benefits?
 - Infrastructure consolidation



THANK YOU





Mr. Raoul Bester

Aeronautical Information Specialist

ATNS

Summary of outcomes and Recommendations

ICAO Information Management Panel – PANS-IM (Mr. Kevin Haggerty)

- Recent IMP/2 held 26 September – 2 October 2021 presented latest version of the draft PANS-IM with this version focused on SWIM.
- Most of the approved edits provided consistency within the PANS-IM or clarified based upon ICAO style and agreed to initiate the coordination process for the publication of the draft PANS-IM as amended by the meeting.
- Proposed information security framework was also presented – with some concerns raised on audience as well as responsibility and applicability and cost of the proposed information security framework.
- Other aspects addressed during the IMP included:
 - Aircraft with folding wing tips
 - Competency based training methodology
 - SWIM Implementation manual

Summary of outcomes and Recommendations

Eurocontrol SWIM Activities (Mr. Dennis Hart)

- Outlines the journey towards information services
- Provides overview of information requirements including technical infrastructure requirements (interoperability of ATM systems – Nationally/Regionally/Globally)
- Overview of SWIM deployment within Europe
 - SWIM Service Description
 - SWIM Information Definition and
 - SWIM Technical Infrastructure
- Detailed description of SWIM implementation steps (information provider and consumer)
- **Need to move towards adoption of SWIM Specifications**
- **IP based network required to enable SWIM**
- **Flexibility of ICAO provisions – “one size does not fit all”**

Summary of outcomes and Recommendations

Panel discussion

- SWIM Concept – (Information, Information Services, Technical Infrastructure and Governance)
- SWIM Core principles – SOA, Separation of Information provision and Consumption, Loose Coupling, open standards, interoperability and service discovery)
- Complexity of different requirements per State, per Region – requires collaboration and harmonisation between all role players.
- Multiple interconnected service registries – cyber security concerns becomes more prevalent.
- Technical aspects easy to solve – needs agreements (Bi-lateral, Multilateral, etc)
- CANSO SWIM WG – SWIM KiT – mobilising ANSPs quickly.
- Shall vs Should? How to achieve global interoperability.



THANK YOU

