

PANS-IM

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PROPOSED VERSION OF PANS-IM

Procedures for
Air Navigation Services

Information Management

System Wide Information Management

Version: 2023

Main Take-away

- SWIM provisions are not mandatory
- PANS-IM provides a framework for information domain that sees the benefit of sharing information applying service orientation like AIM





General definitions

System-wide information management (SWIM).


Standards, infrastructure and governance enabling the management of ATM-related information and its exchange between qualified parties via interoperable information services.

Interoperability. The ability of information and communication technology (ICT) systems, and of the business processes they support, to exchange data and to enable the sharing of information and knowledge.

Service-oriented architecture. Architectural style that supports the designing of systems in terms of services and service-based development.

Governance. The set of bodies, standards, policies and processes that ensure globally interoperable information is provided by reliable and trusted services.

Technical infrastructure. The assembly of software and hardware used to enable the provision of information services.



Definitions related to Information


Data. A representation of facts, concepts or instructions in a formalized manner suitable for communication, interpretation or processing.

Information. The result of the assembly, analysis, formatting and documenting of data, to make the data useful in an ATM context.

Information domain. The scope of the integrated data for a distinct set of business activities that produce a set of unique information products and services.

Information exchange model. A formal description of the information that is agreed to be shared between two or more organizations or groups and includes at least one exchange schema for the associated data.

Reference model. An abstract framework for understanding significant relationships among the entities of information domains.



Definitions
related to
Services

Information service. A type of service in a service-oriented architecture that provides an ATM-related information-sharing capability.

Information service payload. The assembly of information exchanged using an information service.

Information service overview. A set of information service metadata intended to promote information service discovery and an initial evaluation of the information service characteristics.



Technical Definitions

Message. A discrete unit of communication intended by the source for consumption by a given recipient or group of recipients.

Exchange schema. Formal description of the data involved in an information exchange, including, in particular, the encodings and other applicable constraints.

System-wide information management (SWIM) registry. A directory containing entries with the information (metadata) necessary to discover and access information services.

Metadata. Information about a resource.

Interface binding. Specification of the protocols and data formats to be used in transmitting messages defined by the associated interface.

General

- **6 principles to support interoperability**
 - Use of interoperable information services
 - Separation of information provision and information consumption
 - Loose coupling
 - Discoverability
 - Use of Open Standards
 - Secure information exchanges



PANS-IM / General

- System-wide information management is essential for the digital transformation of air traffic management. The collection and processing of data within each information domain should result in information that can be exchanged and used for supporting ATM decision-making. Information management includes the following activities:
 - collection
 - processing
 - exchange of data and information
- The information management activities shall be performed in a quality-controlled manner
- The exchange of information shall be performed through information services which are a type of service in a service-oriented architecture that provides an ATM information-sharing capability.
- To support global interoperability, system-wide information management shall be based on six principles: separation of information provision and information consumption, loose coupling, discoverability, use of open standards, secure information exchange
- The quality of the information shall comply with the requirements of the particular information domain(s) and be ensured through an implemented and maintained quality management system (QMS).
- Information service providers shall implement and maintain a QMS to establish the necessary assurance and confidence for providing the required information service quality. The quality of the information service should be based on the requirements of the particular information domain(s).



Governance

- Key to ensuring SWIM is established in accordance with an appropriate implementation framework
- Request States to establish governance bodies, standards, policies and processes

PANS-IM / Governance

- Governance supports the six global interoperability principles and should be addressed through the establishment of an implementation framework
- Where system-wide information management is planned for implementation, States shall ensure that an appropriate implementation framework is established at the national level and/or within a SWIM region
- States shall ensure adherence to the implementation framework for the provision of information under their responsibility
- The implementation framework should include:
 - a) defining roles, responsibilities and accountabilities of the various system-wide information management stakeholders including, but not limited to, originator, information service provider, information service consumer and regulator
 - b) identifying, if necessary, the appropriate governance bodies responsible for coordinating the implementation within a State or region
 - c) identifying and documenting the relevant standards and any additional standardization requirements
 - d) developing and maintaining policies, processes and guidance in support of system-wide information management implementation

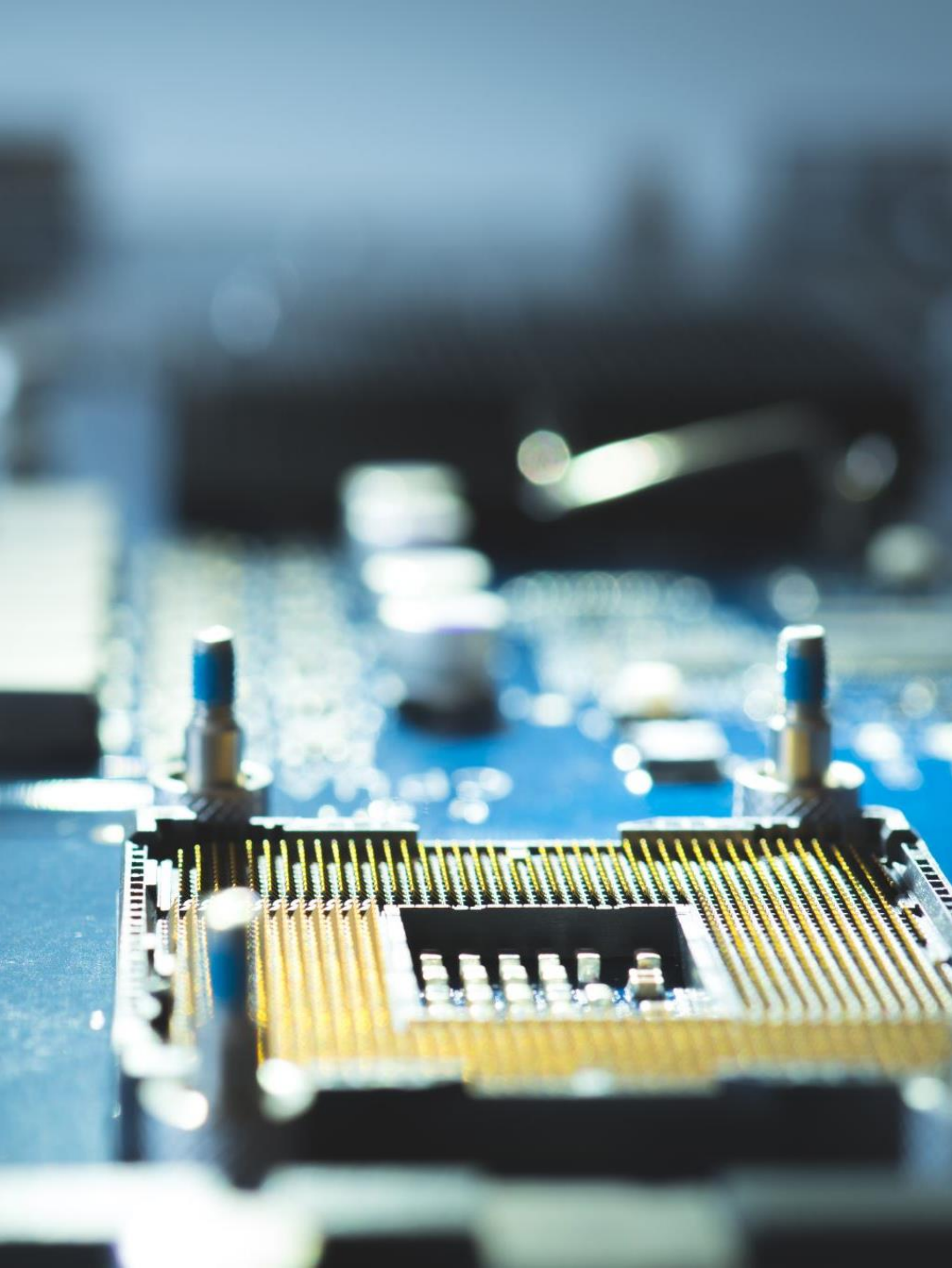
Information

- Introduces the Aeronautical Information Reference Model (AIRM) as the means to ensure a common understanding of the information across the various information domains (Semantic interoperability)
- Includes recommendations regarding use of exchange models or at least standardized exchange schema for information domain (e.g. AIXM for AIS/AIM) to support syntactic interoperability.



PANS-IM / Information

- Information service providers should determine how to meet the information exchange requirements by considering the intended uses of the information in the information service payload
- Information service providers and consumers should have a common understanding of the meaning of the information in an information service payload
- Information service providers and consumers shall have a common understanding of the exchange schema used for the data in an information service payload
- Information service providers should use the domain-specific information exchange models and their business rules for their information service payloads. If the domain-specific information exchange models do not support the information exchange requirements, then information service providers should request a change to the domain-specific information exchange models
- If information service providers do not use the domain-specific information exchange models for their information service payloads, they should align the definition of the information in the information service payloads with a global reference model. In this case, information service providers shall use a standardized exchange schema for the information service payloads
- Information service providers shall provide metadata that describes both the information service payload and the information service that delivers the information
- Metadata on information should be collected when performing information management activities based on the requirements of the particular information domain(s)



Information services

- Means to exchange information
- Are to be publicized to allow information service consumer to select the one that best meet their needs
- Information services are described using service overview
- SWIM service registry is the recommended method to advertise information services

PANS-IM / Services – Part 1

- Information service providers shall publicize the information services that they provide.
- Information service consumers should assess the fitness for purpose of an information service using information service metadata
- Information service providers shall provide information service metadata through information service overviews.
- Information service overviews shall be structured using metadata fields. This practice facilitates discoverability of information services and enables information service consumers to compare different information services.
- Information service providers shall provide a complete description of all metadata fields in the information service overview for each version of an information service.

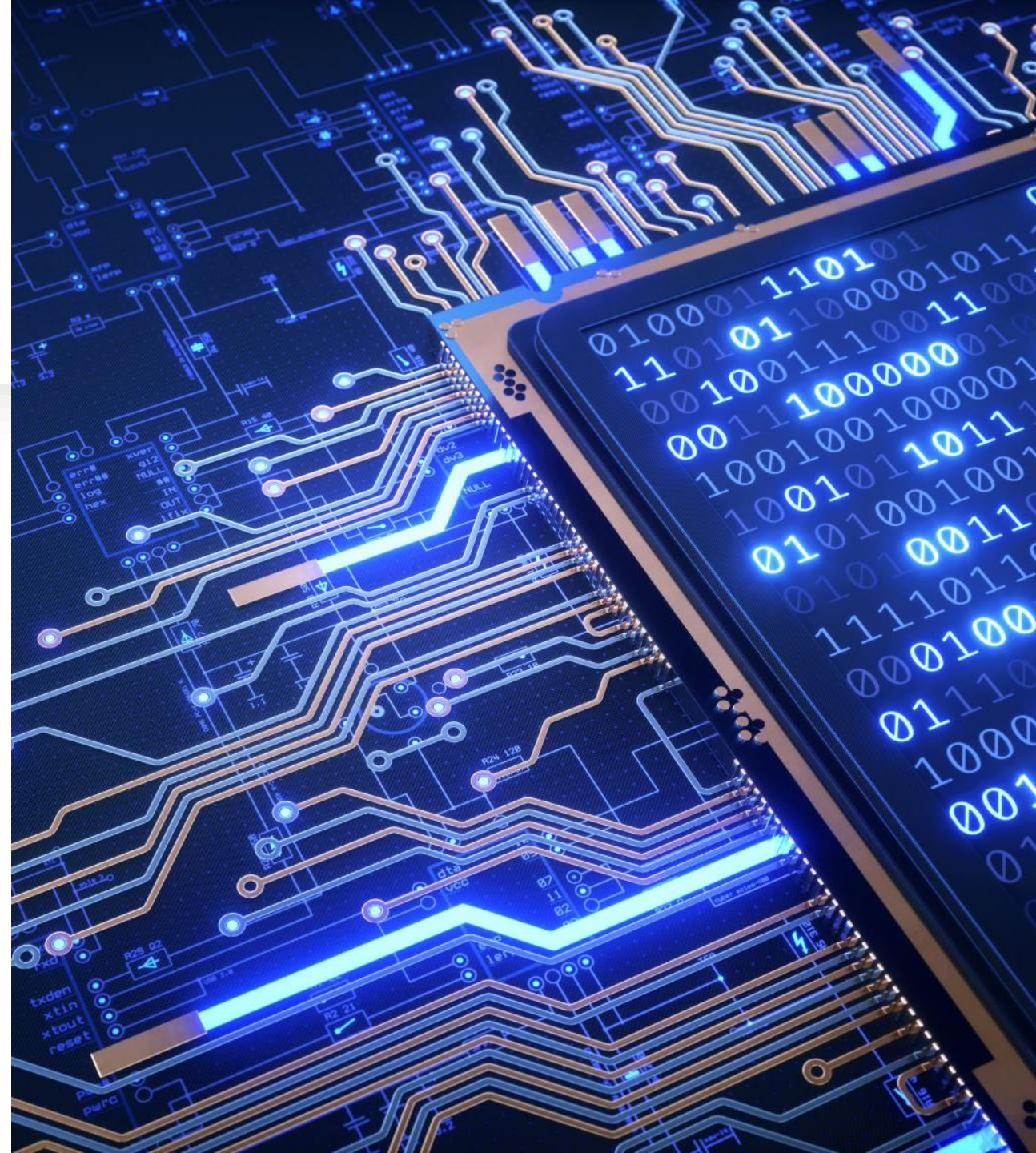
METADATA FIELDS
Information service name
Information service version
Information service life cycle status
Information service life cycle date
Information service functions
Information category
Brief description of the information service
Additional information on the information service
Quality of the service
Information service validation type
Information service validation description
Filtering available
Access restrictions
Message exchange patterns
Information exchange models
Geographical extent of information
Source of information
Information security category
Provider organization
Support availability
Provider point of contact

PANS-IM / Services – Part 2

- Information service providers shall inform consumers where they can access the information service overviews and the metadata on information services therein.
- The uniform resource locator (URL) where information service overviews are publicized shall be included in the AIP. In case a SWIM registry is used, the URL shall be the one of the registry.
- SWIM registries should be used by:
 - information service providers as a means to publicize available information services
 - information service consumers as a means to discover information services
- When a SWIM registry is used:
 - it shall make information service overviews available
 - it shall provide access control for the registration of information service overviews
 - it shall provide search functionalities on information service overviews and their fields
 - it should provide notification functionalities on changes to information service overviews and their fields
 - it should be made publicly available

Technical infrastructure

- Internet Protocol is the required technology
- It is recommended to rely on interface bindings to consolidate the technologies to be used and facilitate the dialog between provider and consumers of information services



PANS-IM / Technical Infrastructure – Part 1

- Information services shall be provided and consumed using a technical infrastructure based on the Internet Protocol Suite (IPS)
- Information services use interface bindings to interact with the technical infrastructure
- Interface bindings shall be based on standardized and widely used and supported protocols
- In order to ensure interoperability, if information service providers and consumers are using different protocols, both parties shall ensure that lossless mediation between protocols has been established.
- Information service providers should manage interface bindings to consolidate the potentially large number of technologies that could be used for implementing interfaces between systems and to maintain flexibility in relation to the opportunities of emerging potential technologies.
- Information services should use defined interface bindings

PANS-IM / Technical Infrastructure - Part 2

- System-wide information management stakeholders processing, storing, consuming or transferring information shall implement an information security framework, designed to ensure the confidentiality (when needed), integrity and availability of the information and information services.
- The information security framework shall apply to the IPS-based network, the technical infrastructure, the information, the information service and the applications that process, use or distribute information in an integrated manner.
- Information service providers shall classify information according to defined information security categories to ensure a mutual understanding of the level of protection of the information exchanged.
- System-wide information management stakeholders should implement information security requirements commensurate with the information security category
- Information service consumers shall assess the impact of the loss of confidentiality, integrity and availability of the information on safety to determine the information security category required for the operational use of the information

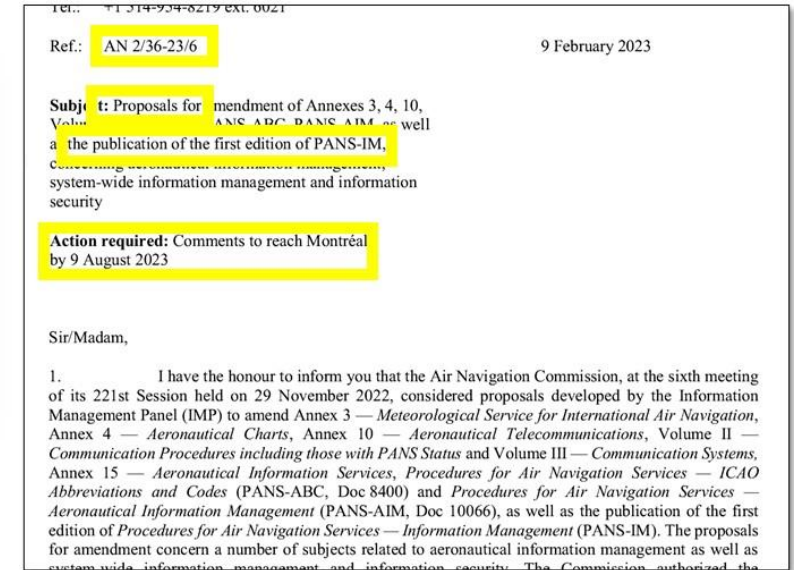
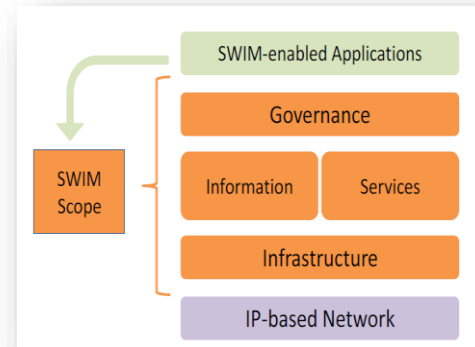
PANS-IM STATUS

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- Definitions
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- Technical infrastructure

- Latest steps carried out

- Inter-panel coordination
- ICAO (Secretariat + ANC) review
- State Letter
- Final approval and publication



Soon to be
published..

