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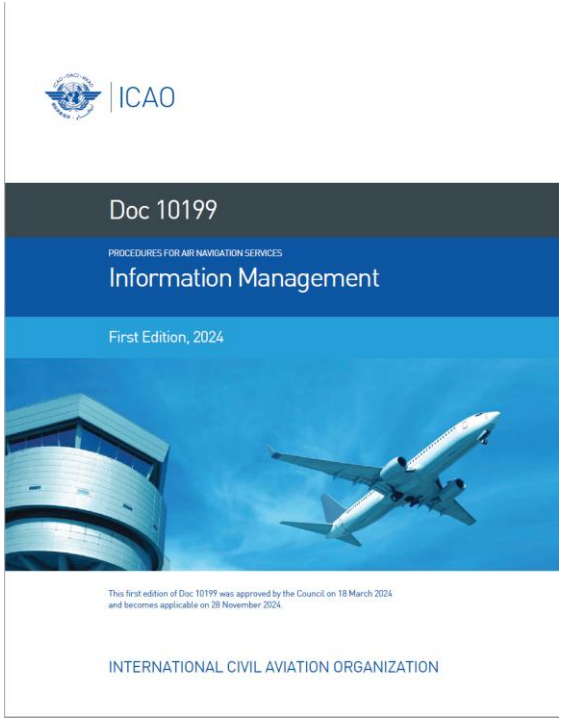


Chapter 1 — Definitions

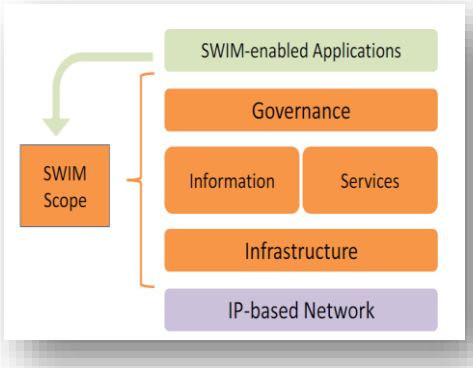
Chapter 2 — General

Chapter 3 — **Governance**

Chapter 4 — **Information**

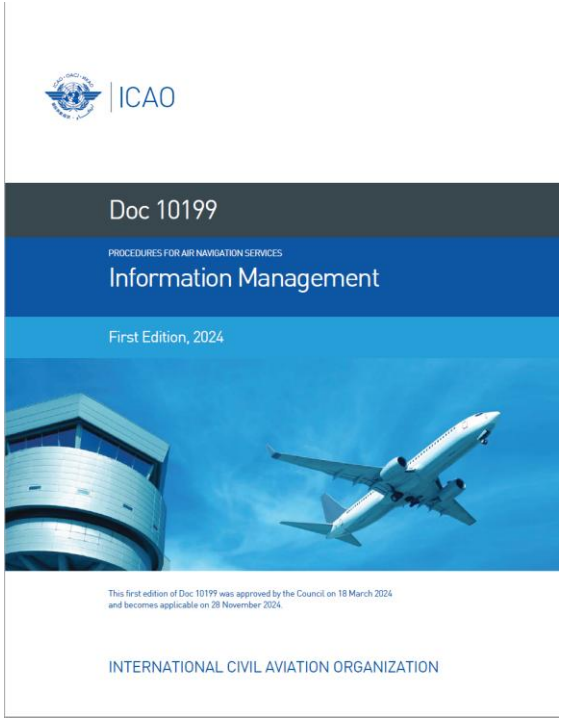
Chapter 5 – **Information Services**

Chapter 6 — Technical infrastructure




Rules
Governance
Mission
Ethics
Decisions
Committees

PANS-IM



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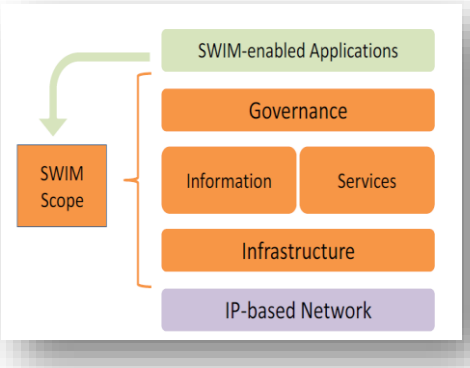


Governance

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

Why SWIM Governance

- SWIM is never “finished” but evolves along with the aviation business. Continuous evolution of the common rules and principles is therefore the key to an effective implementation of SWIM.

- This concern is addressed by **SWIM Governance**, which is the organizational framework for collective maintenance of the overall evolution of the SWIM strategy, rules, principles and processes.

Why SWIM Governance (2)

- Practically, SWIM Governance is an organised federation of SWIM Stakeholders, established to build trust in the SWIM information services

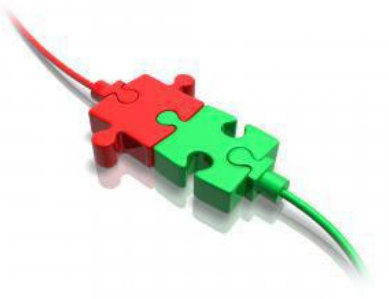
- SWIM Governance aims to establish a collaborative approach within the ATM Community for steering the evolution of SWIM

- SWIM Governance promotes agility, proportionality and strives to have a positive impact on SWIM implementation, with a focus on service provision

SWIM GOVERNANCE DRIVERS

KEY CONSIDERATIONS

Innovation



Connecting ops systems

MAIN GOVERNANCE ACTIVITIES

GOVERNANCE HIGHLIGHTS

- **Main governance framework**
  - Common language and understanding, transparency
  - Clarification on SWIM stakeholders
  - Consistent set of principles, rules, processes and structure for SWIM implementation

- **Communication**
  - A strong voice about SWIM in the ATM context
  - Better awareness and visibility of the SWIM topic in each organization

- **Collaborative work**
  - Stakeholder collaboration on a challenging topic
  - Accommodating stakeholder's diversity

Example : European SWIM Governance activities

- SWIM policies : lay down a set of principles, in the form of 'Policy Statements' related to SWIM, *e.g. the SWIM Service Provisioning Policy contains statements for SWIM Service Providers in order to provide services that are conformant with a minimum set of pre-defined quality criteria*

- SWIM service definitions : SWIM service definitions are provider-independent descriptions of a service that describes the agreed commonalities between services with similar purpose and information content, with the objective to strive for an alignment of the corresponding service designs.

- SWIM guidance material : all supporting material on SWIM

- Connecting to standardisation for aspects related to SWIM : acting on SWIM standards related issues, comments, questions or evolution requests

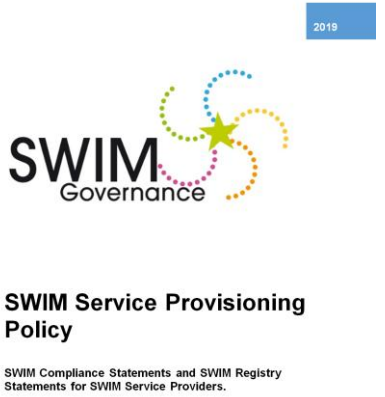
- Managing user requirements related to the SWIM Service Registry : compiling user requirements that are specific for SWIM Governance and should be fulfilled by the SWIM Registry

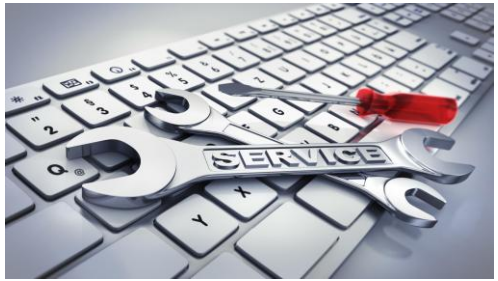
- Mediating about provision and use of SWIM Services : arbitration on non-adherence of specific services to SWIM Policies between SWIM Service Provider(s) and Consumer(s)

- Decision-making on SWIM governance related aspects : decision-making scheme for governance aspect *(eg organizational or financial aspects)*

AN EXAMPLE : SERVICE PROVISIONNING POLICY

- Object
  - Policy statements applicable to service providers
  - Define what is expected wrt the provision of SWIM Services in the scope of SWIM Governance
- Contents
  - **Service registration -** Enabling providers to publish their services in the SWIM Registry.
  - **Service compliance assessment -** Enabling providers to demonstrate the conformance of their services to SWIM compliance criteria.
  - **Alignment of Service Designs -** Enabling providers of similar SWIM Services to align their service designs.





Another example : SWIM Communities of Interest (CoI)

- Support the implementation and manage the evolutions of Specifications

- CoI participants: international members

SWIM **S**ervice **Co**mmu**n**ity of Int**e**rest
SWIM **I**nforma**t**ion **Com**munity

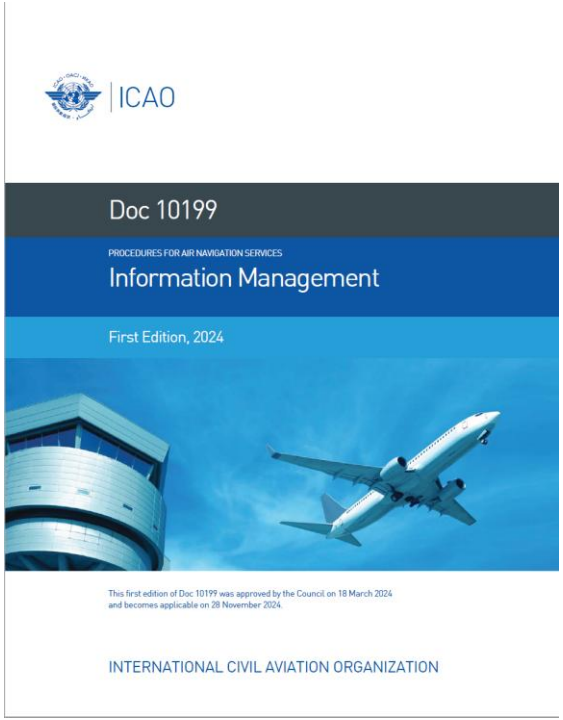
SWIM-TEC

https://ext.eurocontrol.int/swim_confluence/display/SCOI/SWIM+Community+of+Interest

INFORMATION

Modeling – Information eXchange Models - AIRM

PANS-IM



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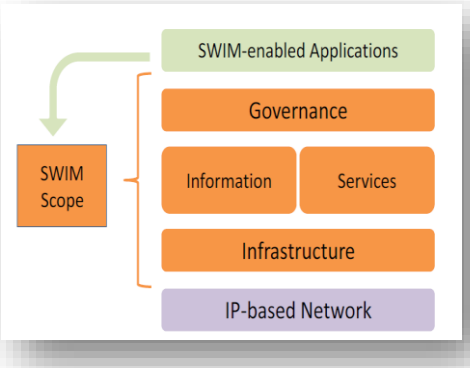
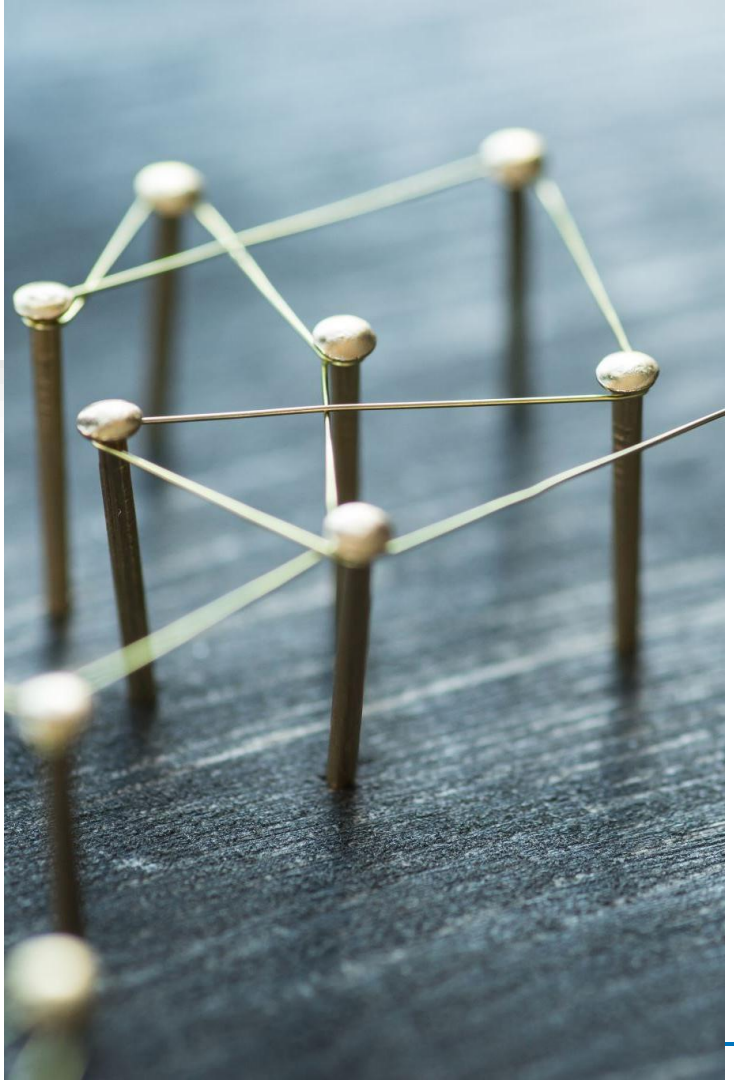


Information

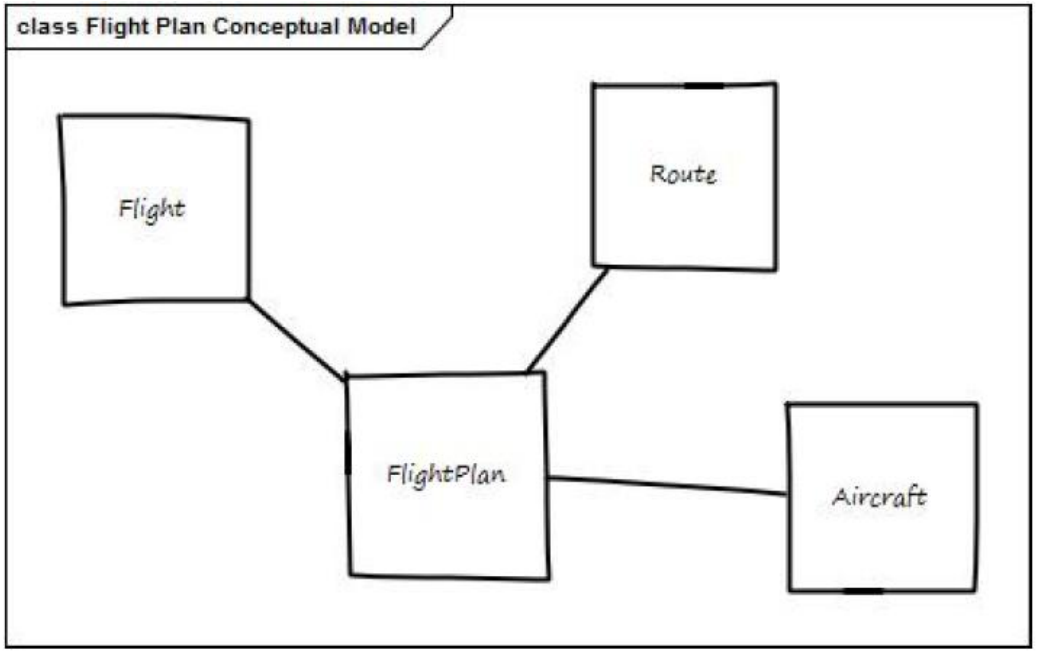
- Introduces the **Aeronautical Information Reference Model (AIRM)** as the means to ensure a common understanding of the information across the various information domains (Semantic interoperability)
- Includes recommendations regarding **use of exchange models** or at least standardized exchange schema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

Information Modeling

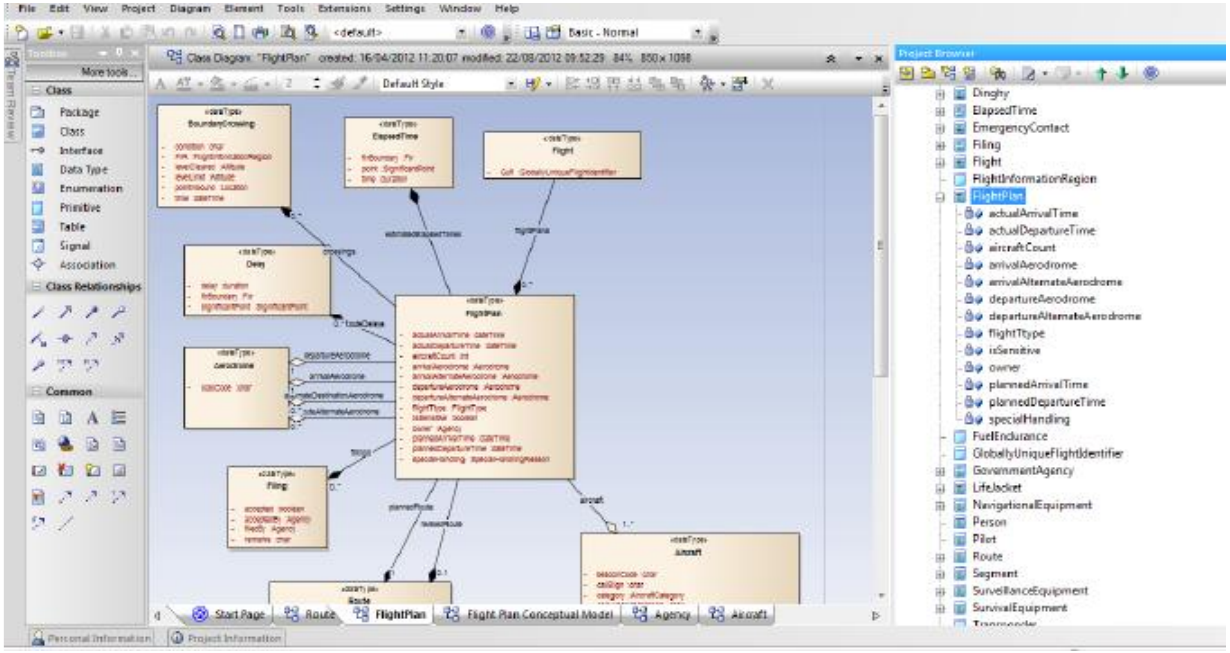
- Three Modeling Perspectives
  - Conceptual Model
    - Platform independent
  - Logical Model
    - Platform specific
  - Physical Model
    - Implementation specific



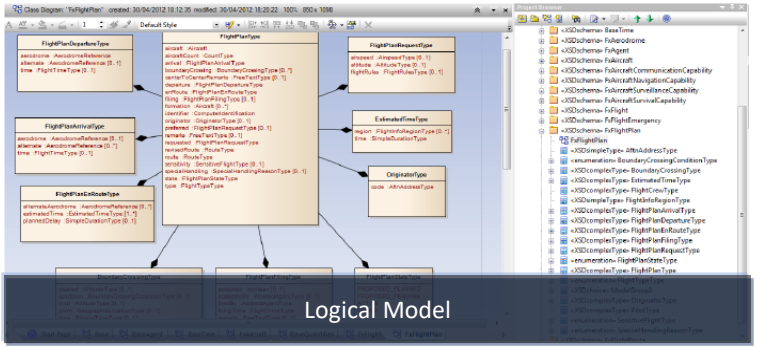
Modeling example (flight plan)



Modeling example (flight plan) - 2



Logical and Physical models



Logical Model

```
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        <xsd:appinfo source="fx:implements">Flight Plan Remarks</xsd:appinfo>
        <xsd:appinfo source="fx:implements">Route</xsd:appinfo>
        <xsd:appinfo source="fx:implements">Route - Revised Destination</xsd:appinfo>
        <xsd:appinfo source="fx:implements">Center to Center External Remarks</xsd:appinfo>
        <xsd:appinfo source="fx:implements">Flight Plan Originator</xsd:appinfo>
        <xsd:appinfo source="fx:implements">Flight Type</xsd:appinfo>
        <xsd:appinfo source="fx:implements">Special Handling Reason</xsd:appinfo>
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    </xsd:annotation>
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            <xsd:sequence>
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                <xsd:element name="formation" type="fx:AircraftType" minOccurs="0" maxOccurs="unbounded"/>
                <xsd:element name="originator" type="fx:OriginatorType" minOccurs="0" maxOccurs="1"/>
                <xsd:element name="remarks" type="base:FreeTextType" minOccurs="0" maxOccurs="1" nillable="true"/>
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```

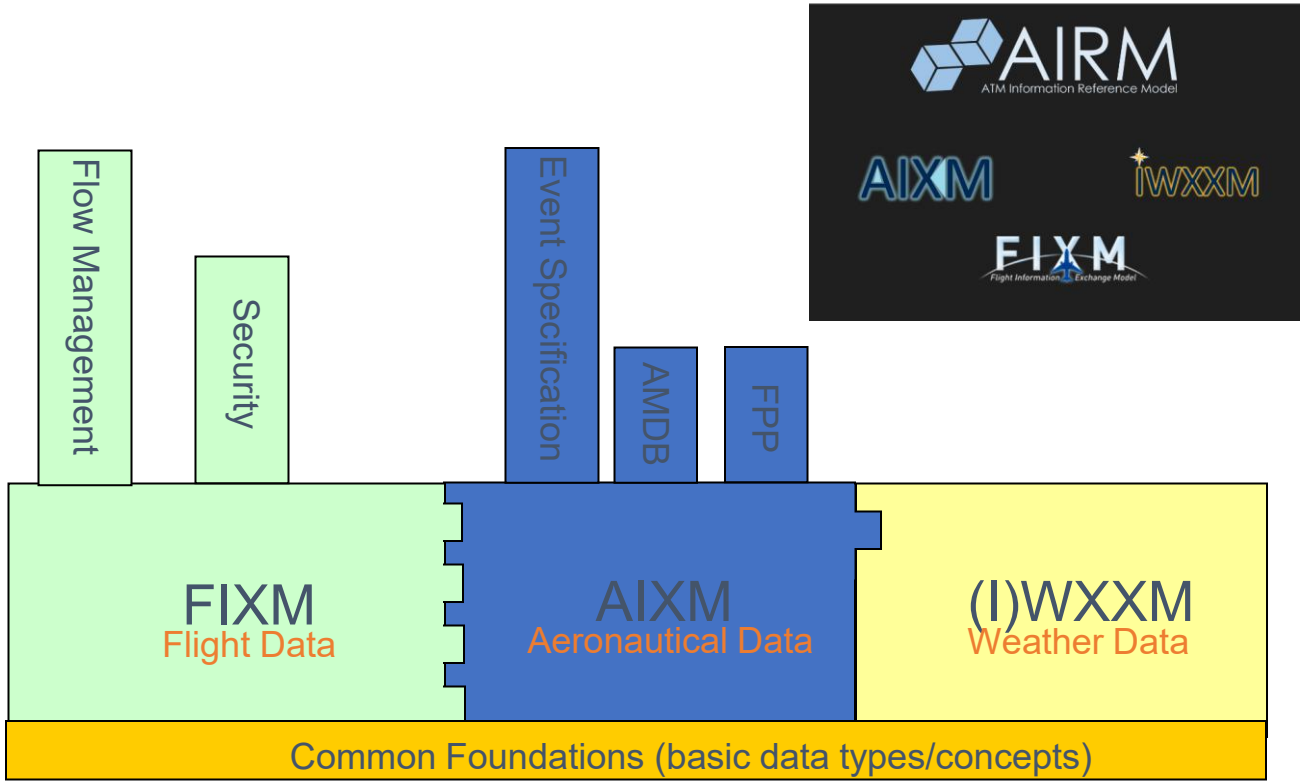
Physical Model

Aeronautical Data Exchange

Role of data models

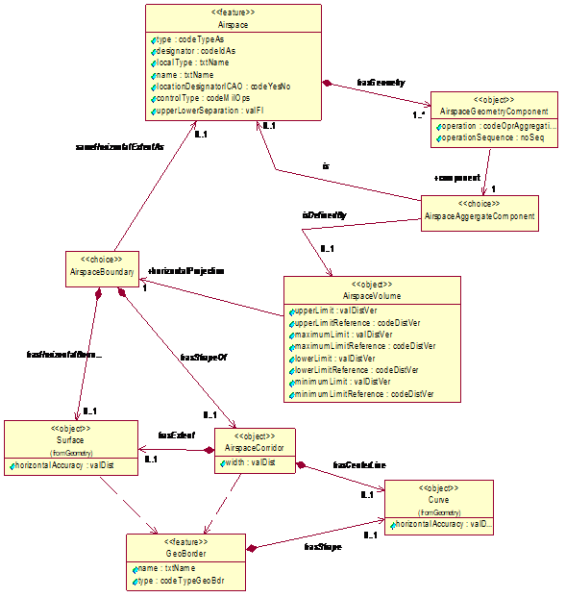
- To represent real world concepts as a theoretical construct which can be represented and understood by automated systems
- To standardize the conceptual understanding of aeronautical data by all actors - “speak the same language"
- To provide a basis for logical data structures used during the software implementation
- To provide basis for formal ‘contracts’ between interoperable systems – example: “use the same format"

The three main Information eXchange Model

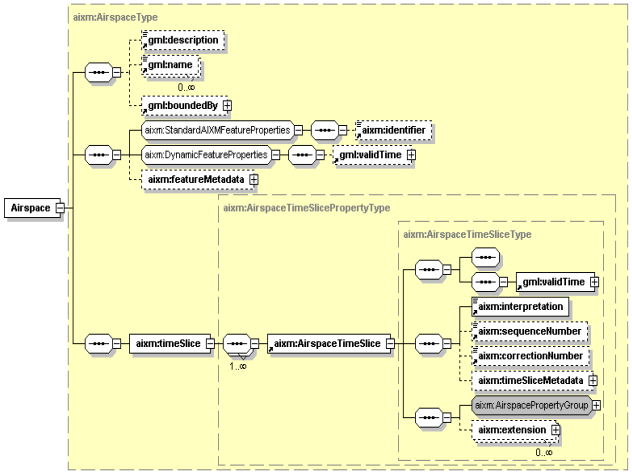


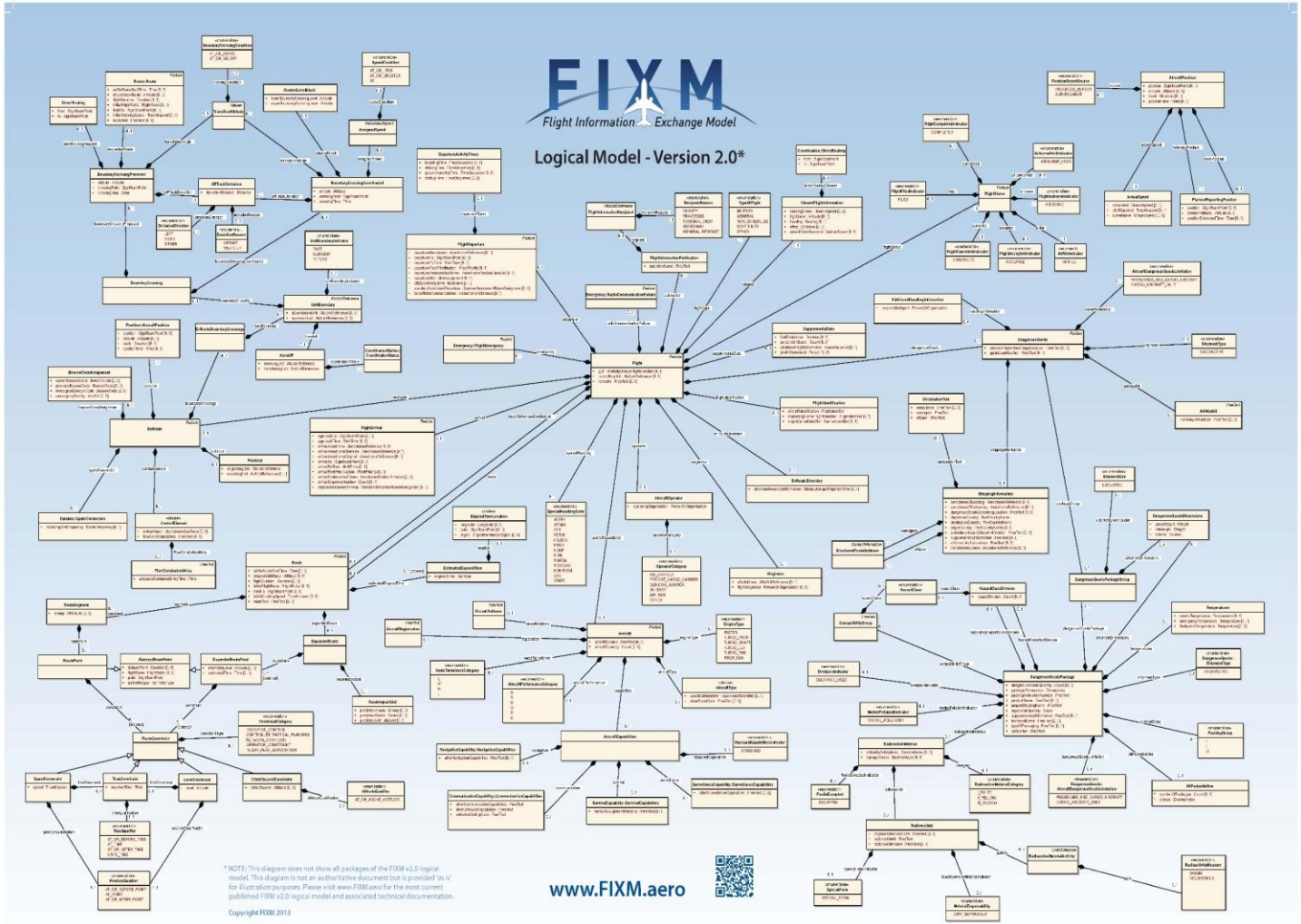
AIXM components

Conceptual (content) Model



Exchange format specification




FIXM
Flight Information Exchange Model
Logical Model - Version 2.0*
* NOTE: This diagram does not show all packages of the FIXM v2.0 logical model. This diagram is not an authoritative document but is provided 'as is' for illustration purposes. Please visit www.FIXM.aero for the most current published FIXM v2.0 logical model and associated technical documentation.
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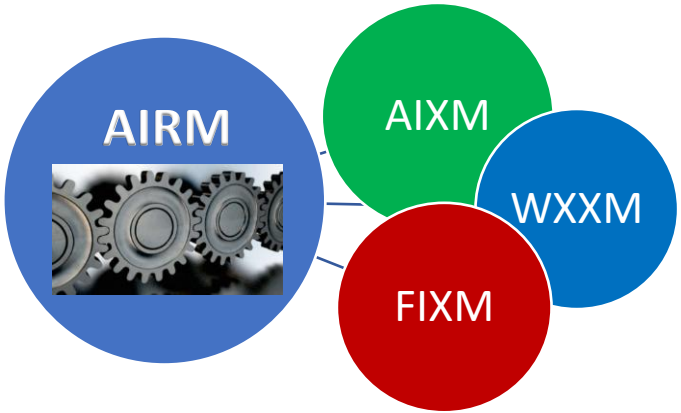


ATM Information Reference Model (AIRM)
https://airm.aero/

What is the AIRM

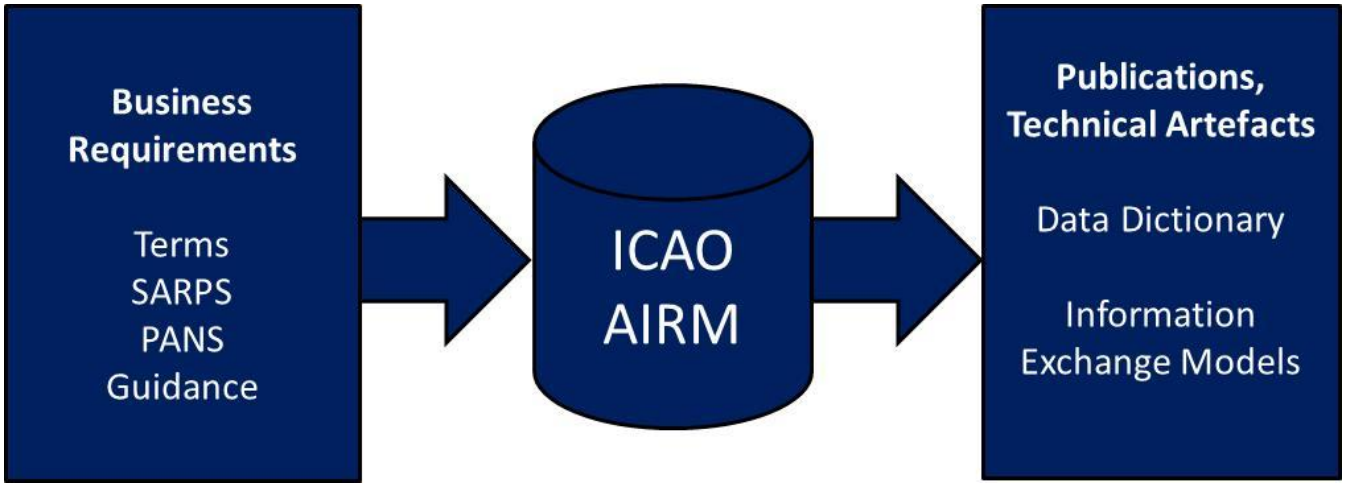
- The System Wide Information Management (SWIM) concept describes a seamless and networked ATM community, enabling **data exchange between information providers and consumers** over interoperable ATM Services
- The information is provided by a large number of different participants and is made available to a wide range of ATM information consumers. Therefore, the information needs to be clearly and uniquely defined and well understood. In other words, there is a need for **semantic interoperability**.

What is the AIRM (2)

The AIRM information constructs can be used, for example:

- To define the information that is exchanged between providers and consumers (e.g. in process models);
- To define and manage domain models;
- As the reference for the definition of the payload of a shared ATM Service.

ICAO AIRM, Inputs and Potential Uses



ATM Information Reference Model

AIRM

- AIRM is **not**
  - × A database
  - × An application
  - × An exchange model

- **AIRM is**
  - \+ Reference material (say building blocks) for all these
  - \+ Based on ICAO SARPs

The ICAO AIRM is intended to support the semantic interoperability aspects of SWIM

A structured, traceable, unified, harmonized, common, digital representation based on standard modelling notation

The ICAO ATM Information Reference Model (ICAO AIRM)

UML class model comprised of ATM-specific terms, definitions, and essential associations, that serve as the common ICAO reference

What are the benefits of the AIRM

The main benefit of the AIRM is ensuring semantic interoperability within ATM.

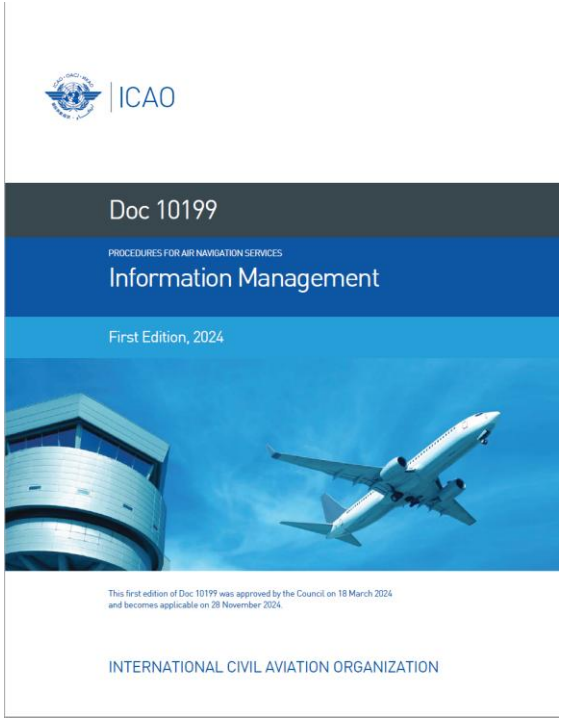
It ensures that the meaning of information is not lost or altered as it travels through SWIM.

The AIRM, through its foundation, also promotes ATM information standardisation at the global level.

Relation with Information Exchange Models

- AIRM
  - **generic** as it is not bound to a solution
  - **reference** for the XMs and information services
  - **tool** for ensuring collaborative, semantic alignment
- eXchange Models
  - enable the management and distribution of digital data sets
  - SWIM: enable the management and implementation of information services
  - needed for implementation work

PANS-IM



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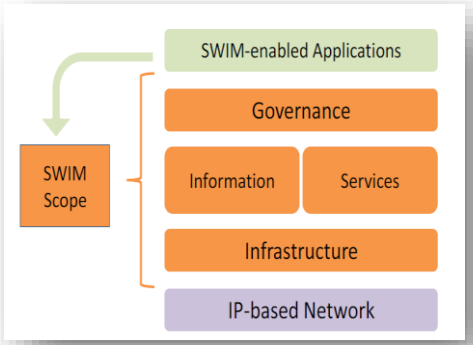
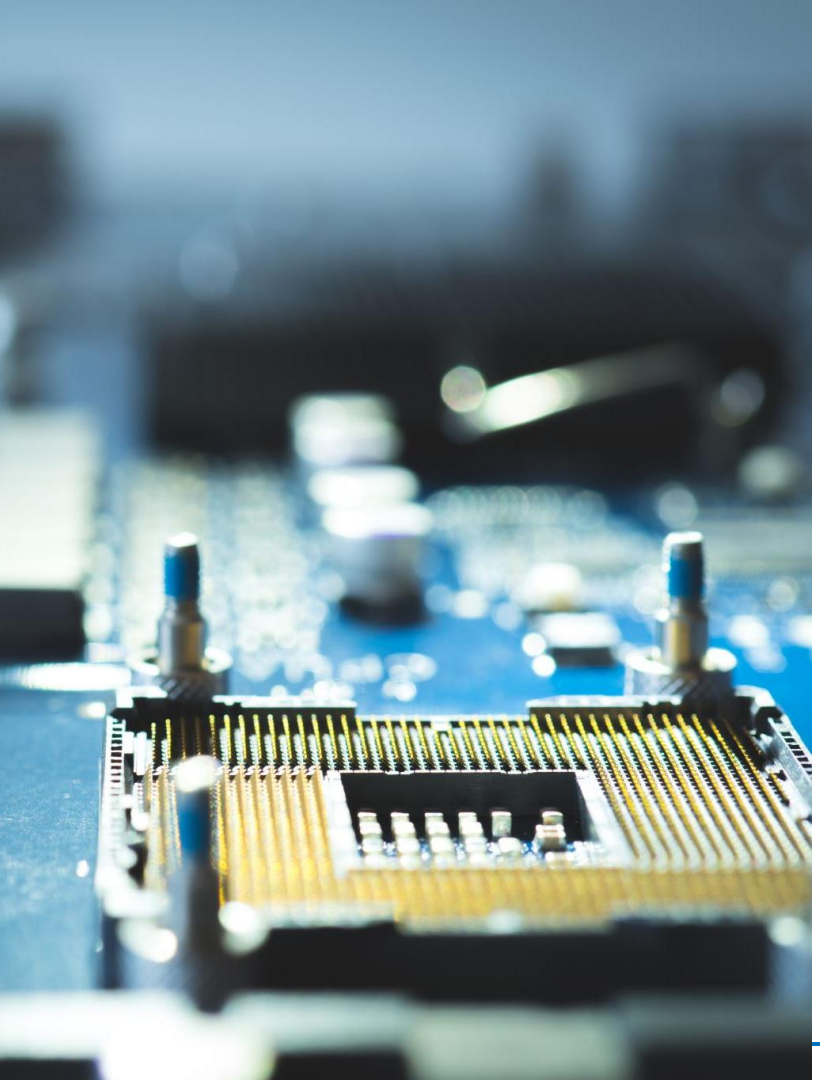




Information services

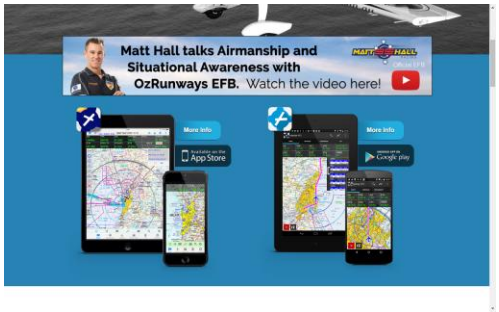
- Means to exchange information
- Information services are described using service overview
- Are to be publicized to allow information service consumer to select the one that best meet their needs
- SWIM service registry is the recommended method to advertise information services

What is an Information Service?

- Information services provide an ATM-related information-sharing capability
  - *Example information services: Aeronautical Information Publication, Flight Data Information Publication, Observed Meteorological Information Publication, etc.*
- Information Service Registries help publicize information about available services (discoverability)
  - *Description of service (service overview): source, data available, exchange protocols, etc.*

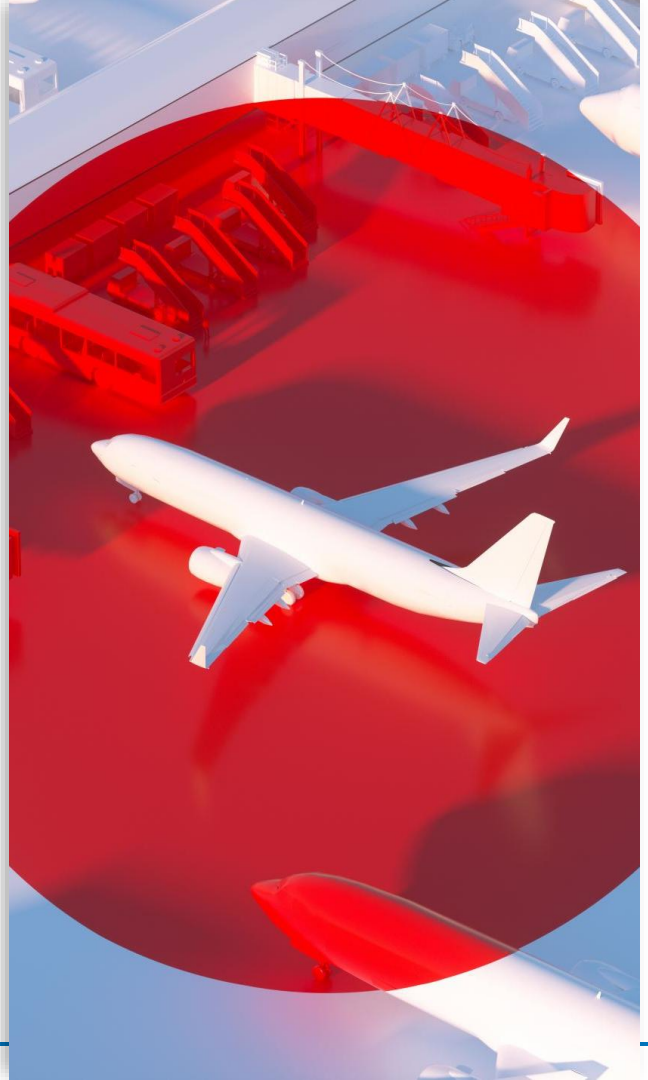
Information services outside ATM

- Internet technologies are already in use for other airline related information needs:
  1. Booking and passenger details (e-ticketing).
  2. Cargo planning and Flight information of interest to Airport and vendors
  3. Electronic Flight Bags with a multitude of services.



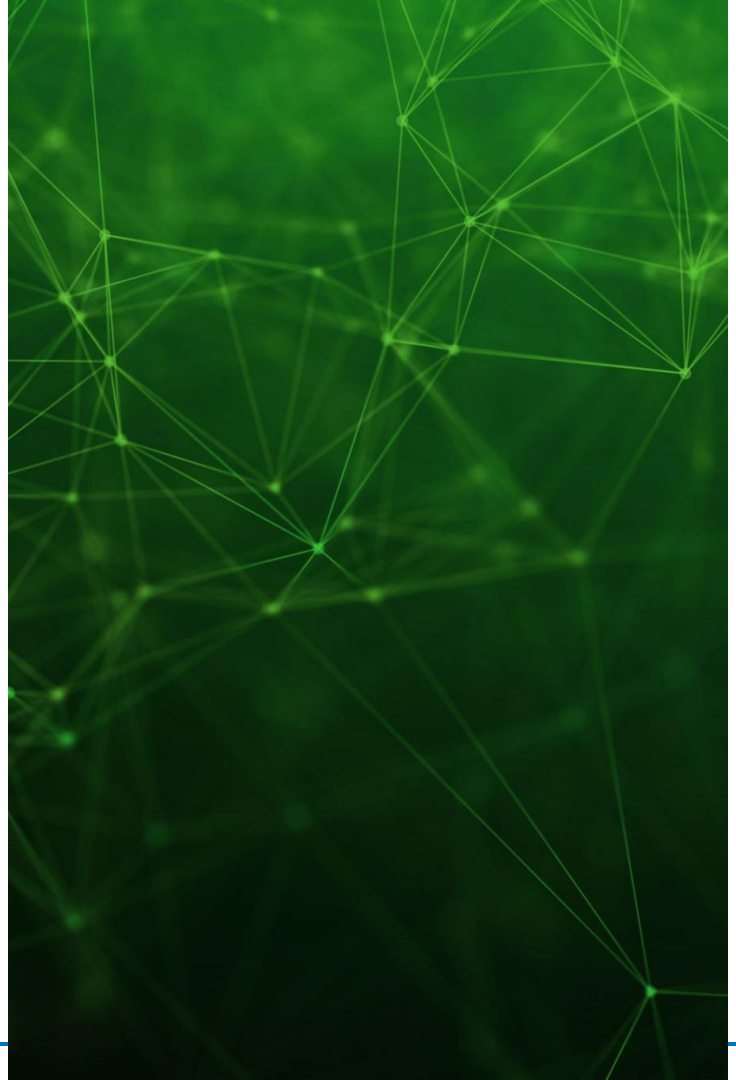
Potential Information Services

- Navaids information service
  - Give in a single service all information on a navaid and impacts of an outage.
- Trajectory information service
  - Provide trajectory awareness including for each waypoint flight levels, course, heading, speed and flight segment time and fuel burn.
- Airspace schedules and reservation service
  - Capacity/demand visibility.



Potential Information Services

- Observer / Nowcast / Forecast MET Information service
  - Provide Met information according to selection criteria.
- Air Traffic Flow Management Information service
  - Provide flow restrictions and updates.



Traps to avoid in creating information services

Change for the sake of change

- Replacing a message by a SWIM information service should only take place when it provides added value.
  - E.g: Creating a METAR service just to provide the METAR information in a digital format may not provide sufficient benefit to justify the investment cost.

Only creates SWIM services when clear value can be demonstrated

- E.g: Increasing ability to share for mutual benefit across multiple users.

Duplication of information and services

- Avoid overloading information models with information not core to the domain.
  - E.g: SAR related information in Flight Object and airport-airline specific information in the flight object.