EUROPEAN ORGANISATION
FOR THE SAFETY OF AIR NAVIGATION

EUROCONTROL

Draft EUROCONTROL
Specifications for SWIM
Explanatory Note

CONTENTS

1.   Introduction

SWIM enables seamless information access and interchange between all providers and users of ATM information and services (Reference: European ATM Master Plan).

> SWIM consists of standards, infrastructure and governance enabling the management of ATM information and its exchange between qualified parties via interoperable services.
>
> *Reference: ICAO Manual on System Wide Information Concept (Doc. 10039)*

Commission Implementing Regulation (EU) No 716/2014 of 27 June 2014 on the establishment of the Pilot Common Project (PCP IR) identified a set of ATM functionalities to be deployed, enabled by Initial System Wide Information Management (iSWIM).

Three Standard Developing Organisations (SDO), EUROCAE, CEN and EUROCONTROL, were identified by the European ATM Standardisation Coordination Group (EASCG), reflected in the EASCG Rolling Development Plan (RDP), to provide the technical specifications for three distinct standardisation areas in support of iSWIM deployment. These three identified standardisation areas are:

- Arrival Sequence Service, a specific information service implementation specifications, coordinated by EUROCAE (currently WG-104);
- ATM information security specifications, coordinated by CEN, and;
- Foundational information service implementation specifications, coordinated by EUROCONTROL.

The draft EUROCONTROL SWIM Standards Package, hereafter referred to as the draft SWIM Standards Package, contains draft EUROCONTROL SWIM specifications which establish foundational requirements applicable to the deployment of iSWIM in support of interoperability within the European ATM network.

The draft specifications within the draft SWIM Standards Package can be considered a Means of Compliance for the enabling ATM functionality iSWIM as defined by Article 3 and related Annex sections of the PCP IR. Therefore, each requirement within each of the draft specifications of the draft SWIM Standards Package is complemented with information on how to satisfy the requirement.

The content of the draft SWIM Standards Package is based on the SESAR1 SWIM deliverables.

2.   Scope of the draft SWIM Standards Package

iSWIM targets the development of services for information exchange in support of Aeronautical, Meteorological, Cooperative network, and Flight information delivered through an internet protocol (IP)-based network by SWIM enabled systems. Furthermore, iSWIM in the PCP IR includes common infrastructure functionalities such as registry and public key infrastructure, and technical infrastructure elements such as profiles.

The draft SWIM Standards Package exclusively covers requirements that address information services, the ATM information exchanged by the information services and the associated technical infrastructure Yellow Profile.

The draft SWIM Standards Package contains foundational requirements that need to be met when implementing SWIM services. They may be complemented by service design requirements, which are typically part of standard service specifications established by other SDOs than EUROCONTROL (e.g. the EUROCAE WG-104 Arrival Sequence Service). Should the need be identified during the public consultation, use of common design requirements will be further elaborated within the service description specifications.

Compared to the full scope of iSWIM as described in the PCP IR, and in accordance with the EASCG RDP, the draft SWIM Standards Package does not address, (i) the PCP IR requirements for common components (registry and public key infrastructure) and (ii) the SWIM technical infrastructure Blue Profile.

3. Draft SWIM Standards Package structure and content

The goal of iSWIM is to foster the interoperability between European ATM Stakeholders in a networked environment. The means to achieve this goal are information services and service orientation practice whereby information services are identified, designed, described, and implemented (provider and consumer side).

Information services themselves require the information conveyed and the technical infrastructure to be interoperable. Consequently, the draft SWIM Standards Package consistently addresses the description of information services, the definition of the exchanged information and the technical infrastructure on which the services are implemented.

The draft SWIM Standards Package therefore includes:

- Draft EUROCONTROL Specification for SWIM Service Description;
- Draft EUROCONTROL Specification for SWIM Information Definition, and;
- Draft EUROCONTROL Specification for SWIM Technical Infrastructure Yellow Profile.

3.1 Draft Specification for SWIM Service Description

The draft Specification for SWIM Service Description contains requirements for describing implemented services within the context of iSWIM. In order for service consumers to make good use of the available information services, it is essential that service descriptions cover the service consumers' needs. Therefore, the requirements focus on the service description that a service provider makes available to service consumers.

More specifically, the requirements prescribe the minimum set of information elements to be contained by a service description in order for a service consumer to discover a service, consider using a service, or implement a service-consuming client.

The requirements ensure that a service description covers the information needs of business experts, operational experts and technical experts. More particularly in terms of:

- what a service does;
- how a service works;
- how to access a service, and;
- other information for consuming a service.

Service providers are expected to apply this specification when describing the services they offer.

Fig. 1 provides a graphical representation of the context of this draft specification.
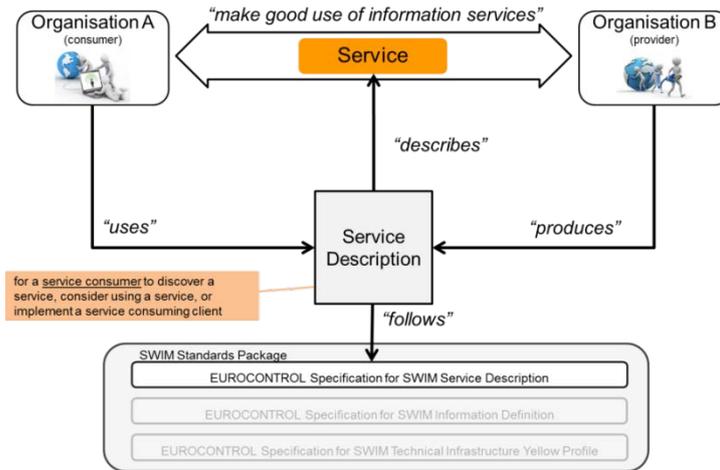
Fig 1: Draft EUROCONTROL Specification for SWIM Service Description

3.2 Draft Specification for SWIM Information Definition

The draft Specification for SWIM Information Definition contains requirements for information definitions within the context of iSWIM.

Information definitions, the formal descriptions of exchanged information, are produced by operational stakeholders. They act as the means whereby the exchanged information is clearly defined, harmonised, understood and shared.

Examples of information definitions are the description of information exchanged by services, standardised information exchange models, data catalogues used to list details on the exchanged information, and information exchanges captured as part of a business process model.

The requirements come in two broad categories: general requirements for information definitions and requirements on how to document semantic correspondence to the ATM Information Reference Model (AIRM). These requirements are necessary for semantic interoperability, which is the ability of computer systems and organisations to exchange data with unambiguous, shared meaning. The requirements ensure that information definitions conform to the semantics of the AIRM, the common reference language for iSWIM.

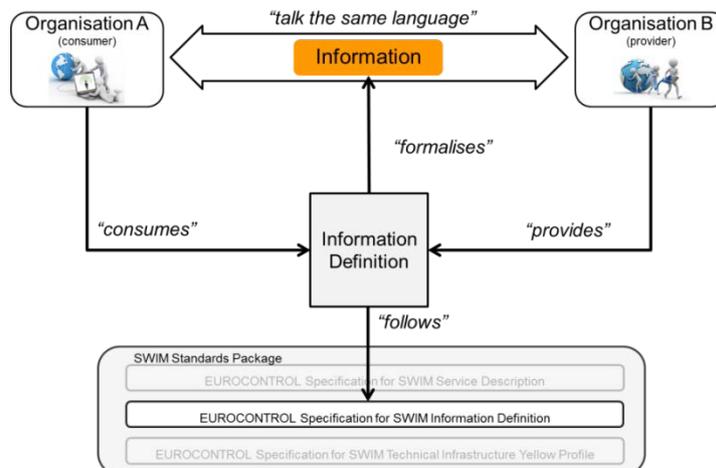Fig. 2 provides a graphical representation of the context of this draft specification.

Fig 2: Draft EUROCONTROL Specification for SWIM Information Definition

3.3 Draft Specification for SWIM Technical Infrastructure Yellow Profile

The draft Specification for SWIM Technical Infrastructure Yellow Profile contains requirements for the implementation of information technology (IT) infrastructure within the context of iSWIM. The requirements are necessary for technical interoperability, which is defined as the "The ability of different IT systems to communicate and exchange data".

In order to achieve technical interoperability, it is essential to have common system interface specifications and common IT infrastructure capabilities to enable a reliable, secure and performant exchange of information. Therefore, the requirements focus on:

- The specification of system interfaces, including the protocols for exchanging information, and;
- The specification of technical infrastructure capabilities, including functional and non-functional capabilities.

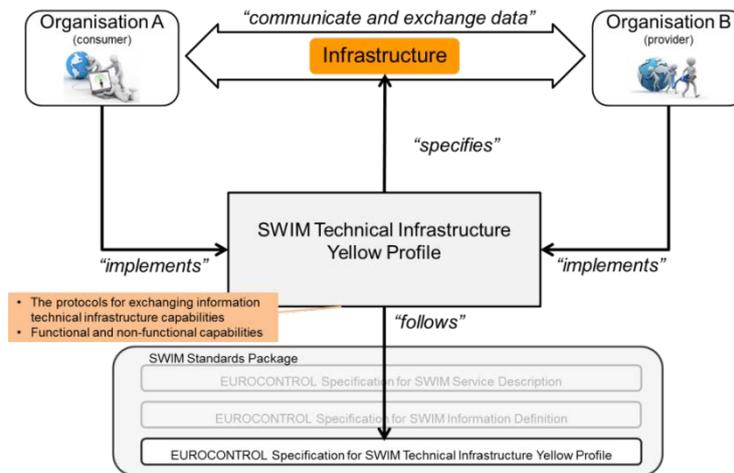Fig. 3 provides a graphical representation of the context of this draft specification.

Fig 3: Draft Specification for SWIM Technical Infrastructure Yellow Profile

4. Use of the Draft SWIM Standards Package

The primary use of the draft SWIM Standards Package is in the context of iSWIM information services deployment and could be categorised as follows:

- Operational stakeholders (e.g. ANSPs, Airspace Users, Airports,…) providing and/or consuming information services use the draft SWIM Standards Package in support of interoperable implementations;
- SDOs (e.g. EUROCAE) use the draft SWIM Standards Package to align specific service implementation specifications (e.g. Arrival Sequence Service) to the foundational requirements of the draft SWIM Standards Package, and;
- Oversight authorities.

The use of draft EUROCONTROL SWIM specifications to foster interoperability in other context than the PCP IR (or iSWIM deployment) is however not excluded.

5. Relation between Draft SWIM Standards Package, PCP IR and EASCG RDP

The PCP IR iSWIM requirements addressed by the draft SWIM Standards Package are:

- Article 3 and Annex sections 5.1.3, 5.1.4, 5.1.5, 5.1.6 of the PCP IR:

    "Service implementations shall be compliant with the applicable version of Aeronautical Information Reference Model (AIRM), the AIRM Foundation Material and the Information Service Reference Model (ISRM) Foundation Material."

- Article 3 and Annex section 5.1.2 of the PCP IR:

    "A SWIM Technical Infrastructure (TI) Profile implementation shall be based on standards and interoperable products and services. Information exchange services shall be implemented on one of the following profiles:

    - *Blue SWIM TI Profile, which shall be used for exchanging flight information between ATC centres and between ATC and Network Manager*
    - *Yellow SWIM TI Profile, which shall be used for any other ATM data (aeronautical, meteorological, airport, etc.)"*

The draft EUROCONTROL SWIM specifications are based on the requirements of the PCP IR. The draft specifications are grouped around the three main SWIM themes: service, information and technical infrastructure, re-packaging the SESAR 1 deliverables referenced by the PCP IR and the EASCG RDP.

The table below shows the relation between the PCP IR, EASCG RDP and draft EUROCONTROL SWIM Standards Package

Package	Title	PCP IR	EASCG RDP v3.0
Draft SWIM Standards Package	Draft EUROCONTROL Specification for SWIM **Service Description**	• ISRM Foundation Material	• SWIM Foundation • ISRM Service Rulebook
	Draft EUROCONTROL Specification for SWIM **Information Definition**	• AIRM Foundation Material • AIRM	• SWIM Foundation • AIRM • AIRM Rulebook
	Draft EUROCONTROL Specification for SWIM **Technical Infrastructure Yellow Profile**	• Yellow SWIM TI Profile	• SWIM Foundation • TI Yellow Profile

Notes:

(i)   the draft SWIM Standards Package does not cover the PCP IR Blue SWIM TI Profile and Compliance Framework indicated by the RDP;

(ii)   the PCP IR refers to the Aeronautical Information Reference Model (AIRM) to actually mean the ATM Information Reference Model;

6. Draft SWIM Standards Package resources

The draft SWIM Standards Package refers to additional resources:

- **ATM Information Reference Model (AIRM)**:
  The draft EUROCONTROL Specification for SWIM Information Definition references the AIRM available at: www.airm.aero. The AIRM will evolve due to the nature of SWIM. The evolution of the AIRM will be managed through the AIRM Change Control Board representing the AIRM community and potentially reporting to the AIM/SWIM Team. It is acknowledged that this could be a temporary set-up awaiting further discussions at ICAO level for a globally applicable AIRM and emerging developments on SWIM Governance in Europe.

- **Information Services Reference Model (ISRM) Foundation version 8**
  The draft EUROCONTROL Specification for SWIM Service Description references the SESAR ISRM Foundation version 8[1] as an example of a formal and standardised notation. The need to provide guidance material for the modelling of service design in UML is recognised. It is anticipated this material will be provided under the form of a "Service design in UML" Guide based on the ISRM Foundation version 8 adapted to the needs of iSWIM deployment. The ISRM Foundation 8 is available at:
    - ISRM Primer (http://www.sesarju.eu/sites/default/files/documents/transversal/08.03.10_D45_ISRM_Primer.docx);
    - ISRM Foundation Rulebook (http://www.sesarju.eu/sites/default/files/documents/transversal/08.03.10_D45_ISRM_Foundation_Rulebook.docx);
    - ISRM Modelling Guidelines (http://www.sesarju.eu/sites/default/files/documents/transversal/08.03.10_D45_ISRM_Modelling_Guidelines.docx)

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7. Scope of consultation

The scope of the stakeholder consultation is the draft SWIM Standards Package. The three draft specifications therein are the subject of the consultation and stakeholders are invited to raise comments on them.

No comments are invited to the additional resources listed in paragraph 6. Comments, which stakeholders may have on these additional resources, are part of their life cycle management.

Furthermore, no comments are invited to this explanatory note.

8. Acknowledgment of contributions

EUROCONTROL technical and standardisation experts in collaboration with various partners performed the drafting of the SWIM Standards Package. EUROCONTROL gratefully acknowledges the contribution of the following subject matter experts:

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