



Supporting  
European  
Aviation



# Aeronautical Information Services for the EU

## ICAO EUR MID Digital Data Sets Workshop

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AIM Specialist – EAD Data Operations

EUROCONTROL – Cairo, Egypt 22 May 2023



NETWORK  
MANAGER



# Content

- European regulatory background
  - What is driving the Aeronautical Information Services for the EU?
  - Supplementary supporting material
- What are those Aeronautical Information Services?

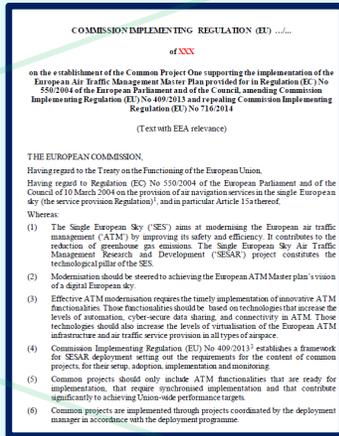
# *European regulatory background*

# Regulatory framework

SESAR  
DEPLOYMENT  
PROGRAMME



COMMON PROJECT  
ONE REG. (EU)  
N.116/2021



SESAR Deployment Programme 2022

Supporting Material to SDP Implementation

- Short-term Deployment Approach
- Performance Assessment & CBA methodology
- Risk Management Plan
- Stakeholders' Deployment Roadmaps
- Standardisation and Regulation support to CP1 deployment

December 2022

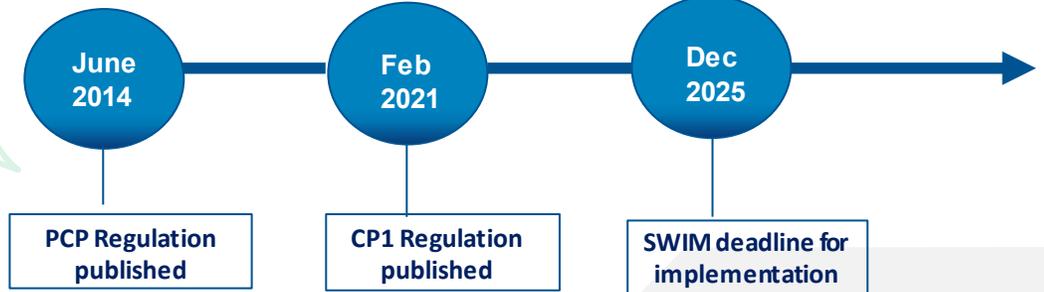


Vision for EU Digital Sky

Framework for SESAR Deployment

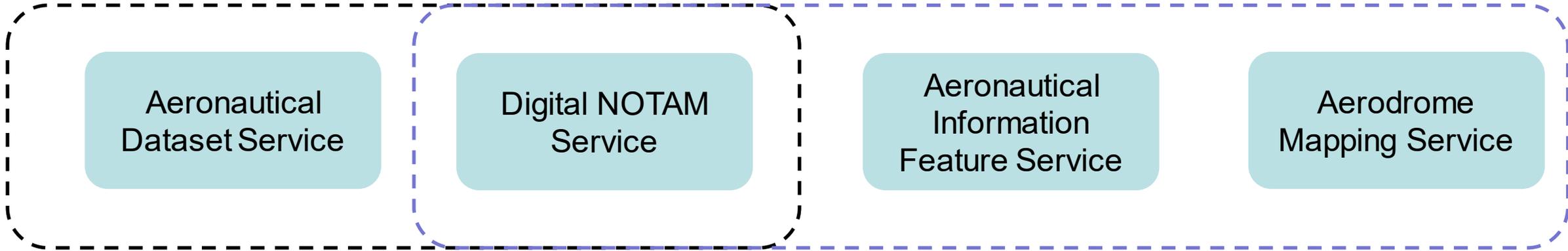
Workplan for CP1 Deployment

Developed and consulted by all stakeholders



# References

## Alignment – ICAO and EU



ICAO

discover and access digital datasets

digital OPREP (tentative name)

access to information on features with filtering capabilities

aerodrome mapping data sets



digital NOTAM

aeronautical information feature on request; filtering possible by feature type, name and an advanced filter with spatial, temporal and logical operators

digital aerodrome charts

# *Aeronautical Information Services*

# EUROCONTROL Aeronautical Information SWIM Services Sub-group (A3SG)

## PURPOSE

- Facilitate the implementation of AIM Information Exchange Services defined in CP1
  - Supports harmonized implementation

## ROLE

- Ensure availability of service implementation reference material (MoC).
  - Coordinating with the competent groups and organizations
- Identify deficiencies and concerns and recommend specific measures
- Collect and share information, best practices and lessons learned

# Service Architecture

<b>Service Definition</b>	[SWIM-DEFN-030] Service definition identification	[SWIM-DEFN-010] Service definition coverage	[SWIM-DEFN-020] Service definition language
General service information	[SWIM-DEFN-040] Service identification	[SWIM-DEFN-050] Service abstract	
Service definition provider and contact details	[SWIM-DEFN-085] Service definition provider		
Service characteristics	[SWIM-DEFN-090] Geographical extent of information	[SWIM-DEFN-095] Intended service providers and consumers	[SWIM-DEFN-100] Service categories
High level description of the service offer	[SWIM-DEFN-130] Operational environment	[SWIM-DEFN-140] Service functions	[SWIM-DEFN-120] Service standard reference
Limitations and constraints on using the service	[SWIM-DEFN-150] Service access and use conditions	[SWIM-DEFN-160] Service constraints	
Quality aspects	[SWIM-DEFN-180] Quality of service	[SWIM-DEFN-190] Source of information	[SWIM-DEFN-200] Service validation information
Behaviour of the service	[SWIM-DEFN-210] Service messages	[SWIM-DEFN-220] Service monitoring	
Service implementation and structural details	[SWIM-DEFN-240] Service interfaces	[SWIM-DEFN-250] SWIM TI Profile and interface bindings	[SWIM-DEFN-260] Service interface protocols and data format
Information aspects of the service	[SWIM-DEFN-290] Information definition (minimum)	[SWIM-DEFN-300] Information definition (extended)	[SWIM-DEFN-310] Filter encoding
Resources	[SWIM-DEFN-320] Machine-readable service interface definition	[SWIM-DEFN-330] Model view	[SWIM-DEFN-350] Abbreviations and acronyms

Link to the work of ICAO Information Management Panel Job Card – IMP0.13.01 Information Service Definition

# Service Definition

## EUROCONTROL Confluence - Service Definitions

### SP Aeronautical Information Request Service

#### Aeronautical Information Request Service - Service Definition

Created by Scott Wilson, last modified on Mar 09, 2023

**Task Status**  
This page is part of the ongoing SWIM communities of interest discussions. The content is **working material**. It should not be treated as final as it is still subject to review, comment and change.

**Guidance**  
This template allows for the documentation of service definitions based on the requirements found at: *Service definitions minimum content*  
General requirements to remember:

SWIM-DEFN-010	Service definition coverage	A service definition <b>shall</b> define a single service	<b>Note:</b> This concerns the definition of a service that can be implemented by service providers. It is not used to describe a running service - use a service description in that case. <b>Note:</b> This requirement uses "define" rather than "describe".
SWIM-DEFN-020	Service definition language	The textual descriptions in a service definition <b>shall</b> be written in English using the spelling listed as the primary British spelling when conflicting spellings exist.	-

#### Service Definition Identification

**DRAFT**

**Trace**  
SWIM-DEFN-030

service definition identification	title	Service definition for the Aeronautical Information Request Service
	edition	00.00.01
	reference date	2023-02-09

#### Service Identification

**DRAFT**

**Trace**  
SWIM-DEFN-040

service identification	service name	Aeronautical Information Request Service
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#### Service Abstract

**DRAFT**

**Trace**  
SWIM-DEFN-050

service abstract	The Aeronautical Information Request Service allows the service consumer to get aeronautical information concerning the actual and future infrastructures specified in the request e.g. based on feature name or the location of the feature. The information returned is in the form of an AIXM 5.1.1 message.
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### SP Aeronautical Aerodrome Map Request Service

#### Aeronautical Aerodrome Map Request Service - Service Definition

Created by Scott Wilson, last modified on Mar 09, 2023

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#### Service Definition Identification

**DRAFT**

**Trace**  
SWIM-DEFN-030

service definition identification	title	Service definition for the Aeronautical Aerodrome Map Request Service
	edition	00.00.01
	reference date	2023-02-09

#### Service Identification

**DRAFT**

**Trace**  
SWIM-DEFN-040

service identification	service name	Aeronautical Aerodrome Map Request Service
------------------------	--------------	--

#### Service Abstract

**DRAFT**

**Trace**  
SWIM-DEFN-050

service abstract	The Aeronautical Aerodrome Map Request Service allows the service consumer to get an aeronautical aerodrome map. The map is generated using the content of the map can be in the request e.g. based on GIS layer and the location of the feature. The map can be used to support various operations such as serving as a baseline map for dynamic data operations.
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### SP Digital NOTAM Subscription and Request Service

#### Digital NOTAM Subscription and Request Service - Service Definition

Created by Scott Wilson, last modified on Mar 10, 2023

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#### Service Definition Identification

**DRAFT**

**Trace**  
SWIM-DEFN-030

service definition identification	title	Service Definition for the Digital NOTAM Subscription and Request Service
	edition	00.00.01
	reference date	2023-02-09

#### Service Identification

**DRAFT**

**Trace**  
SWIM-DEFN-040

service identification	service name	Digital NOTAM Subscription and Request Service
------------------------	--------------	--

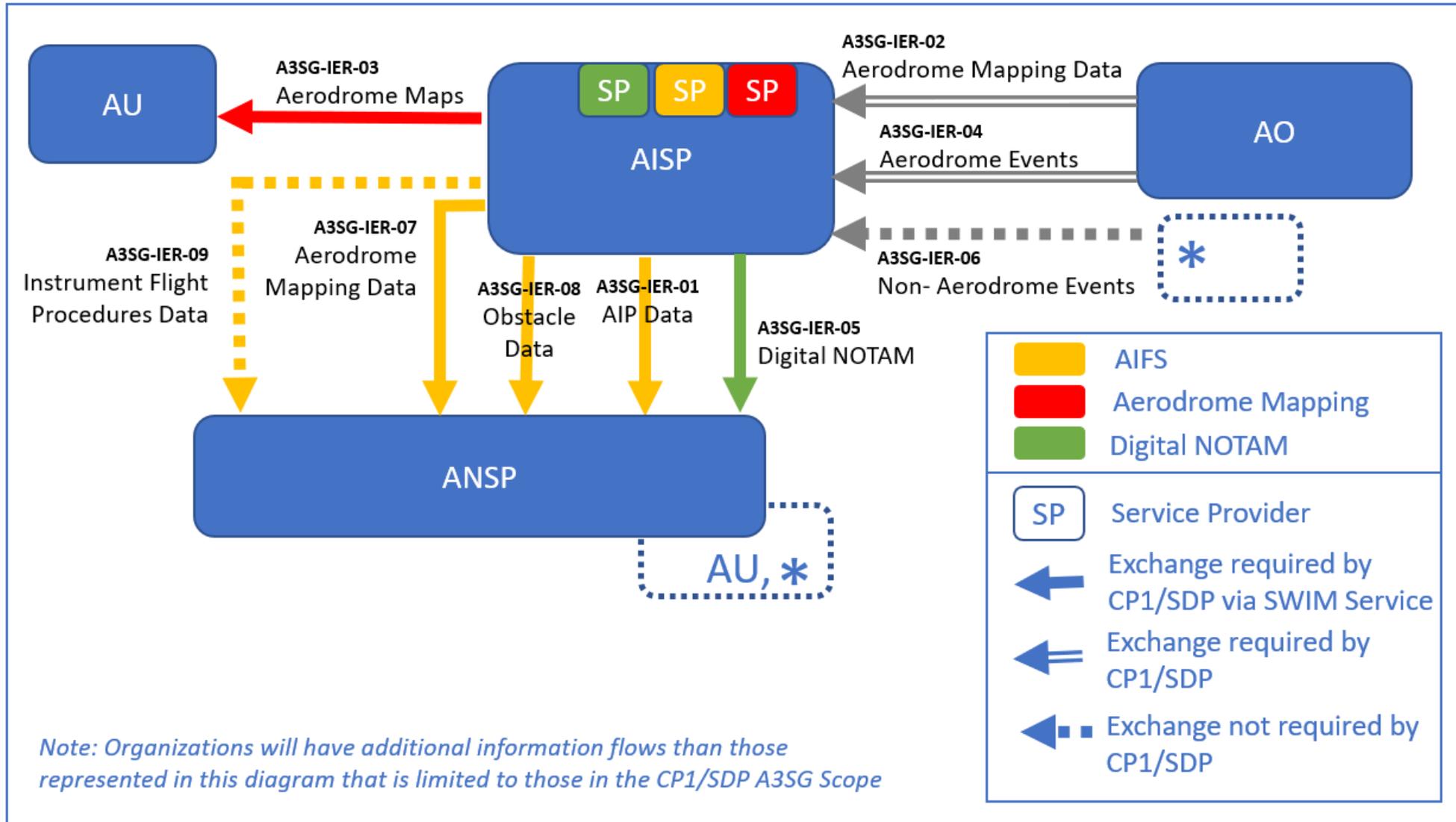
#### Service Abstract

**DRAFT**

**Trace**  
SWIM-DEFN-050

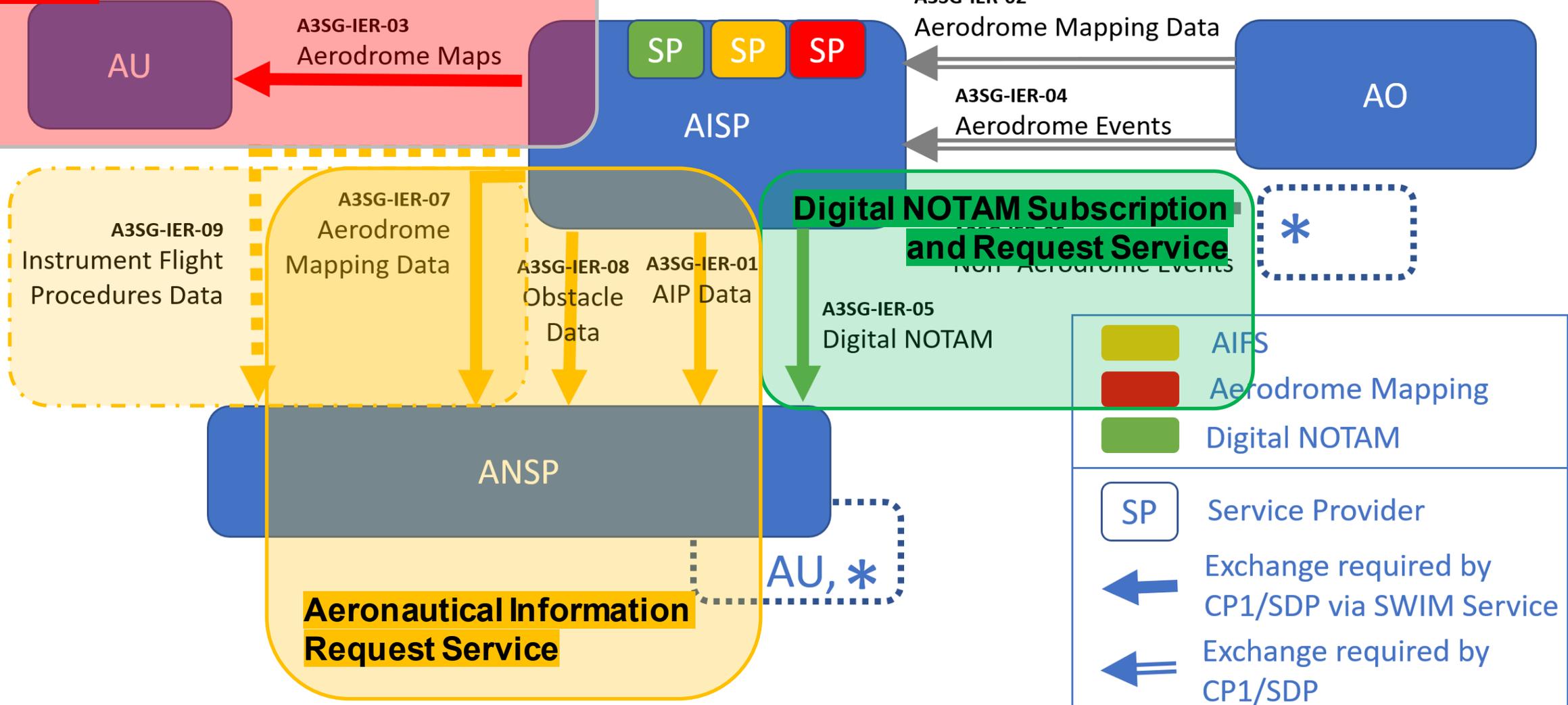
service abstract	The Digital NOTAM Subscription and Request Service allows the service consumer to get aeronautical information in accordance with the Digital NOTAM service. The service consumer may subscribe to the service, specifying the event scenarios of interest. It is also possible to send a direct request to the service. The information returned is in the form of an AIXM 5.1.1 message.
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# Information Exchange Requirements





# Aeronautical Aerodrome Map Request Service



Note: Organizations have other information flows than those represented in this diagram that is limited to those in the CP1/SDP A3SG Scope

# Operational needs and capabilities

By service consumer role

Stakeholder/Role	<i>Description of stakeholder/role</i>	<b>Needs for Aeronautical Features</b>	<b>Needs for DNOTAM</b>	<b>Needs for Aerodrome Maps</b>
<b>CIVIL_AIRSPACE_USER</b>	<i>A generic term designating an organization operating aircraft and its pilots, the flight operations centres (FOC) responsible for the strategic planning of a flight and the entity responsible for the execution of a flight which is traditionally a flight deck.</i>	<ul style="list-style-type: none"> <li>• Retrieve baseline data and updates to it for a point in time in order to perform safe, economical and efficient operations.</li> <li>• Generate graphical representations of data in support of responsibilities.</li> <li>• Visual support to pilots under the form of digital charts and cockpit displays.</li> <li>• Airline engineering and operations departments may import and export obstacle data for use in their applications.</li> <li>• Safety nets. Monitor aircraft for hazardous conditions.</li> </ul>	<ul style="list-style-type: none"> <li>• Retrieve dynamic data to support digital integrated briefing concepts.</li> <li>• Ensure safe operations by responding to changes in the situation.</li> <li>• Provide in-flight information updates.</li> </ul>	<ul style="list-style-type: none"> <li>• Generate graphical representations needed to support digital briefing concepts.</li> <li>• Have an up-to-date backdrop for dynamic layers (see SDP).</li> </ul>

# Information aspects

## DIGITAL DATA SETS

## MAP LAYERS

## EVENT SCENARIOS

	AIXM 5.1.1. feature	AIP ("en-route") data set	AMD data set	OBS data set	GIS layers	AD.CLS	AD.LGT	AD.LIM	AGS.UNS	APE.CLS	APE.LIM
	<b>AerialRefuelling</b>										
y	<b>AeronauticalGroundLight</b>	y									
y	<b>AircraftGroundService</b>								y		
y	<b>AircraftStand</b>		y		y						
	<b>AirportClearanceService</b>										
	<b>AirportHeliportCollocation</b>										
y	<b>AirportHeliport</b>	y	y	y	y	y	y	y	y	y	y
y	<b>AirportHotSpot</b>		y		y						
	<b>AirportProtectionAreaMarking</b>										
y	<b>AirportSuppliesService</b>		y		y				y		
	<b>AirspaceBorderCrossing</b>										
y	<b>Airspace</b>	y									
y	<b>AirTrafficControlService</b>	y									

# Service behaviours

## Application Message Exchange Pattern

DRAFT

 **Trace**  
[SWIM-DEFN-210](#)

application message exchange pattern [REQUEST\\_REPLY](#)

## Service Behaviour

DRAFT

 **Trace**  
[SWIM-DEFN-220](#)

service behaviour	typical behaviour	
		<p>The service behaviour shall be in accordance with the patterns detailed in the <a href="#">Message Exchange Patterns: Identification Guidelines</a>. It allows for two implementations of the request-reply message exchange pattern: asynchronous and synchronous. The OGC Web Feature Service 2.0 Interface Standard shall be used for the basic behaviour.</p> <p>The typical behaviour is as follows:</p> <p><b>Synchronous Request/Reply</b></p> <ul style="list-style-type: none"> <li>• The request message is sent from the service consumer to the service</li> <li>• The service consumer remains blocked while awaiting the reply</li> <li>• The service remains blocked while processing the reply</li> <li>• The AIXM Basic Message, the reply message, is sent from the service to the service consumer.</li> </ul> <p><b>Asynchronous Request/Reply</b></p> <ul style="list-style-type: none"> <li>• The request message is sent from the service consumer to the service</li> <li>• The AIXM Basic Message, the reply message, is sent from the service to the service consumer.</li> </ul>

# Standardised implementations

## Example standardised implementations

The standardised implementations discussed in this section conform to the [SWIM TI YP Specification](#).

### OGC Standards

Service implementations can use the Open Geospatial Consortium (OGC) standards. These include a suite of service standards detailed at <https://www.ogc.org/docs/is>, including:

- **Web Feature Service (WFS)** for direct fine-grained access to geographic information at the feature and feature property level.
  - WFS includes transactional operations that allow changes to be made to a feature instance over WFS.
  - [OGC Web Feature Service \(WFS\) Temporality Extension](#) for the AIXM 5 temporality extensions of the WFS 2.0 and FES 2.0 standards.
- **Web Map Service (WMS)** for requesting geo-registered map images from one or more distributed geospatial databases.
- **Web Coverage Service (WCS)** for accessing multi-dimensional coverage data over the Internet.

The standards contain e.g.

- defined functionality
- defined operations e.g. WFS's GetCapabilities (discovery operation)
- characteristics e.g. feature access service

In addition, other standards are of relevance such as:

- **Filter encoding** standard that details a system neutral syntax for expressing projections, selection and sorting clauses collectively called a query expression.

### AMQP v1.0

Service implementations can use the **Advanced Message Queuing Protocol (AMQP) v1.0** international standard. This is available at <https://www.amqp.org/>.

It is discussed in connection with the EUROCONTROL SWIM TI Yellow Profile Specification on the SWIM reference website. See:

- <https://reference.swim.aero/technical-infrastructure/guidance-for-pub-sub-push-implementation.html>
- <https://reference.swim.aero/technical-infrastructure/binding-selection-guidelines.html>

The issue of topics has been discussed in the FAQ. See:

- [How do I define the list of topics for use in AMQP1.0?](#)

# Aeronautical Information Request Service

[https://ext.eurocontrol.int/swim\\_confluence/display/ASW/Aeronautical+Information+Request+Service+-+Service+Definition](https://ext.eurocontrol.int/swim_confluence/display/ASW/Aeronautical+Information+Request+Service+-+Service+Definition)

- Request:
  - aeronautical information
  - filtered according to spatial, temporal and logical operators
- Return:
  - AIXM 5.1.1 basic message – features/timeslices that:
    - are listed in Appendix B, aligned with data set needs
    - satisfy the applicable sections of [Commission Implementing Regulation \(EU\) 2017/373](#) of 1 March 2017
    - apply the AIXM 5.1.1 coding guidelines
    - follow the supporting material for digital data sets
- Using:
  - OGC Web Feature Service 2.0 Interface Standard (Basic WFS and spatial joins)
  - OGC Filter Encoding 2.0 Encoding Standard

## Appendix B: Information Definition

DRAFT

AIXM 5.1.1. feature
AeronauticalGroundLight
AircraftStand
AirportHeliport
AirportHotSpot
AirportSuppliesService
Airspace
AirTrafficControlService

# Aeronautical Aerodrome Map Request Service

[https://ext.eurocontrol.int/swim\\_confluence/display/ASW/Aeronautical+Aerodrome+Map+Request+Service+-+Service+Definition](https://ext.eurocontrol.int/swim_confluence/display/ASW/Aeronautical+Aerodrome+Map+Request+Service+-+Service+Definition)

- Request:
  - aeronautical aerodrome maps that are generated from aerodrome mapping data
  - for current or next AIRAC cycle
  
- Return:
  - aeronautical aerodrome map generated from data that:
    - has a layer listed in Appendix B
    - satisfy the applicable sections of [Commission Implementing Regulation \(EU\) 2017/373](#) of 1 March 2017
    - apply the AIXM 5.1.1 coding guidelines
    - follow the supporting material for aerodrome map digital data sets
  
- Using:
  - OGC Web Map Service 1.3.0
    - Basic WMS
    - *recommended* Queryable WMS

Layer	AIXM 5.1.1 feature	Layer Geometry
<b>AircraftStandLocation</b>	<b>AircraftStand</b>	Point
<b>AircraftStandArea</b>	<b>AircraftStand</b>	Polygon
<b>AerodromeReferencePoint</b>	<b>AirportHeliport</b>	Point (from AerodromeReferencePoint)
<b>AerodromeHotSpot</b>	<b>AirportHotSpot</b>	Polygon

# Digital NOTAM Subscription and Request Service

[https://ext.eurocontrol.int/swim\\_confluence/display/ASW/Digital+NOTAM+Subscription+and+Request+Service+-+Service+Definition](https://ext.eurocontrol.int/swim_confluence/display/ASW/Digital+NOTAM+Subscription+and+Request+Service+-+Service+Definition)

- Request:
  - aeronautical information that can be integrated into an existing aeronautical information store by:
    - subscription, specifying the **event scenarios** of interest
    - direct request to the service to get the aeronautical information
  
- Returns:
  - AIXM 5.1.1 message - **event feature** and related features that:
    - has an event scenario listed in Appendix B
    - satisfy the applicable sections of [Commission Implementing Regulation \(EU\) 2017/373](#) of 1 March 2017
    - is according to the Event Encoding Specification
    - apply the AIXM 5.1.1 coding guidelines
  
- Using:
  - subscription interface
  - AMQP 1.0 implementation
  - OGC Web Feature Service 2.0

event scenario identifier	event scenario name	event scenario version	mandatory/recommend /optional
AD.CLS	Aerodrome/Heliport - closure (NOTAM)	2.0	M
AD.LIM	Aerodrome/Heliport - limitation (NOTAM)	2.0	M
APE.CLS	Apron element - closure (NOTAM)	2.0	R
APE.LIM	Apron portion - usage limitation change (NOTAM)	2.0	R

# Digital NOTAM Use Cases

## PROVISION

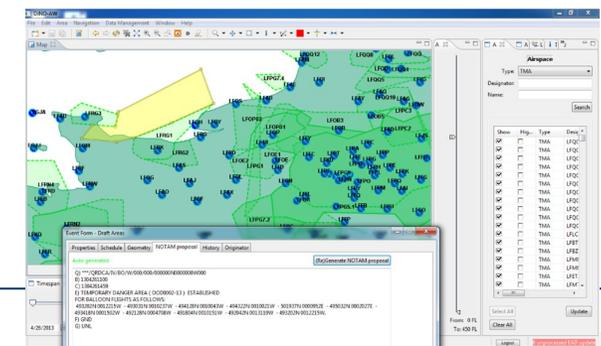
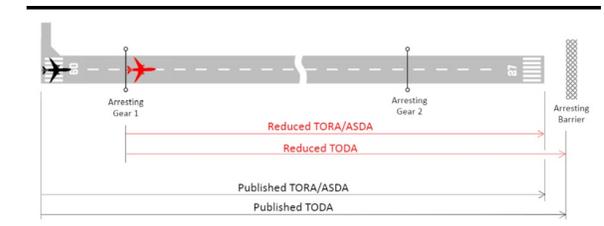
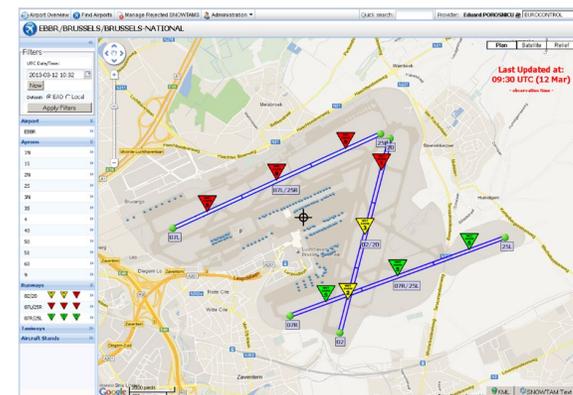
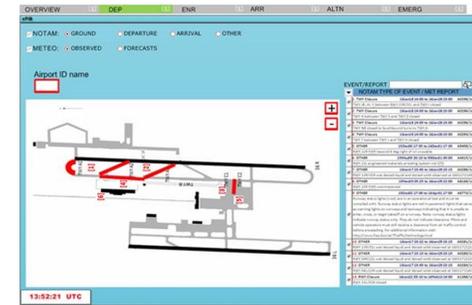
### EUROCONTROL Digital NOTAM Specification

#### ▼ Coding scenarios

- [2.0] [AD.CLS] Aerodrome/Heliport - closure
- [2.0] [AD.LIM] Aerodrome/Heliport - usage limitation change
- [2.0] [RWY.CLS] Runway - closure
- [2.0] [RWY.LIM] Runway - usage limitation change
- [2.0] [RWE.CLS] Runway portion - closure
- [2.0] [RCP.CHG] Runway centreline point - displacement (placeholder)
- [2.0] [RDD.CHG] Runway declared distance(s) - change
- [2.0] [TWY.CLS] Taxiway - closure
- [2.0] [TWY.LIM] Taxiway - usage limitation change
- [2.0] [APN.CLS] Apron - closure
- [2.0] [APN.LIM] Apron - usage limitation change
- [2.0] [APE.CLS] Apron portion - closure
- [2.0] [APE.LIM] Apron portion - usage limitation change
- [2.0] [STAND.CLS] Aircraft stand - closure
- [2.0] [STAND.LIM] Aircraft stand - usage limitation change
- [AD.LGT] Ground Light System unserviceable - coding
- [2.0] [SFC.CON] Surface condition report - coding

... 24 Scenarios

## USE



... 4 use cases

# THANK YOU FOR YOUR ATTENTION

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