



Understanding Europe





41 EUROCONTROL Member States



27 countries in the EU



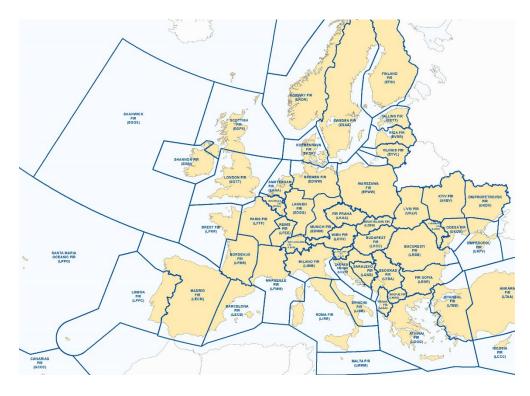
10,8 million km2 of airspace



60+ Area Control Centers (ACCs)



Interoperability





Regulatory framework



Single European Sky - Regulatory Framework







Regulatory framework



Developed and consulted by all stakeholders



Vision for EU Digital Sky







2014-2021

ONE REG. (EU) N.116/2021





COMMISSION IMPLEMENTING REGULATION (EU) .../...

- (1) The Single European Sky ('SES') aims at modernising the European air traffic management ('ATM') by improving its safety and efficiency. It contributes to the reduction of genetious gas emissions. The Single European Sky Air Traffic Management Research and Development ('SESAR') project constitutes the technological pillar of the San.
- Modernisation should be steered to achieving the European ATM Master plan's vision of a digital European sky.
 Effective ATM modernisation requires the timely implementation of innovative ATM functionalities. Those functionalities should be based on technologies that increase the
- levels of automation, cyber-secure data sharing, and connectivity in ATM. Those technologies should also increase the levels of virtualisation of the European ATM inflastructure and air traffice service provision in all types of airspace.

 (4) Commission Implementing Regulation (EU) No 409/2013² establishes a framework
- for SESAR deployment setting out the requirements for the content of common projects, for their setup, adoption, implementation and monitoring.

 (5) Common projects should only include ATM functionalities that are ready for
- (5) Common projects should only include ATM fluctionalities that are ready for implementation, that require synchronised implementation and that contribute significantly to achieving Union-wide performance targets.
- (6) Common projects are implemented through projects coordinated by the deploy manager in accordance with the deployment programme.

2021-2027

SESAR DEPLOYMENT **PROGRAMME** SESAR **SESAR Deployment Programme** 2021 Delivering ATM modernisation in Europe togethe

Workplan for CP1 Deployment

Framework for SESAR Deployment

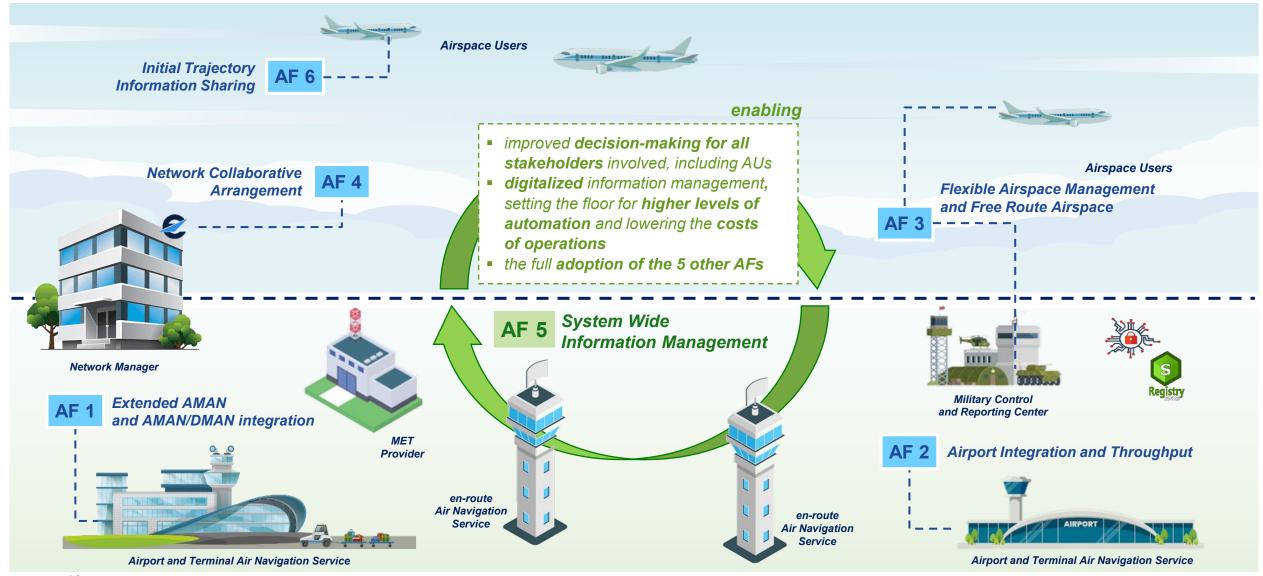




AF 5 – SWIM

Overview of the ATM functionality





CP1 SWIM Compliance

Deadlines are fast approaching



Families		Content	2019	2020	2021	2022	2023	2024	2025
5.1.1: Common SWIM PKI and cybersecurity	•	Common infrastructure components covering cyber security, common PKI and its governance							
5.2.1: Stakeholders SWIM PKI and cyber security	•	Generic public key infrastructure management in line with national Security Management System (NSA approved)							
5.3.1: AIM exchange	•	Airspace structure and availability, ARES, Digital NOTAM, airport mapping and aero. inf. feature							
5.4.1: MET exchange		Volcanic ash, aerodrome MET, en-route and approach MET, network MET					+		
5.5.1: Network exchange	•	ATFCM tactical updates, flight management, measures, STAM, counts service							
5.6.1: Flight exchange	•	Filing, flight data request, notification, data publication, trial service							



Family 5.1.1 Common SWIM PKI and cyber security General view



CP1 services

initial needs as expressed by stakeholders

Interop with Certificates Local PKI (SWIM) (SWIM) Interop with Certificates Local PKI (others) (others)

Mandatory EACP scope: SWIM

Extended Use Cases: Use cases that can be covered by the same requirements / technical solution => No additional costs

Public Trust Certificates

Local Registration Authority

consultation

SDM

01/2023



01/2024

R&D Common PCP

SESAR



SDM Common PKI Project

Call For Tenders Technical Specifications

Governance & Funding Principles

Tech Framework & Procedures

EUROCONTROL Procurement

EACP Initial Solution -Operation

CP1 met

EACP Target Solution – Preparation

SDM consultation

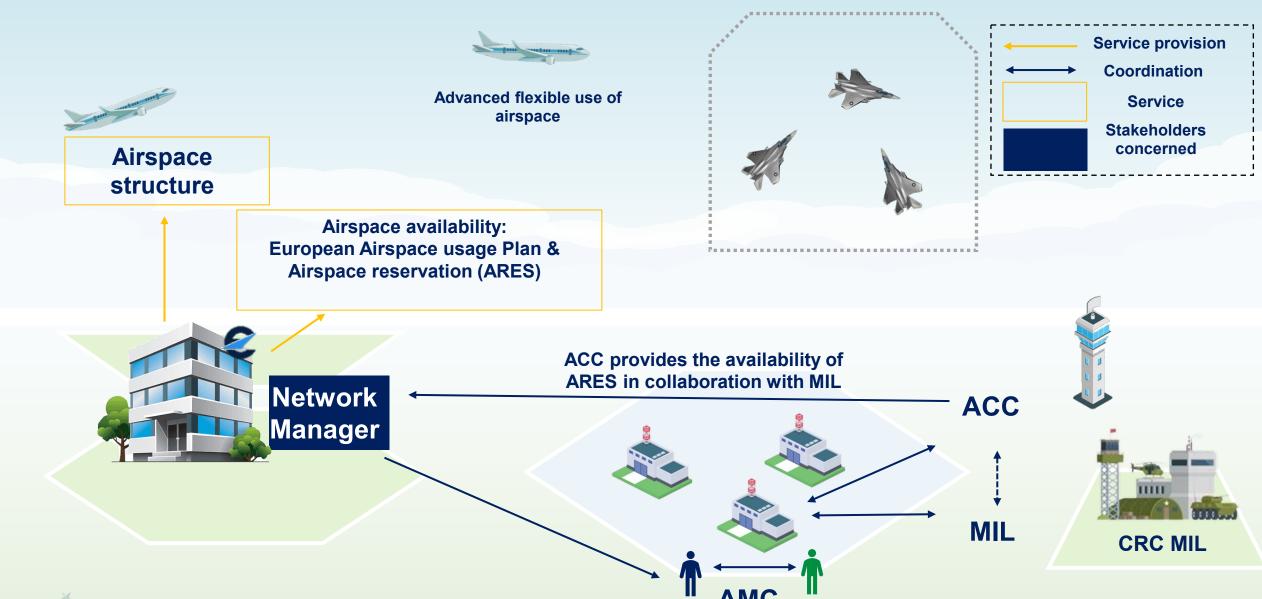




TRACK1

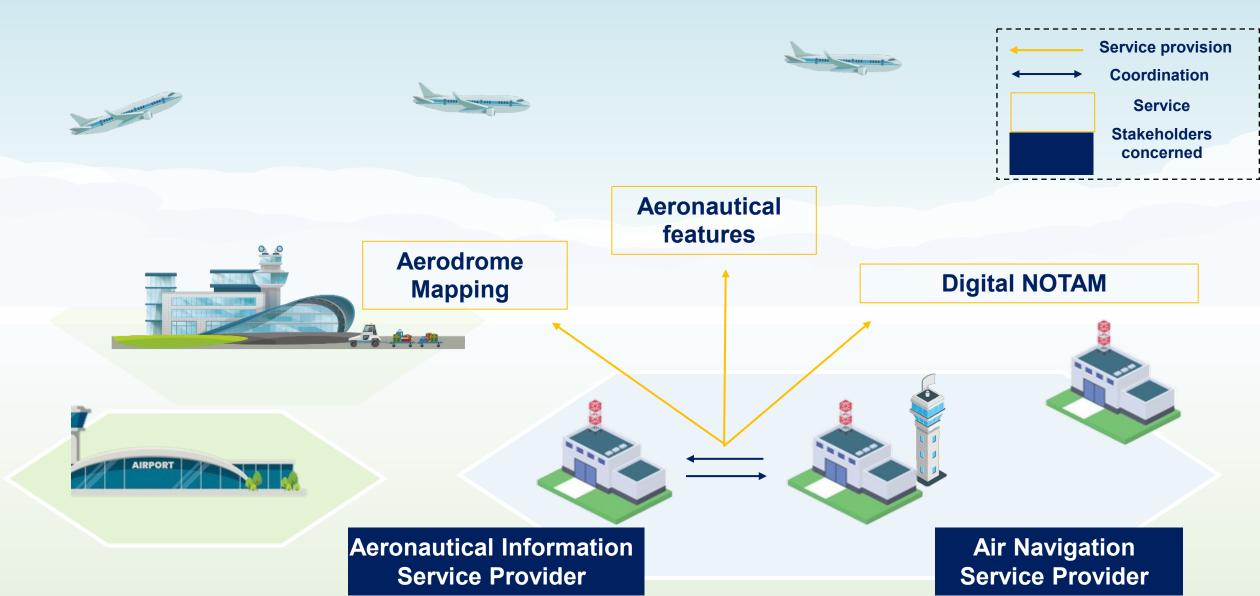
Family 5.3.1 – Aeronautical Information Exchanges





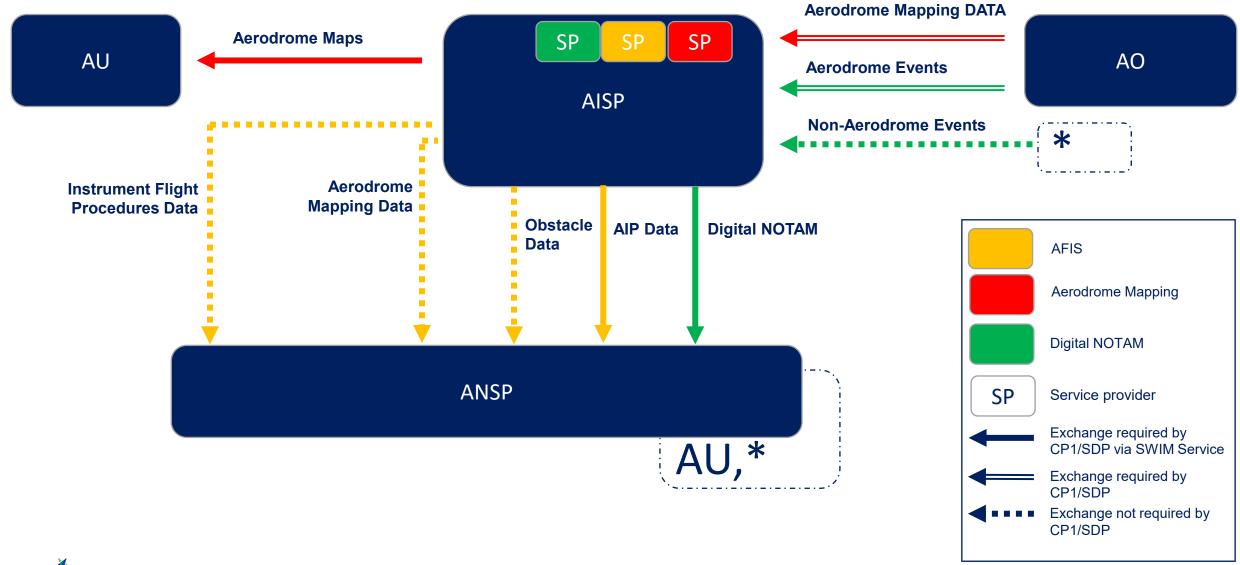
Aeronautical Information Exchanges





AIM SWIM Service orchestration in Europe









A1926/21 NOTAMN

- Q) EHAA/QMRLC/IV/NBO/A/000/999/5218N00446E005
- A) EHAM
- B) 2109060500
- C) 2109150500
- E) RWY 09/27 CLSD

Current NOTAM

- Only human readable (due to personalized item E)
- Space for errors
- No visual representation
- Hard to read & understand
- Difficult to keep overview

Digital NOTAM

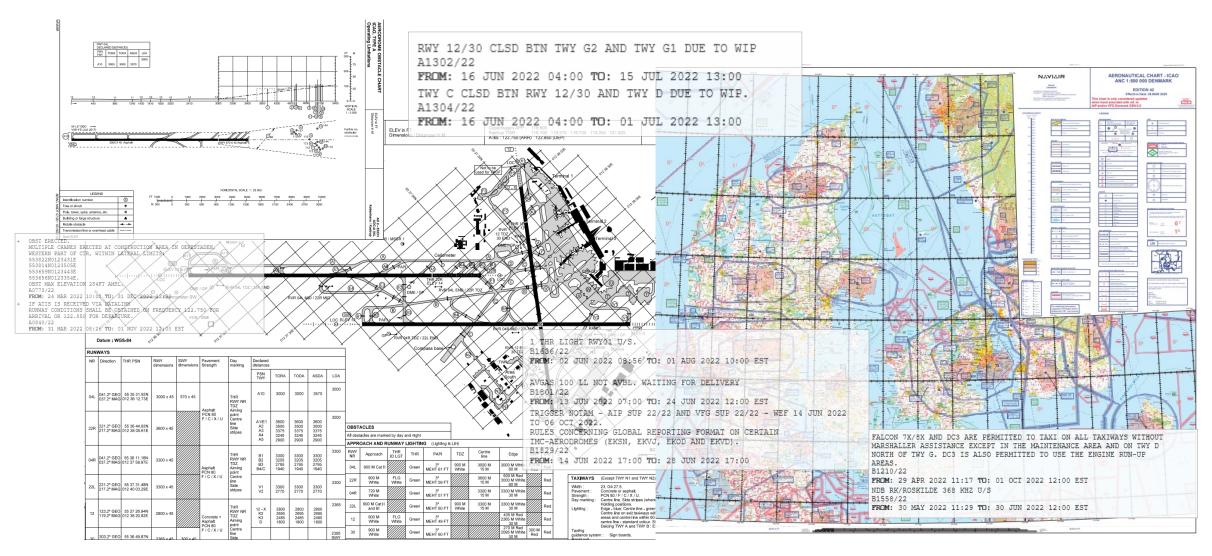
- System readable
- Possible additional data validation
- No visual representation
- Possibility for export as a Digital NOTAM data set
- Traceable association to related features

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<event:traffic>IV</event:soope>
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Family 5.3.1 What do we rely on today?





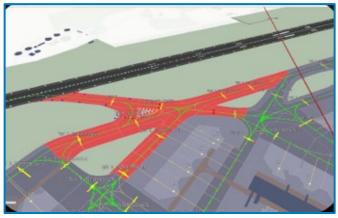


Family 5.3.1 Supported Digital NOTAM

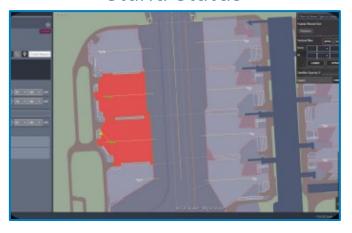
Runway Closure



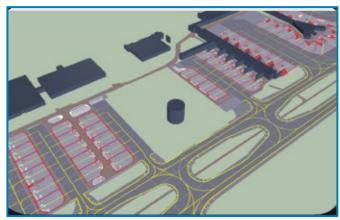
Taxiway Closure



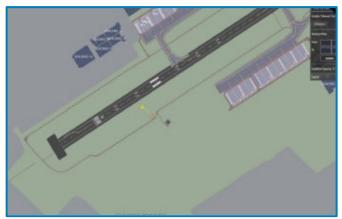
Stand Status



Obstacle New



Navaid Unserviceable



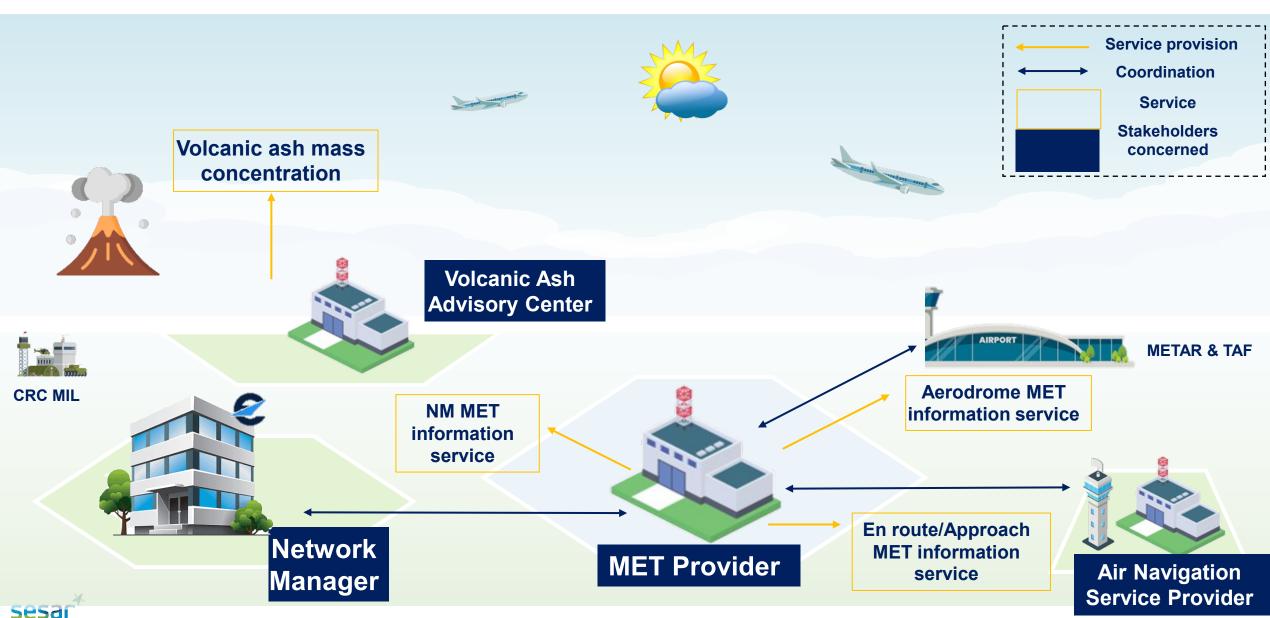
ATS Airspace Activation





SWIM Services Implementation - Met Information Exchange





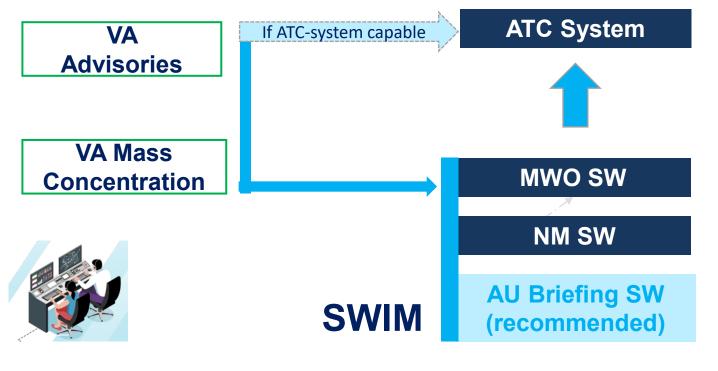
Volcanic Ash Mass Concentration Information Service



VAAC UKMO VAAC MF

New product(s) planned to be available Nov/Dec 2024.

→ One year time to implement operational consumption



- Display of latest information in MWO (Meteorological Watch Office) visualization tool via SWIM service
- Display of latest information in NM visualization tool via SWIM service
- Not mandated but highly recommended to display latest information in AU-briefing tools via SWIM service
- Display of latest information at the Controller working position (CWP)

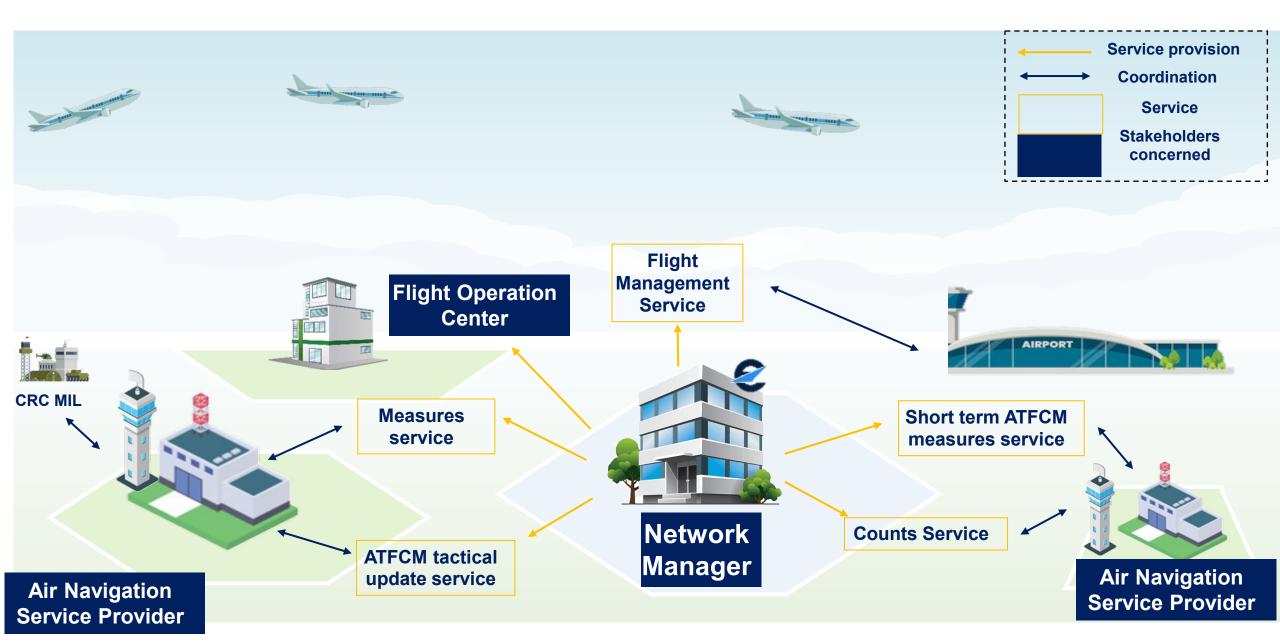






Cooperative Network Information Exchange

Flow Services



Flight & Flow Information for collaborative environment (FF-ICE)



FF-ICE End-to-End

Initial Negotiation with IFPS (eASP(s)) Agreed Trajectory Updated as needed, to Strategic Renegotiation as needed, resulting Resulting in an Agreed Trajectory that is align with Tactical Changes issued by ATC in new Agreement that's coordinated with Filed to IFPS or other factors **ATC for Delivery to Pilot** Conflict Constraint Strategic Negotiation/ Clearance Delivery
Boundary Boundary **Preliminary Flight** Flight Plan Filing Taxi Out, Departure, & **EnRoute** Decent. Arrival. Crossing Crossing **Plan Filing** Climb & Taxi In Re-evaluation of Agreed **Desired Trajectory Agreed Trajectory Trajectories as Constraints Emerge Predeparture Post Flight Execution** FF-ICE R1 FF-ICE R2 **Pre-Departure Flight Planning & Filing** Post-Departure Negotiation & Flight Re-Planning



ICAO Vs Europe



FF-ICE Release 1 in ICAO



FF-ICE R1 services

Planning Service (Optional)

Filing Service (Mandatory)

Trial Service (Optional)

Flight Data request service (Mandatory)

Data publication Service (Optional) Notification Service (Optional)

Recommendations



FF-ICE Release 1 in Europe



Trial Service



Filling Service



Notification Service



Publication Service



Flight Data request Service



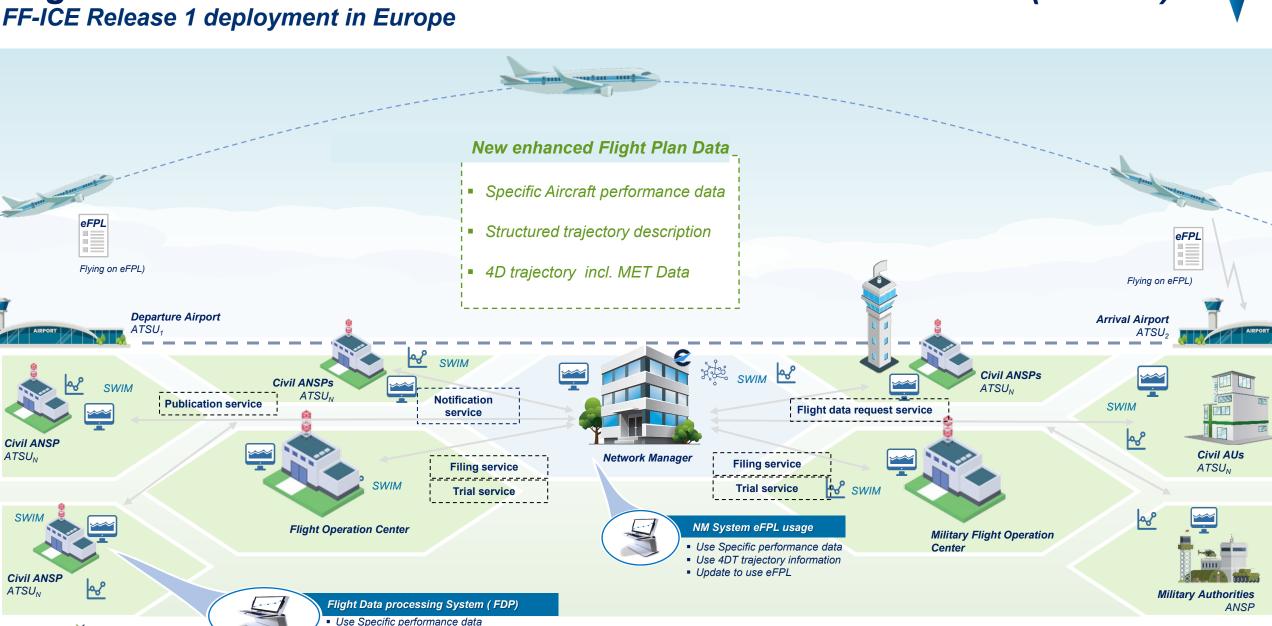
Mandatory





Flight & Flow information for a collaborative environment (FF-ICE)





Use 4DT trajectory information

Update to use eFPL

Regulatory framework – Geographical Scope – FF-ICE



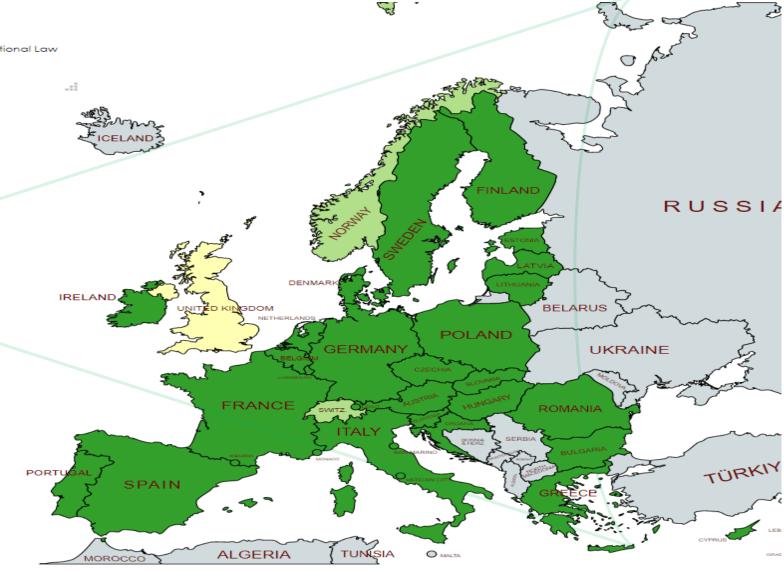
Airspace Mandate



CP1 Adopted in National Law
CP1 Mandated

Ground Mandate







Geographical Scope



SWIM Services must be deployed in the European ATM Network (EATMN)



EATMN in the CP1 Context

27 EU member states including MUAC + Norway & Switzerland.

Definition 17 of the (EU) 549/2004

COMMISSION IMPLEMENTING REGULATION (EU) .../...

of XXX

on the establishment of the Common Project One supporting the implementation of the European Air Traffic Management Master Plan provided for in Regulation (EC) No 550/2004 of the European Parliament and of the Council, amending Commission Implementing Regulation (EU) No 409/2013 and repealing Commission Implementing Regulation (EU) NO 409/2015 and repealing Commission Implementing

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union.

Having regard to Regulation (EC) No 550/2004 of the European Parliament and of the Council of 10 March 2004 on the provision of air navigation services in the single European sky (the service provision Regulation)¹, and in particular Article 15a thereof, Whereas:

- (1) The Single European Sky ("SES") aims at modernising the European air traffic management ("ATM") by improving its safety and efficiency. It contributes to the reduction of greenhouse gas emissions. The Single European Sky Air Traffic Management Research and Development ("SESAR") project constitutes the technological pillar of the SES.
- Modernisation should be steered to achieving the European ATM Master plan's vision of a digital European sky.
- 3) Effective ATM modernisation requires the timely implementation of innovative ATM functionalities. Those functionalities should be based on technologies that increase the levels of automation, cyber-secure data sharing, and connectivity in ATM. Those technologies should also increase the levels of virtualisation of the European ATM infrastructure and air traffic service provision in all types of airspace.
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Mandated stakeholders

- ✓ ANSPs (Military)
- ✓ Air space users (Military)
- ✓ (Indirectly manufacturing Industry)

Mandated AUs are globally

All AUs operating in the EATMN Airspace are mandated by this regulation to fulfil the obligations explained above and file eFPL the latest 31st Dec 2025, incl. Military GAT Traffic

CP1 deadline is 31 December 2025 status of implementation to be reported in SDM monitoring exercise.



Mandatory content of eFPL



Mandatory content (New) of the eFPL

Content:

- Trajectory points (4D Trajectory)
- GUFI

Content:

- Aircraft Take-Off Mass
- Speed Schedule
- Performance Profile

CP1	Service
Flight plan and routes generation and validation	Filling Service, Trial Service (FF-ICE/R1)
Flight plans, 4D trajectory	Filling Service, Data Publication Service (FF-ICE/R1)
Flight performance data	Filling Service (FF-ICE/R1)
Flight status	Notification service (departure and arrival events) (FF-ICE/R1)
Flights lists	Data Publication Service (FF-ICE/R1)

Mandatory Vs Optional fields of eFPL

- ☐ Flexible and Voluntary implementation in ICAO
 - Including many optional fields
- ☐ Mandatory implementation in Europe through CP1
 - Mandatory fields (Content)
- ☐ ICAOs Global strategy Applicability date 2024
- ☐ EU Mandated deployment 31st December 2025



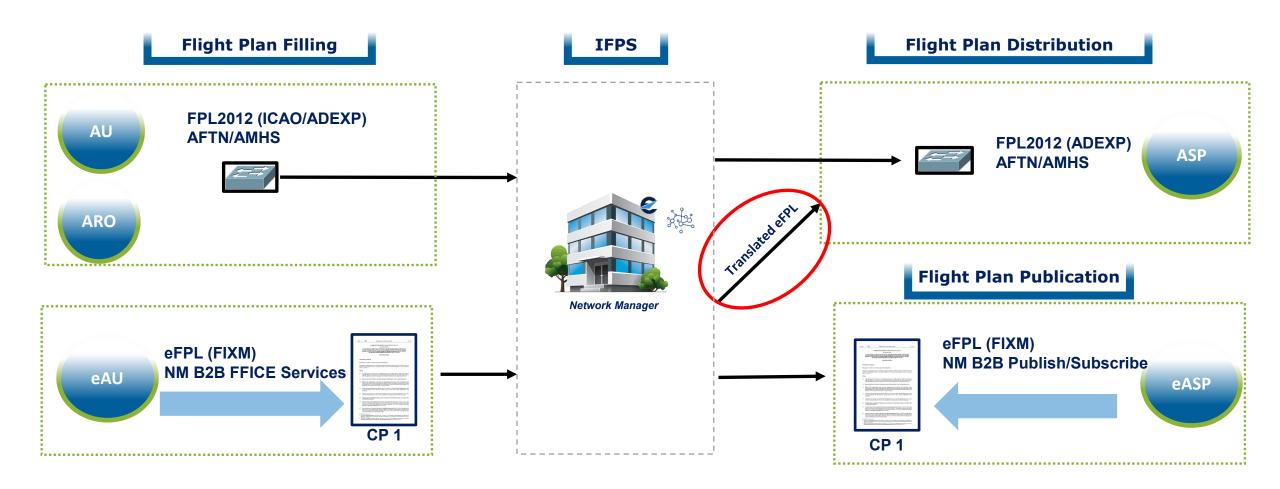


How it will work?



Implements FF-ICE, while still supporting FPL2012 over AFTN/AMHS.

Translation of FF-ICE FPLs to FPL2012 and distribution via AFTN/AMHS to non-migrated ASPs.

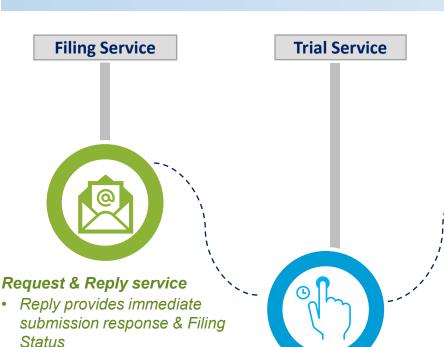




FF-ICE services implemented in Europe



The FF-Ice services in Europe are implemented and provided operationally by Eurocontrol – Network Manager using both NM B2B Request & Supply and Publish & Subscribe as explained below.



Request & reply Service providing immediate feedback on acceptability of a Flight Plan

Publication Service Publication Service supported by generic NM B2B publish & Subscribe

flight plan filing

- flight plan update
- flight cancellation
- arrival notification
- departure notification
- · re-evaluation process results
- Publish & Subscribe



Data Request Service

Request & reply service allowing immediate access to Flight Plan data





Request & reply service allowing submission of notifications of significant events in the cycle of a flight

 Distribution of changes to events are done via NM Publish & Subscribe



Changes can be obtained via

Request /reply or

Publish/subscribe

FF-ICE R1 Impact on stakeholders

ANSPs

ARO: Serve AUs filing eFPLs via the ARO function – fpls received

daily in IFPS from +500 different AFTN adresses

FDP: Use eFPL as primary fpl data source, processing all the

data shared in the eFPL.

Each state (27+2) needs to mandate an organisation to offer flight plan filing on behalf of the AUs, and this organisation will have to do so using Filing service filing eFPLS



AUs

File eFPLs including <u>all</u> the <u>mandatory information</u> elements from <u>CP1</u>

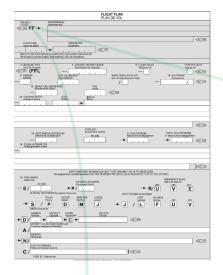
CFSPs & Manufacturing Industry

Ensure they have the systems and product available to fulfill the CP1 requirements





FPL vs eFPL



FPL2012

- Human readable
- Space for errors
- No visual representation



eFPL

- Only machine readable
- Possibility for digital and richer data, e.g. performance data
- Multiple possibilities for visual representation
- Structured route trajectory description





- ✓ We will not have mixed operations forever
 - ✓ A need for global transition to eFPL
- ✓ Global Implementation = Global Benefits
 - ✓ Global Sunset date in 2034?



The magnitude of the change and transition



FPL2012 transition

- No basic FPL Format change
- Main Changes were to field content
- Additional fields in some cases
- Same exchange mechanism AFTN/AMHS
- Translation to legacy format took place for many years after



eFPL transition

- New FPL Format
- New content e.g Flight Performance data
- New Exchange Mechanism SWIM







Transition from FPL2012 to eFPL.

A much greater change than FPL2012 transition





FF-ICE Operational in Europe



 Flight Planning software (Lido Flight 4D) provider Lufthansa Systems (LSY) participated with Eurocontrol NM in SESAR validation exercises since 2011

Common SESAR Deployment project established (Lufthansa, Air France, Lufthansa Systems)

Intense testing between DLH-LSY-NM-DFS since 2019

- On 15, Dec 2022, a Lufthansa flight from Munich to Hamburg was supported by the first ever eFPL filed to the NM OPS system a world premiere
- The eFPL was calculated and filed with LIDO FLIGHT 4D
 a flight planning solution from Lufthansa system (LSY)

First flight supported by pre-flight 4D-trajectory data exchange performed by Lufthansa in the European Network

THIS COVERS

OPIDISED OFERATIONAL PERFORMANCE ...

DISTRALISATION AND DESENTION NAM...



2022

2011



First flight supported by pre-flight 4D-trajectory data exchange performed by Lufthansa in the European Network | EUROCONTROL



European FF-ICE/R1 Implementation and Support Initiative

*=

31st March 2024

Finalise the

Roadmap & PMP





14th June 2023 NDOP & NDTECH advice on the Master Plan & AIC



30th Nov 2023 Analyse FF-ICE/R1 Req & Use cases



30th Nov 2023
Approve the FF-ICE/R1
master Plan & AIC



31st Dec 2023

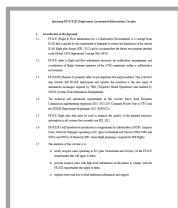
Pre –Implementation

Safety Assessment

Master Plan



AIC



Testing of eFPL

Implementation of necessary Technical & Operational changes



30th June 2024
Finalise discussions
with Manufacturers



Date: 31/12/2025

Migration to eFPL

2023

2024

2025

2026

2027

2028



Today

FF-ICE Support Initiative





Modernising
Air Traffic Management
As One

Follow SESAR deployment:

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LinkedIn: <u>SESAR Deployment Manager</u> Facebook: <u>@SESARDeploymentManager</u>

Instagram: sesar_deployment

