Supporting Material to SESAR Deployment Programme implementation Update 2025

Final version

23rd June 2025

Table of Contents

Contents

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Introduction

This SDP Supporting Material complements the SESAR Deployment Programme 2024 that was delivered to EC on 30th September 2024.

It includes elements aiming at increasing the clarity of the SDP itself, as well as providing additional guidance for stakeholders required to invest in the CP1 implementation. For instance, it includes the recommended Deployment Approaches with selected priorities per ATM Functionalities (so called Short-Term Deployment Approach) and the main risks to be taken into account. It also contains the performance methodology applied by SDM to estimate the benefits delivered by the CP1 implementation.

The document includes an update of the Standardisation and Regulation support to CP1 deployment, addressing the standards, specifications, Means of Compliance, etc. that are supporting the implementation of the SDP Families.

1. SDP 2024 further clarification

Introduction

The SESAR Deployment Programme 2024 has been developed in accordance with the CP1 Regulation to detail and drill down the system requirements foreseen and it can be updated only as a consequence of the CP1 regulation modification. Nevertheless, during consultation and interactions with stakeholders, some further clarifications appear necessary.

The objective of this chapter is to go through some requirements that may be subject to different interpretations or that need some further clarifications and provide the necessary support to the stakeholders in order to achieve a synchronised and seamless implementation.

AF1 - Extended AMAN and Integrated AMAN/DMAN in the High-Density TMAs

Family 1.1.1 Arrival Management extended to en-route airspace

Geographical scope

The "Geographical scope" in the SDP should read as "*Extended AMAN shall be deployed at ATS units responsible for the TMA airspace of the airports listed in the Regulation, and in the associated en-route sectors within 180 nautical miles and in the ATS units responsible for terminal operations at in-horizon airports located within 180 nautical miles*" (instead of "Extended AMAN shall be deployed at ATS units corresponding to the following airports and in the associated en-route sectors within 180 nautical miles").

Information Exchange Requirements

System requirement (b) of the Regulation reads that "*Existing data exchange technology may be used until SWIM is available*". It is hereby clarified that this requirement to use existing data technology or SWIM applies in cases where the ATS Unit responsible for the TMA / Extended AMAN operations and the ATS unit responsible for an adjacent ACC (en-route)/ATS-units responsible for terminal operations at in horizon airports, to which advisories should be provided, operate on the basis of separate ATC Systems requiring external network communication.

System requirements in the SESAR Deployment Programme Family 1.1.1 - Arrival Management extended to en-route airspace assume that the AMAN ATSU and upstream (remote) ACC ATSU each operate a different FDP, and hence a standardized interface is required between the ATSU's to communicate arrival management information. This assumption may not necessarily be true and in some cases the local (AMAN) ATSU and the remote ACC ATSU are using a common FDP, and the need for a standardized interface is therefore dispensed with.

In such a case, in order to achieve compliance with CP1, the ANPS provider should ensure that they meet the following outstanding system requirement in the SDP, irrespective of the means of sharing of the arrival management information:

In order to facilitate timely implementation of the arrival sequence, a sector receiving arrival messages shall display arrival management information to the controller.

Implementing to a shortened horizon distance

The CP1 mandates a minimum range of 180 NM, but a shorter range can be considered when recommended in SDP. In the SDP this provision is clarified as: "*when, due to the geographical location of the arrival airport, the extension of the AMAN does not provide additional performance benefits*". In such cases, when the stakeholders have considered a horizon range less than 180 NM from the mandated airport, they shall provide relevant evidence/report of justification of no additional performance benefits, **for assessment and verification by the SDM/ EASA/ Competent Authority.**

In order to facilitate the assessments and harmonize the production and presentation of the supporting evidence, SDM, with the support of the AF1 Coordination Platform[1], elaborated a document[i] titled 'Family 1.1.1 - Extended AMAN non-applicability assessment process'. This document[2] offers an overview of the relevant regulatory text, provides guidance on the assessment criteria, the verification process and the manner in which its outcomes are recorded in the SDP. It is agreed that the reduction of the 180 NM is not meaningful globally (e.g. to change the range from 180 NM to 120 NM over the 360° horizon) but this reduction needs to apply only in certain portions of the airspace. Furthermore, it is also agreed that the best portioning, from an operational viewpoint, is one already existing, i.e. airspace portioning in ACCs. Therefore, the process allows for ANSPs managing a mandated TMA to request that the Extended AMAN

[1]The SDM AF1 Coordination Platform is established, with the purpose of providing a platform for exchanges between SDM, and associated operational stakeholders required to implement ATM Functionality 1: Extended Arrival Management and Integrated Arrival Management (AMAN)/Departure Management (DMAN) in the High-Density Terminal Maneuvering Areas, as defined in EU IR 2021/116 Common Project One.

[2] Document referred as part of the Guidance material related to Family 1.1.1 in the chapter Standardisation and regulation support to CP1 requirements.

horizon is not covering certain ACC(s) -located within the 180 NM horizon- and to provide operational justification for that -in accordance with certain criteria expressed in the document-. The SDM verified such criteria and provided their resulting assessment of the request. If this assessment was positive, corresponding ACC's were reported as Not Applicable for the purposes of AF1 implementation monitoring of Extended Arrival Management at the respective CP1 airport.

SDM maintains a table listing the received requests for assessment and their associated status with regards to the progress of the related assessments. In addition to the SDP, this table will be made available on the SDM public site, in addition to the SharePoint site of the SDM AF1 Coordination Platform.

Treatment of in-horizon airports

In paragraph 1.1.1 System requirements, the Regulation [2021/116 Annex] provides that:

(a) Extended AMAN systems shall provide arrival sequence time information and associated advisories into en-route ATC systems to a minimum of 180 nautical miles from the arrival airport ***as well as into ATC systems of airports impacted by the extended AMAN horizon,*** *unless a shorter distance is recommended in the deployment programme.*

Further, in paragraph 1.3 Stakeholders required to implement the functionality and the implementation target dates, the regulation provides that:

(c) Air traffic control ('ATC') services in the terminal manoeuvring areas ('TMAs') implementing extended AMAN operations ***shall coordinate*** *with air traffic services ('ATS') units responsible for adjacent en-route sectors as well* ***as ATS units responsible for inbound traffic originating from airports covered by the extended AMAN horizon.***

Taking note of the stricter requirements related to the associated en-route sectors in that same paragraph 1.3:

(a) ATS providers and the Network Manager shall ensure that ATS units providing ATC services within the terminal airspace of the airports referred to in point 1.2 and the associated en-route sectors operate extended AMAN by the implementation target date of 31 December 2024.

Which reflects the text in 1.1.1 General addressing only the en-route sectors,

"[…] Traffic sequencing/metering shall be conducted in en-route before top-of-descent in order to improve predictability and to smoothen the flow of traffic".

In conclusion, the SDP Supporting Material aims to provide acceptable clarifications concerning the expected level of implementation related to the in-horizon airports. The following text provides for such clarifications:

- In terms of geographical scope, only airports referenced in the scope of Family 1.1.1 should be considered as in-horizon airports in the context of this ATM functionality. There is no implementation requirement on other airports.
- In order for effective sequencing in the extended horizon to take place, accurate and stable flight information is required at the input to the trajectory prediction that underpins the construction of the arrival sequence. At present, departure planning information typically does not meet that criterion and as a result, sequencing of a flight prior to departure is rarely feasible. Rather, a departure from an in-horizon airport will only be sequenced once airborne, with also potentially detrimental effect on the already established sequence.
- The distribution of advisories is dependent on the flight being sequenced. Therefore, the unavailability of usable departure planning data defeats the intent behind the system requirement to send the advisories to the ATS unit of the in-horizon airport since advisories for such a pop-up flight will only become available after the flight has departed.

While considering the System requirements related to in-horizon airports and maximizing the benefit to the Airspace User, the following is recommended to ANSPs mandated to implement the Extended AMAN functionality:

- In the cases **when pop-up departures can be accommodated** (i.e. consideration of a flight in the AMAN sequencing when in-flight) through existing operational **procedures without routinely**

requiring the cancellation or revision of previously implemented advisories concerning other flights (i.e. the sequence is undisturbed), then no further implementation is required.

- Otherwise, the ANSP operating the AMAN should review and assess the availability and suitability of departure planning information at the respective in-horizon airports. If departure planning information is available and assessed as usable for AMAN operations, it should be considered for use in the sequencing process; otherwise, a shortening of the implementation horizon is permissible in accordance with section **"Implementing to a shortened horizon distance"** above.

SDM provides a list of such airports[3] including information on the arriving traffic share to each airport in scope of AF1. Within that same list, SDM, in coordination with mandated Stakeholders, will provide details on the local implementation related to each in-horizon airport (in accordance to the description above).

"Shall coordinate" in Regulation text 1.3. Stakeholders required to implement the functionality means by SDM as the need to coordinate actions regarding any aspects of the technical implementation, bilateral agreements and resulting operational adaptations between the respective ATS providers, as opposed to operational ATC-ATC coordination and transfer. The approach to the in-horizon airport problem is summarized in the following figure:

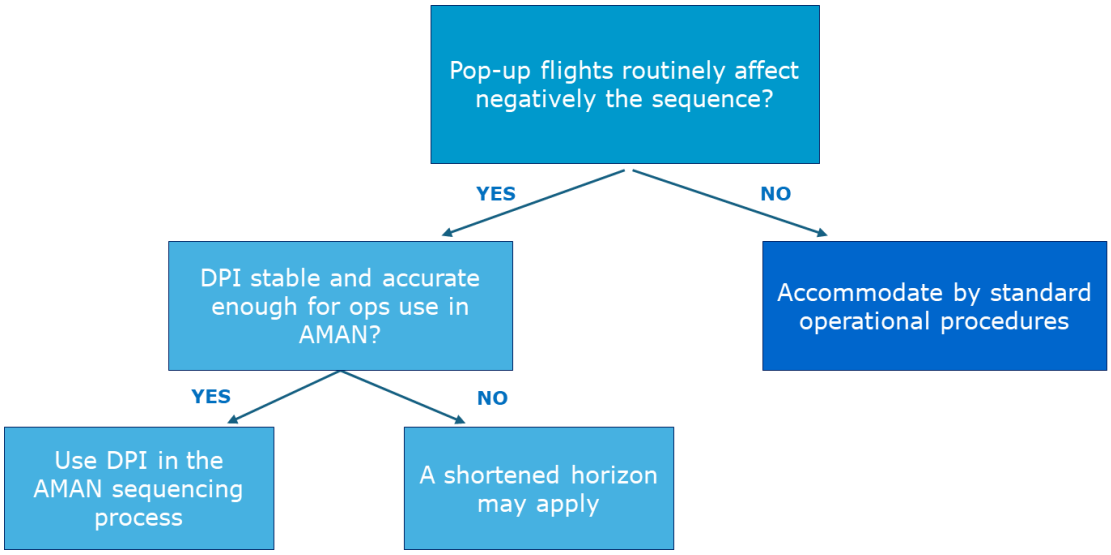


Figure 1. Coordination with in-horizon airports

Family 1.2.1 AMAN-DMAN Integration

Two SESAR Solutions are available to meet the system requirements of the Regulation.

- AMAN/DMAN Integration, based on SESAR Solution #54 Flow based integration of Arrival and Departure Management
- Integrated runway sequence for full traffic optimization on single and multiple runway airports (IRSM), validated in PJ02-08-01 and PJ02-08-02 in 2023.

From the deployment perspective, either may be implemented from scratch and each will satisfy the objective of the Regulation. The SDP deployment milestones have been updated to account for the addition of the PJ02-08 solution; see new milestones proposed in the SDP 2024.

Furthermore, and in recognition of the fact that, at the time of drafting of this chapter, standardization support to the implementation of coupled AMAN/DMAN is lacking, the SDP system requirements (i.e. AMAN and DMAN systems shall be able to share data to be included in their planning algorithms calculating arrival and departure flows; The integration of AMAN and DMAN shall be based on the optimised pre-departure sequence and interfaces with airport CDM systems) is further clarified as follows:

[3] To be uploaded in the SDM website

1. There should be an automated way for an exchange of constraints between the sequence planning processes.

   a) The AMAN function should be provided with up-to-date information on DMAN data and constraints, including A-CDM, pre-departure sequence information (TSAT, TOBT, TTOT) on the departing flights for consideration in the building of the arrival sequence, or,

   b) The DMAN function should be provided with up-to-date information from the arrival sequence (ELDT, TLDT) for consideration in the building of the departure sequence, or,

   c) both planning processes shall forward their constraints to a third process, responsible for the integration. SDP is not prescriptive of any architectural approach to meet the system requirement.

Note that the stability horizon of both parent sequences may not necessarily be comparable. Typically, the arrival sequence will be stable and frozen much earlier than the departure sequence and therefore there will be always a need for manual adjustments, in addition to the level of automation implemented. At the same time, priority on accommodating arrivals and departures will also vary, locally, with time and with dependency on other factors external to the sequence planning process, such as, for example, unexpected weather, runway closures and inspections.

2. The integrated planning process should make a proposal on the integration of the sequences taking into account any locally defined operational strategies, present the proposal in an HMI and involve the human operator(s) for any adjustments or refinements whenever appropriate or required. The interaction with the human operator may be realized at the following levels of automation:

   d) Display of respective constraints and prompt for manual action to accommodate both sequences and achieve integration.

   e) Display of the modifications proposed by the system to integrate both sequences, allowing for a manual validation, adjustment and execution by the operator.

   a) Automatic modification without manual validation but alerting the operator to any change effected by the automated process whilst allowing a manual intervention as required.

AF2 – Airport Integration and Throughput

Family 2.1.1 Departure Management Synchronised with Pre-Departure sequencing

Variable Taxi Times (VTTs) is an area that have been subject to different interpretations. The reasons for having the most predictable VTT is that this leads to the most predictable Take-Off Time (TOT) which helps with network capacity planning and reducing delays. The DPI & API Implementation Roadmap defines the acceptance criteria for DPI messages including TTOTs that are impacted by VTTs.

The roadmap references the A-CDM Manual 2017 which has this to say about VTTs in section 3.4 Variable Taxi Times: "In order to keep track of the traffic situation taxi time parameters can be adjusted in order to hold or release aircraft at/from the stand, with the purpose to regulate traffic based on actual events. Surveillance data from radar or routing information from Advanced SMGCS, clearance input from controllers, or manual controller correction of taxi time values are all means to modify the taxi time estimates into more realistic values".

Regarding the Advanced taxi time calculation, the methods previously detailed concern static data obtainable from look up tables. Available systems or tools (e.g., A-SMGCS) should be able to accurately and progressively predict the taxi time dynamically using more sophisticated data sources. Any ground movement surveillance equipment, taking into account the conditions or position of the aircraft, will be able to improve the prediction of EIBT and ETOT or TTOT.

More specifically, it must be considered that routing and planning are not needed to achieve VTTs. The difference between having routing and not having routing is that the initial estimate is potentially better. But once the aircraft is en-route to the holding point, and route clearances are put into the ECI (EFPS) system then the update based on live traffic derived from A-SMGCS method is the same, albeit the complete route to the holding point may not be known at that time. The estimate can still be updated though based on known data and this is better than a completely static table. This means that a look-up table that does not then take account of live apron and taxiway traffic will not give an accurate result.

Family 2.2.1 and 2.2.2 Initial and extended AOP (iAOP & E-AOP)

The SESAR Solution 21 and OFA 5.1.1 that were the first incarnation of this AOP topic and data sharing with the NM contained too many parameters to be practical. ACI Europe therefore lead the work to define the means of compliance to implement the iAOP. The document references all the NM implementation guides and roadmaps that support the data exchanges needed for Families 4.2.2 and 4.4.1. The compliance document is referenced in the Standard and Regulations section of this Supporting Material document. Similar documents have been produced to provide guidance to the CP1 (IR2021/116) for the extended AOP and integration of the extended AOP with the network operations plan (see Standards and Regulations in this document).

Family 2.3.1 Airport Safety Nets

The area of interpretation is about the meaning of local variations in relation to safety nets. Quote from CP1 section 2.1.3 ATM sub-Functionality on airport safety nets:

"Any local limitations to the introduction of the airport safety support service must be indicated in the deployment programme. The RMCA function acts as a short-term alerting tool, whereas the CATC and CMAC act as predictive tools that aim at preventing situations where an RMCA alert may be triggered. "

And from the system requirements in that section:

"Airport safety nets must integrate advanced surface movement guidance & control system (A-SMGCS ') surveillance data and air traffic controller clearances related to the manoeuvring area. Airport conformance monitoring must integrate A-SMGCS surveillance data and when available surface movement routing and air traffic controller routing clearances.

A-SMGCS must include a function to generate and distribute the appropriate alerts. Such alerts are meant to supplement, not replace, the existing RMCA. "

The reference documents for compliance to safety nets are:

EUROCONTROL Specification for Advanced-Surface Movement Guidance and Control System (A-SMGCS) Services document reference EUROCONTROL SPEC 171 dated April 2020. For a better understanding and interpretation, Spec 171 uses the following language conventions:

Shall – indicates a requirement which is mandatory or necessary to provide conformity with this specification.

Should – indicates a requirement which is recommended.

May – indicates a requirement which is optional or permitted.

This document references the EUROCAE standard ED-87: EUROCAE Document ED-87D Minimum Aviation System Performance Standard (MASPS) for Advanced Surface Movement Guidance and Control Systems (A-SMGCS) dated June 2019.

The specification (EUROCONTROL SPEC 171) identifies the types of alerts and safety support services in section 3.3 Airport Support Services as:

"The Airport Safety Support Service is designed on the basis of one or more of the following three functions. These functions may be partially introduced depending on local requirements e.g. not all CATC or CMAC alerts may be suitable depending on the aerodrome layout: Runway Monitoring and Conflict Alerting (RMCA); Conflicting ATC Clearances (CATC); Conformance Monitoring Alerts for Controllers (CMAC)."

Section 6 A-SMGCS requirements states in the opening paragraph that:

Whichever of the services and associated requirements are selected for implementation, discussion is required between the local ANSP, airport operators and regulators. In particular there is a need to identify which local parameters should be used, e.g. when and which alerts are triggered, on which control positions and how they should be displayed "

Section 6.3 Airport Safety Support Services lists the following mandatory services as mandatory by use of the word "shall":

"A-SMGCS-[SAFE]-[010] The Airport Safety Support Service shall be designed on the basis of one or more of the following functions RMCA, CATC and CMAC."

Since it is stated that not all CATC and CMAC alerts may be suitable as noted above, only RMCA has no caveats attached to it. Combined with the language of CP1 of must in relation to RMCA alerts as noted above, RMCA is mandatory with no exceptions. As a footnote, RMCA does not rely on routing and planning functions.

CATC and CMAC must also be implemented and any local variations must be agreed between the local ANSP, airport operators and local regulators.

According to CP1 Annex Section 2.1.3 ATM sub-functionality on airport safety nets:

"Any local limitations to the introduction of the airport safety support service must be indicated in the deployment programme." The specification EUROCONTROL Spec 171 Edition 2 includes in Appendix E a useful check on conformity assessment to the specification and will be used to capture local limitations. Therefore, airports required to operate safety nets are asked to complete the following tables from 6.3 Airport Safety Support Service: 6.3.1 General requirements, 6.3.2 RMCA Requirements, 6.3.3 CATC requirements, 6.3.4 CMAC requirements, 6.4.1 General routing requirements, 6.4.3 Controller interaction, 6.4.4 Provision of taxi times.

These tables would have to be completed after the implementation of Safety Nets. When reporting, in the frame of the next SDM Monitoring Exercise, completion of DM1 (RMCA) and DM2 (CATC & CMAC) please indicate in the comments field if limitations exist to these safety support services and that these are recorded in the above tables together with a corresponding safety assessment as described in DM4. The completed tables should be sent to the SDM using the email address DPMonitoring@sesardeploymentmanager.eu to be kept on record but will not be published in the SDP. Also, a copy should be kept by the implementers so that they are available for inspection by any competent authority carrying out a post implementation audit.

AF3 – Flexible ASM and Free Route Airspace

Despite CP1 compliance related to the implementation of Family 3.1.1 - Airspace Management and Advanced Flexible Use of Airspace and Family 3.1.2 - Management of Predefined Airspace Configurations has been granted for the majority of countries thanks to the operation of available NM systems (CIAM, CHMI), the deployment of a local ASM tool represents an important milestone to implement the AF5 SWIM services.

Stakeholders are invited to continue reporting on their local ASM tool implementations, by updating Family 3.1.1 DM1a, DM3, DM4, DM5, DM8, DM9 on next Monitoring View.

SDM will take advantage of this available information to monitor AF5- Family 5.3.1 – ARES Services, support implementing stakeholders and raise any potential risks.

AF4 – Network Collaborative Management

This section aims at clarifying the AOP/NOP data exchanges and referencing all NM implementation guidelines and roadmaps that support the data exchanges needed for Families 4.2.2 and 4.4.1. The details to all the documents referred can be found in Chapter 4.4.

Family 4.2.1 Interactive Rolling NOP

The DM3 for ANSP refer to reception and handling of the Target Time from the slot allocation and revision messages. Any "TTO" field if present in the SAM (Slot Allocation Message)/SRM (Slot Revision Message) contains this data element to indicate that the corresponding CTOT is always adjusted to respect the most penalizing regulation contained in the TTO.

Receiving the target time from SAM/SRM and handle it in the systems is the basis for any procedures or processes related to airborne target time adherence in the future.

Family 4.2.2 Initial AOP/NOP Information Sharing

The suggested sequence to look at the supporting documents is to start with the "Guidance on Compliance" document, giving a summary on the requirements in the CP1 related to iAOP and AOP-NOP. Details on the data elements to be exchanged should be taken from the iAOP-NOP implementation guide, which is a document that was produced by ACI Europe together with EUROCONTROL where the data elements were agreed. Apart from the data elements it also comprises a summary of the steps to be taken to establish the iAOP-NOP connection that should be taken into consideration during the project planning. The technical details for the data exchange and guidelines are then to be taken from the referenced EUROCONTROL documents therein (e.g. DPI Implementation Guide, API Implementation Guide).

Family 4.4.1 AOP/NOP Integration

For Family 4.4.1 - AOP-NOP Integration a document on "Guidance to the CP1 (IR2021/116) for the extended AOP and integration of the extended AOP with the network operations plan", as well as a document giving information about how to implement the connection with the NOP and related data elements ("E-AOP-NOP Implementation Guide") have been published. Similar documents[4] had already been released for the iAOP-NOP context. Please note that stakeholders targeting Extended AOP implementation should also refer to the documents on iAOP and iAOP-NOP to obtain a complete picture (please also refer to AF2 documentation on these Families). It is important to always consult the latest versions of the technical documentation of EUROCONTROL referred to in these documents.

[4] See chapter 4 Standardisation and Regulation support to CP1 deployment

AF5 – SWIM

The SDP Deployment Milestones have been updated to cover a set of technical requirements. The mandatory requirements are in the SDP and the additional necessary clarifications, concerning AIM and MET, are found in the supporting material. All requirements are referenced in the Deployment Milestones.

General SWIM Requirements clarification

The provision of SWIM Services requires the registration of the SWIM Service in the SWIM registry where it, if compliant with CP1, will get a "CP1 & SWIM compliant" stamp.

Only the consumption of services with such dedicated stamp will make consumers CP1 compliant.

Family 5.2.1 - Stakeholders' SWIM PKI and cyber security

Introduction

This guidance material provides a structured approach to the implementation of PKI 5.2.1 within the System Wide Information Management (SWIM) framework. It outlines key principles, deployment options, and compliance requirements for stakeholders, ensuring alignment with common technical domain standards and European aviation standards.

Why PKI is Essential:

Public Key Infrastructure (PKI) plays a crucial role in securing inter-stakeholder communication within air traffic management. The adoption of a common PKI ensures interoperability, trust, and secure data exchange among ANSPs, airports, and other aviation stakeholders.

Implementation Options for Service Providers:

1. Developing a Local PKI:

Stakeholders may choose to establish their own PKI, which involves defining local policies, implementing audit programs, and ensuring compliance with common security standards. Interoperability with National/local PKIs shall be achieved through the European Aviation Common PKI (EACP) solution. For this reason, it's hugely important to engage with the EACP early in the implementation process, as detailed implementation requirements may depend on the implementation option.

2. Using the EACP Solution:

Stakeholders can opt to use the EACP solution, which provides standardized digital certificates and trust services. This approach simplifies compliance and ensures seamless integration with the SWIM environment.

3. Hybrid Approach

A combination of both approaches is also valid, allowing stakeholders to maintain internal PKI systems while using the EACP for external communications.

Implementation for Service Consumers:

Regarding consumers of services, the requirements can be fully achieved by having an Information Security Management System (ISMS) covering the use of Digital Certificates, assuming that the following basic certificate validations are done. Regardless of the option chosen, validation is key. For Service Providers, the following basic validation shall be done on the client certificate.

Client Certificate Validation Process:

To ensure secure authentication and maintain the integrity of communications, the following key checks should be performed when validating a client certificate:

1. Client Identity Verification
   - The server must authenticate the client by validating the provided certificate.
   - This ensures that only legitimate users or systems can access the service, preventing unauthorized access attempts.
2. Trust Chain Verification

- The service provider must verify that the client's certificate is issued by a trusted Certificate Authority (CA).
- This is achieved by checking whether the certificate chain correctly links back to a recognized and trusted root CA.
- Any certificate that fails this verification should be rejected.

3. Certificate Revocation Check
   - The server must check whether the client's certificate has been revoked to prevent compromised or invalid certificates from being used.
   - This can be done by verifying the certificate against a Certificate Revocation List (CRL) or using the Online Certificate Status Protocol (OCSP).
4. Validity Period Confirmation
   - The certificate's validity period must be checked to ensure it is currently active.
   - Expired certificates must be rejected, as they are no longer considered secure.
   - The system should also account for potential time discrepancies to avoid premature rejection of valid certificates.
5. Certificate Usage Validation
   - The intended purpose of the certificate must be verified to ensure it is specifically designated for client authentication.
   - This involves checking the Extended Key Usage (EKU) field, which should explicitly allow "TLS client authentication".
   - Certificates intended for other purposes (e.g., server authentication or code signing) should not be accepted for client authentication.

Conclusion:

By implementing these validation steps, service providers can ensure robust client authentication, enhance trust and security, and mitigate risks associated with invalid, expired, or compromised certificates.

Server Certificate Validation Process:

To ensure secure communication and protect against impersonation attacks, clients must validate the server's certificate before establishing a trusted connection. The following key verification steps should be implemented:

1. Server Identity Verification
   - Clients must validate the server's certificate to confirm that they are communicating with the legitimate server rather than a malicious actor.
   - This process typically involves checking the Common Name (CN) or Subject Alternative Name (SAN) field in the certificate to ensure it matches the expected domain or hostname.
2. Trust Chain Verification
   - Clients must verify that the server's certificate is issued by a trusted Certificate Authority (CA).
   - This involves validating the entire certificate chain back to a root CA to ensure that all intermediate certificates in the chain are also trusted.
   - If the certificate does not chain back to a trusted CA, the connection should be rejected.
3. Certificate Revocation Check
   - To prevent the use of compromised or revoked certificates, clients should check the server's certificate against: A Certificate Revocation List (CRL) published by the issuing CA or using the Online Certificate Status Protocol (OCSP) for real-time revocation status.
   - If the certificate is found to be revoked, the client must terminate the connection.
4. Certificate Expiry and Validity Period
   - Clients must verify that the server's certificate is currently valid and has not expired.
   - Expired certificates indicate that the entity has not renewed its authentication credentials, which may expose the system to security risks.
5. Certificate Usage and Extensions Validation
   - Clients must check that the server's certificate is specifically intended for server authentication.
   - This is determined by verifying the Extended Key Usage (EKU) field, which should include "TLS server authentication".
   - Certificates issued for other purposes (e.g., client authentication or code signing) should not be accepted as valid server certificates.

Conclusion:

By implementing these validation steps, clients can ensure secure and authenticated connections, protect against impersonation attacks, and maintain the integrity of encrypted communications.

Compliance and Security Monitoring:

Regardless of the chosen implementation approach, stakeholders must implement monitoring and control mechanisms to oversee the lifecycle of digital certificates. This includes:

- Regular audits to ensure adherence to security policies.
- Automated tools for certificate tracking and expiration alerts.
- Incident response strategies for handling compromised certificates.

Deployment Timeline and Stakeholder Responsibilities:

The SESAR Deployment Manager (SDM) continues to monitor the implementation progress of PKI 5.2.1. Stakeholders are encouraged to align their implementation strategies with the SESAR Deployment Programme to ensure timely compliance by end 2025.

Conclusion

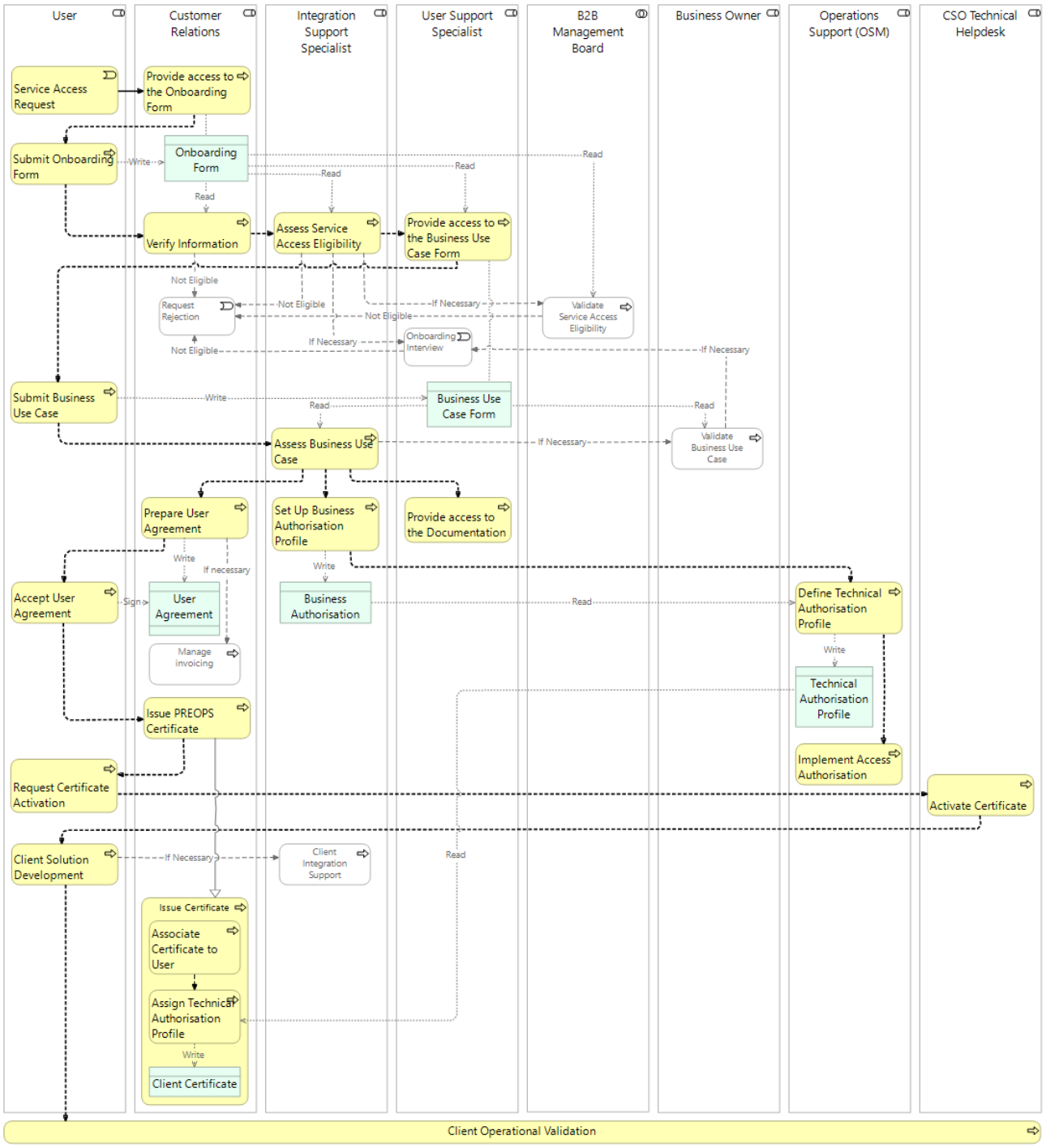
The implementation of PKI 5.2.1 is a fundamental step towards enhancing cybersecurity and interoperability in European aviation. By adopting a structured approach, stakeholders can ensure compliance with SWIM TI Yellow Profile standards and contribute to a secure digital aviation ecosystem.

NM support for user onboarding

The User Onboarding process is a critical aspect of the NM B2B API service delivery management, as it outlines the steps necessary for its successful integration with client solutions.

As illustrated in the diagram below, the User Onboarding process is composed by the following main steps:

- **Verification of identity and affiliation**: Includes a step to verify the identity of the user and their affiliation with an organisation, if applicable.
- **API usage intent and scope:** users are required to provide a clear description of how they intend to use the API. This helps in understanding users' operational needs and ensuring that their intended use aligns with the NM B2B API's capabilities and policies.
- **Assessment and approval**: process for reviewing and approving applications. This involves checking the provided information for completeness and accuracy, ensuring that the requested use case is legitimate and aligns with NM's policies, and potentially conducting a risk assessment.
- **Acceptance of terms and conditions**: users are required to accept NM Service Access Agreement describing terms and conditions applicable to the provision and consumption of the API, including data segregation policies, and any usage limits or fees.
- **Provision of access credentials:** Once a user is approved, a client certificate is provided to grant access to the PREOPS platform, according to the appropriate authorisation profile.



Family 5.3.1 – Aeronautical Information Exchange

Air Space reservation Service (ARES)

Applicability to FIR Border Areas (Clarifying ARES-006 and ARES-007 in the SDP)

The requirements apply to all areas near the FIR boundary, where there is the need of FUA pre-tactical and tactical coordination of airspace structures between adjacent Flight Information Regions (FIRs).

Updating LoAs to Include Airspace Reservation Sharing

Applicable airspace structures are identified in existing Letters of Agreement (LoAs), which should serve as the primary reference for defining cross-border airspace management arrangements, in line with DM5 of Family 3.1.1.

If LoAs between ANSPs do not contain provisions for coordination of airspace reservation at FUA pre-tactical and tactical levels, they should be reviewed and updated to define clear procedures.

The updated LoAs should specify the areas subject to the ARES service between the countries.

Creation of Ad Hoc Airspace Reservations

ANSPs could ensure that ARES supports the dynamic creation of ad hoc airspace reservations within their designated Area of Interest (AoI).

Such ad-hoc reservations impacting neighbours' activities should be coordinated with neighbouring ANSPs, ensuring alignment on activation procedures, usage conditions, and deconfliction with general air traffic (GAT).

Integration of Restricted and Danger Areas

Thanks to the real-time information exchange through ASM-ASM, ANSPs could take the opportunity to share the existing Restricted Areas (R) and Danger Areas (D) as part of the flexible airspace framework.

Ensuring Interoperability

Effective coordination between ANSPs is key to ensure seamless implementation of ARES across FIR boundaries.

ANSPs should verify the availability and operational status of ARES in neighbouring FIRs, ensuring alignment with airspace management processes.

Digital NOTAM Service (Clarifying DNOT102 and DNOT105)

This section clarifies the minimum required CP1 mandatory data scope to be implemented by all mandated AISPs for the Digital NOTAM service.

- The digital NOTAM service implementation conforms with the DNOTAM Spec (v2.0) (material currently available to be published formally in 2025) for the encoding of events in AIXM 5.1.1.
    - The DNOTAM specification considers 24 different event scenarios, however those mandated for CP1 are defined by the DNOTAM Service Definition.
    - https://ext.eurocontrol.int/aixm_confluence/display/DNOTAM/Digital+NOTAM+Specification
- The digital NOTAM service implementation is required to conform with the DNOTAM Service Definition.
    - This service definition requires that all AISPs implement, as a minimum, the 8 mandatory event scenarios listed in its appendix.
    - The service definition recommends that all AISPs implement the other 16 event scenarios.
    - The service definition is available in the European SWIM Registry and it is recommended for the interoperable implementation of the Digital NOTAM service in accordance with CP1 and SDP.
        - https://eur-registry.swim.aero/services/eurocontrol-digital-notam-subscription-and-request-service-010000
- The digital NOTAM service implementation is expected to support the use cases and associated events (included in the clarification statements of SDP2024) within the area of responsibility of the AISP and when the conditions apply.
    - https://swim-eurocontrol.atlassian.net/wiki/spaces/ASW/pages/60031290/Digital+NOTAM+Use+Cases
    - The implementation of the 8 mandatory events enable to support each of the identified use cases. It is to be understood however that for the full support of the use cases, additional events will be required to be implemented.
- The digital NOTAM service provides information on events (temporary changes) that are expressed in relation to a static aeronautical information baseline that is to be made available via the AIFS service..

The table below summarises the Digital NOTAM event scenarios that are required to be supported and their relationship to the supported use case. This table is part of the Digital NOTAM service definition (Appendix B- Information definition.

Event Scenario ID	Event Scenario Name	Use Cases			
		ePIB	TO/L Calc	Winter Cond	Airspace/VFR
AD.CLS	Aerodrome/Heliport - closure (NOTAM)	x		x	x
AD.LIM	Aerodrome/Heliport - limitation (NOTAM)	x			
OBS.NEW	Obstacle new - decoding				x
RWY.CLS	Runway - closure (NOTAM)	x		x	
RWY.LIM	Runway - usage limitation change (NOTAM)	x	x		
SAA.ACT	Published special activity area - activation (NOTAM)				x
SAA.NEW	Ad-hoc special activity area - creation (NOTAM)				x
SFC.CON	Surface condition report - decoding	x			

AIM feature Service and Aerodrome mapping service (Clarifying AIFS101-AIFS105)

The below table shows the minimum required CP1 mandatory data scope to be implemented by all mandated AISPs according to their own operating environment (meaning data that exists today in the AISP's catalogue). Exceptions to minima data scope should be documented and reported to SDM through the Monitoring exercise. The below table is part of the AIFS service definition (Appendix B- Information definition).

It should be considered that the AIFS service data scope should be aligned to include all information elements that support the data scope covered by the digital NOTAM service implementation, as the digital NOTAM events are expressed in relation to static aeronautical information baseline that is provided by the AIFS service.

AeronauticalGroundLight	RadioCommunicationChannel
AircraftStand	RadioFrequencyArea
AirportHeliport	Road
AirportHotSpot	RouteSegment
AirportSuppliesService	Route
Airspace	RunwayBlastPad
AirTrafficControlService	RunwayCentrelinePoint
AirTrafficManagementService	RunwayDirectionLightSystem
AngleIndication	RunwayDirection
ApproachLightingSystem	RunwayElement
ApronElement	RunwayMarking
ApronLightSystem	RunwayProtectArea
Apron	Runway
ArrestingGear	SDF
AuthorityForAirspace	SearchRescueService
Azimuth	SpecialDate
ChangeOverPoint	SpecialNavigationStation
DeicingArea	SpecialNavigationSystem
DesignatedPoint	StandardLevelColumn
DirectionFinder	StandardLevelSector
DistanceIndication	StandardLevelTable
DME	SurveyControlPoint
Elevation	TACAN

GeoBorder	TaxiHoldingPositionLightSystem
Glidepath	TaxiHoldingPositionMarking
GroundTrafficControlService	TaxiHoldingPosition
GuidanceLineLightSystem	TaxiwayElement
GuidanceLineMarking	TaxiwayLightSystem
GuidanceLine	TaxiwayMarking
HoldingPattern	Taxiway
InformationService	TouchDownLiftOffLightSystem
Localizer	TouchDownLiftOff
MarkerBeacon	Unit
Navaid	VerticalStructure
NDB	VisualGlideSlopeIndicator
ObstacleArea	VOR
Organisation Authority	WorkArea

Family 5.4.1 – Meteorological Information Exchange

General clarifications

ANSPs providing ATS & MET

Under CP1 regulation, the implementation of SWIM is mandatory. This obligation applies to both the provision and consumption of SWIM services by ANSPs and Met providers — even when both services are delivered by the same ANSP.

Although ATS and MET services may fall under the same organizational structure, they are considered as separate operational entities for SWIM purposes. Accordingly:

- It is recommended to establish distinct SWIM platforms for the MET and ATM domains, to clearly separate the provision and consumption responsibilities of each.
- In instances where the designated METP and the ATS ANSP are the same organisation, a single SWIM platform may be used. In such cases, the designated METP side should act as the sole provider, using a SWIM service to provide MET data to the ATS ANSP side of the organisation.
- Both the ATM and MET components must be able to consume SWIM services, such as retrieving SIGMETs from neighbouring FIRs, even when accessing the same data.

Within this document, the term 'METP' is used to refer to the Meteorological ANSP, as highlighted in Implementing Regulation 2017/373, and specified in Regulation 2018/1139. For consistency with the SESAR Deployment Program, and to avoid confusion with the operational 'ATS ANSP', the Meteorological

ANSP in this section will henceforth be referred to as a 'MET Provider' (METP). For further context, an overview of the scope of services, including Meteorological services is presented below.

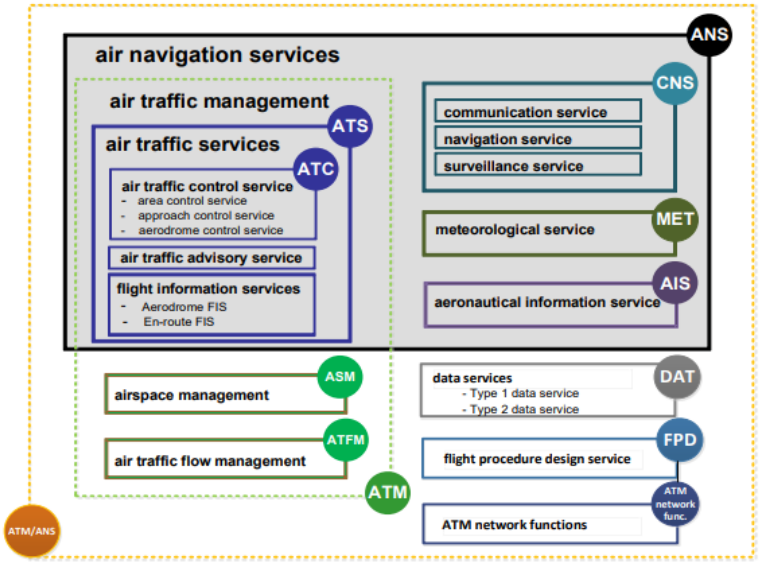


Figure 2. The scope of the services, subject to certification, as specified in Regulation (EU) 2018/1139 (Easy Access Rules for ATM /ANS – Provision of Services (Regulation (EU) 2017/373)

MET-Visualization Tool for ANSP (ACC)

For ANSPs it is mentioned in several places in this supporting material that a MET-visualization solution can be used.

MET visualisation tool should be located/hosted as part of the ATM system. It needs to receive the data either via the ANSP SWIM infrastructure or consume SWIM services directly.

ANSPs being restricted by national law (Clarifying SDP requirement METEAIS-004 and METEAIS-005)

ANSPs restricted by national law to consume MET data only from the designated national METP, is the only case (exceptional circumstances) where the ANSP does not have to consume any operationally required data via SWIM services directly from the official providers as defined in ICAO (i.e WAFS etc).

In such a case the national METP consumes all operationally necessary data on behalf of the ANSP but nevertheless use SWIM-compliant services to provide it to the ANSP.

Further clarifications - Volcanic Ash Mass Concentration Information Service [5] (Clarifying SDP requirement METVAIS-001, METVAIS-001, and METEAIS-005)

Data Scope

This information service is about the provision and consumption of the QVA (Quantitative Volcanic Ash) Concentration Information Service as discussed between and defined by representatives from ICAO, WMO and airlines, as well as aircraft and engine manufacturers. The new services/products will be included in ANNEX 3/PANS-MET (Amendment 82) with applicability from November 2025.

[5] SDM is in dialogue with EASA and ICAO to clarify the regulatory approach. Furthermore, SDM will reach out to the VAACs and emphasize the need to ensure continuous operations (legacy products) for mandated and non-mandated stakeholders

Provision of the QVA-service (Clarifying METVAIS-003)

For the provision of the new QVA services, the two European Volcanic Ash Advisory Centres (VAAC London and VAAC Toulouse) are mandated. These two VAACs collaboratively defined a service definition. This service definition can be found on the SWIM-registry. An ICAO globally mandated QVA Service Definition, consistent with the European one, will likely be published in PANS-MET (Amendment 1).

No other METPs have an obligation to provide a QVA service.

Clarifications with regards to Consumption of the QVA service (Clarifying SDP requirement METVAIS-004 and METVAIS-005)

It is expected that all users of aeronautical volcanic ash information will be capable of accessing, consuming and demonstrating operational use of these new QVA SWIM services to become compliant with CP1.

It should also be noted that for PANS-MET states that all **area control centres, and flight information centres** should be in receipt of QVA, therefore all ANSPs are expected to consume the new QVA service.

For ANSPs/ACCs, consumption of the QVA SWIM Service means:

The ANSP consumes the QVA services from both VAACs and displays the information as needed. This can be done:

- Directly in the ASD (Air Situation Display) of the ATCOs who can overlay/blend in the QVA information
- By providing a graphical representation via the ATC-systems support screen
- Using a dedicated tool, provided by a third party e.g. the designated national METP, for the visualization of QVA-data (see section 'MET-Visualization Tool for ANSP (ACC)' for additional information)
- A combination of the above

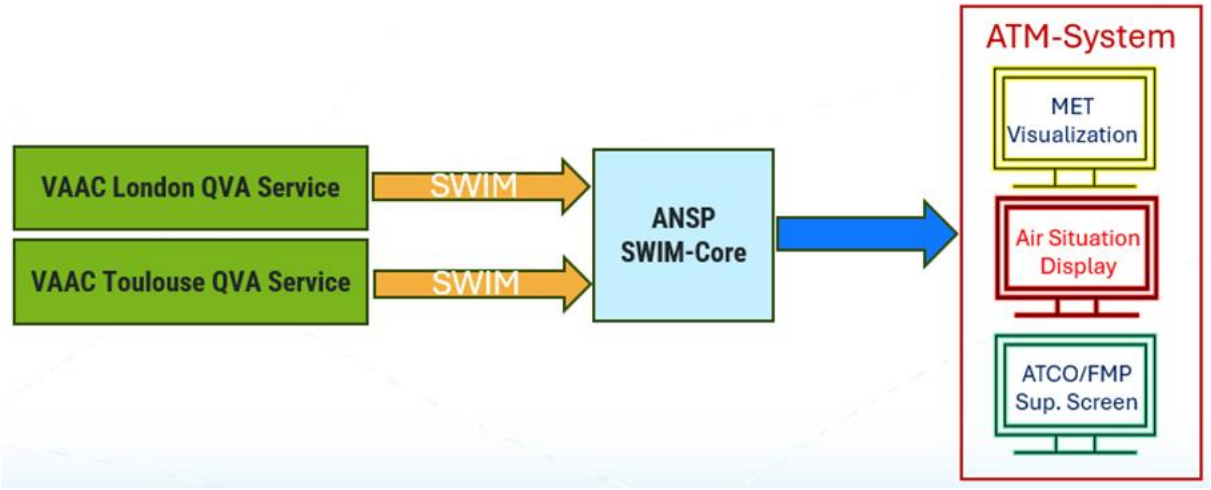


Figure 3. An example of approaches that ANSPs could take to consume the QVA service

METPs

Designated METPs, acting as the MWO (Meteorological Watch Office), are mandated to consume the QVA-services (METVAIS-004). The provided data can be used as part of the process to issue Volcanic Ash SIGMET for the FIR(s) the METP is responsible for and/or can be provided as part of the MET flight briefing for pilots, and for situational awareness.

In some cases, a VAAC is also a METP. In this capacity, the METP, acting also as the MWO, is still mandated to consume the QVA service for the purposes stated above. This means that the VAAC Toulouse is mandated to consume the QVA-service provided by VAAC London. MWOs are responsible for issuing Volcanic Ash SIGMETs in case volcanic ash is forecasted to reach the FIR – so all MWO should consume the QVA information services.

Figure 4. An example of approaches that METPs could take to consume the QVA service

Network Manager

The QVA-services has to be consumed by the NM as this information is used within the **E**uropean crisis **V**isualisation **I**nteractive **T**ool for **A**TFCM (EVITA). This is a visualisation tool that supports decision making in times of crises. EVITA is available on the Network Operations Portal (NOP) to all NOP registered users.

Further clarifications - Aerodrome Meteorological Information Service

Data Scope

These information services are about the provision and consumption of basic SWIM services for airport observations (METAR/SPECI) and airport forecasts (TAF) as information service(s), in IWXXM, based on the service definitions developed by MET3SG and published in the SWIM-Registry. Work on developing enhanced services is ongoing and such services are expected for after CP1, hence not described here.

Provision of the service(s)

MET-Providers

Designated METPs are mandated to provide the two defined services for all aerodromes (METAMIS-003) which are listed in the EUR ICAO Doc 7754, Volume II, MET Table II-2. This table indicates the regional METAR and TAF requirements for RS-aerodromes (intern. scheduled air transport, regular use) and AS-aerodromes (intern. scheduled air transport, alternate use) in the ICAO EUR-region. The document can be found on the website of the EUR/NAT ICAO office Paris.

For each State, **one service-instance for METAR/SPECI and one for TAF** is to be provided, offering:

- A Publish/Subscribe service for one or a group of airports to receive information when available.
- A Request/Reply service to request the latest available information for an aerodrome or group of aerodromes

CP1 compliant way to consume OPMET from other states (clarifying SDP requirement METVAIS-005, METAMIS-005, METEAIS-005

To consume OPMET data from other states, consumers subscribes to the corresponding CP1-compliant **SWIM service for each individual service (METAR/SPECI, TAF) per state**, available on the SWIM Registry and published directly by national METPs. These **services have to be based on the CP1 compliant SWIM Service Definitions** also available on the SWIM registry.

Consumption of the service(s)

ANSPs

National METAR/SPECI are used by the ATM system, and most commonly, the temperature and pressure values. These are necessary to calculate the transition altitude and transition level. The data is also used to calculate the lowest usable flight levels in mountainous regions. It is important to recognise that any **data provided by the designated national METP needs to be consumed via the provided SWIM-service.**

The following approaches are seen as CP1 compliant.

The ANSP consumes the IWXMM METAR/SPECI or TAF information service as required from the provider and forward the data to the ATM system which will display the information as needed. This can be done:

- Directly in the ASD (Air Situation Display) of the ATCOs who can overlay/blend in meteorological information,
- By providing a graphical representation via the ATC-systems support screen,
- Using a dedicated tool, provided by a third party e.g. the designated national METP, for the visualization of aerodrome meteorological information (see section 'MET-Visualization Tool for ANSP (ACC)' for additional information),
- A combination of the above.

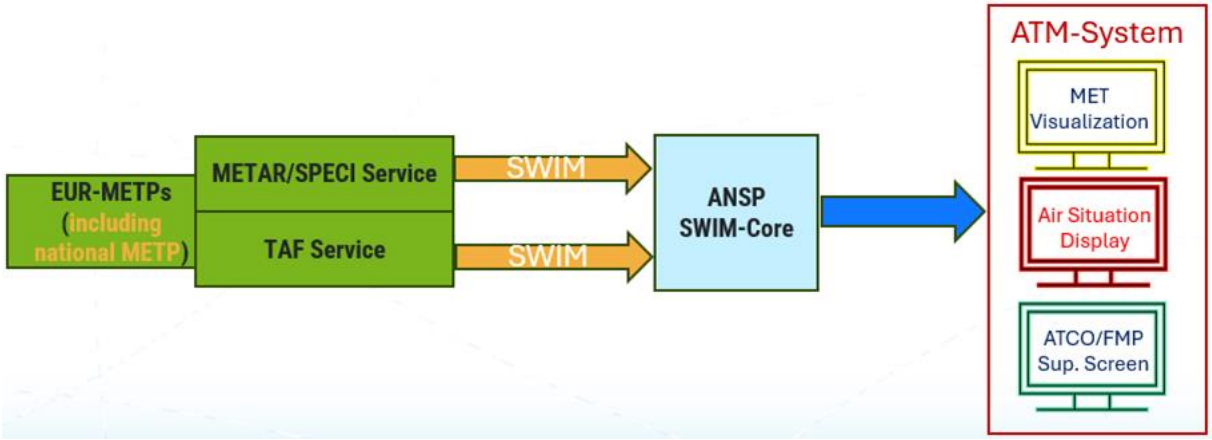


Figure 5. An example of approaches that ANSPs could take to consume the Aerodrome Meteorological Information service

MET Providers Clarifying SDP requirements METAMIS-004 and METAMIS-005)

All available and necessary IWXXM METAR/SPECI and TAF SWIM services have to be consumed by the METPs. This is because:

- METPs use the data in operations to fulfil their tasks and visualize this data via a dedicated tool,
- METPs are mandated to provide MET-flight briefing (2017/373 - MET.OR.215) to flight crew, which also needs to include observations and forecast for the departure aerodrome, the destination as well as for aerodromes along the route and alternate aerodromes.

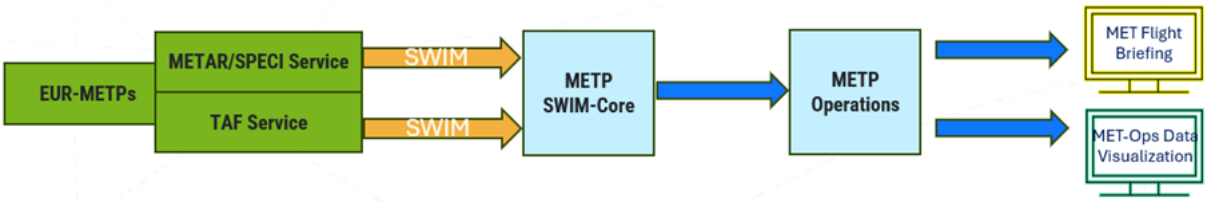


Figure 6. An example of approaches that ANSPs could take to consume the Aerodrome Meteorological Information service

Airports

Airports already have the data needed for operations, available locally and it is therefore not necessary for them to consume a dedicated SWIM service.

What nevertheless might be interesting for airports, is to closely collaborate with the designated METP to develop SWIM-services tailored for the operational needs, e.g. for weather warnings. Such are not part of CP1 but might be useful, e.g. to receive warnings when the windspeed reaches a defined threshold.

Further clarifications - En-Route and Approach Meteorological Information Service (Clarifying SDP requirement METEAIS-001 and METEAIS-002, METEAIS-003)

Data Scope

- Gridded-data (provided by WAFC, or another locally arranged METP)
- Significant Weather Charts (SIGWX-Charts) provided by the WAFC-London (or another locally arranged METP)
- SIGMET data (by all METPs acting as the designated MWO)
- other meteorological data that is according to CP1 "*...supporting en-route/approach ATC process…*" (forecasts for turbulence, icing, etc.)

The IWXXM SIGMET information service is provided by each State, based on the service definitions developed and registered in the SWIM-Registry. The MET3SG is also in the process of developing a set of example Service Descriptions to support a harmonized approach in the publication of CP1 SWIM services on the SWIM Registry.

Provision of the service(s)

WAFC

The provision of Significant Weather Charts and gridded data (upper wind/temperature charts), as defined by ICAO ANNEX 3 respectively EU Reg. 2017/373, via SWIM-services is fulfilled by UK MET Office, acting as a WAFC (World Area Forecast Centre). The data is provided via the SADIS-API (Secure Aviation Data Information System). Stakeholders can apply for an account to use the API and retrieve needed data.

MET Providers

The provision of the IWXXM SIGMET Information Service is to be produced for all FIRs in the EU by the designated METP acting as a MWO (Meteorological Watch Office), and published as a SWIM service per State. It has been decided in MET3SG that each State should provide only one instance for providing all SIGMET messages.

In the case where a METP is currently tasked to provide additional data i.e. local gridded data to support ATM operations, this should also be provided and consumed via a SWIM service. In case the gridded data is only provided to the national ANSP, the service should still be CP1 compliant and published on the SWIM registry, with a note in the description outlining that the service is only intended for consumption by the national ANSP.

Consumption of the service(s) (Clarifying SDP requirements ETEAIS-04 and METEAIS-005)

ANSPs

All SIGMET information services providing the SIGMET IWXXM messages which are used in operations (likely the ones for the ANSPs own FIRs and/or the surrounding FIRs) have to be consumed via the appropriate IWXXM SIGMET information Services.

An ANSP also needs to consume gridded data needed for their own trajectory calculations. There is no obligation, according to CP1, that the WAFC gridded data have to be used for that purpose, but given its consistent ready availability, this may be the natural choice for most ANSPs. Although the SDP focuses on the WAFC gridded data, an ANSP may choose to consume and use gridded data from another METP e.g. the national METP. In such a case it is still mandatory to consume the data via a SWIM compliant service published on the SWIM registry.

The ANSP's systems can either consume the MET information directly or via their SWIM infrastructure. This can be done:

- Directly in the ASD (Air Situation Display) of the ATCOs who can overlay/blend in meteorological information, e.g. areas with forecasted hazardous weather,
- By providing a graphical representation via the ATC systems support screen,

- Using a dedicated tool, provided by a third party e.g. the designated national METP, for the visualization of en-route and approach information (see section 'MET-Visualization Tool for ANSP (ACC)' for additional information),
- A combination of the above.

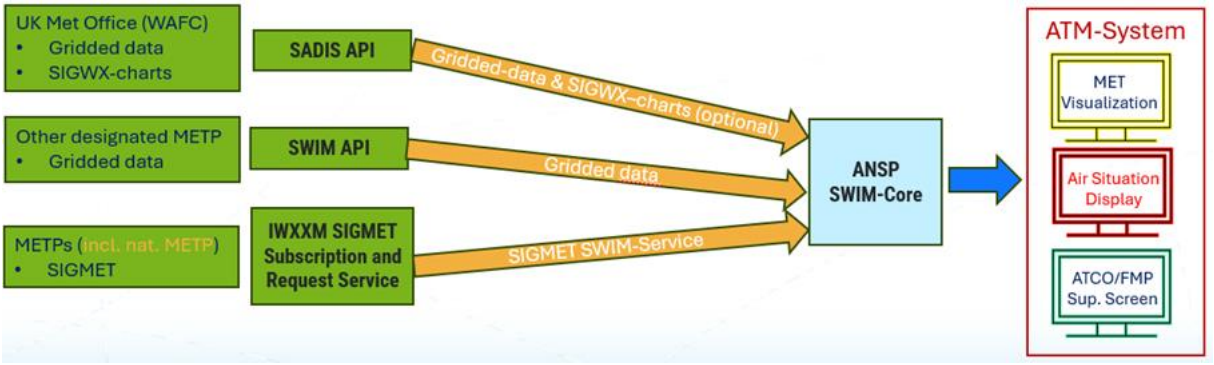


Figure 7. An example of approaches that ANSPs could take to consume the En-route and Approach Meteorological Information service

MET Providers:

All available and operationally essential SIGMET services should be consumed by the METPs. METPs then provide MET flight briefing to customers, which also needs to include current SIGMET messages along the planned flight route.

The SIGWX-charts and upper wind information should also be consumed due to the same reason as stated above.

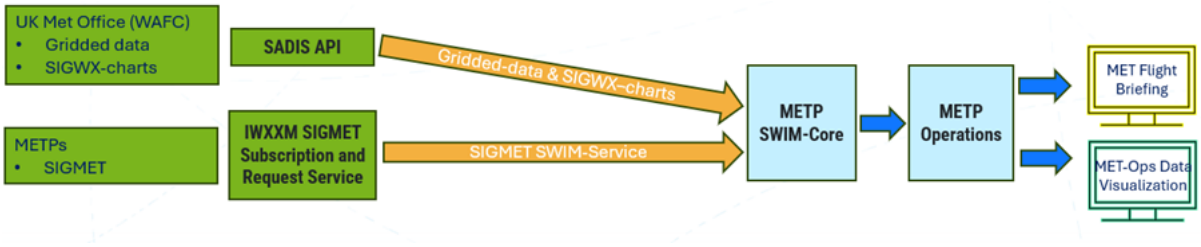


Figure 8. An example of approaches that METPs could take to consume the En-route and Approach Meteorological Information service

Further clarifications - Network Meteorological Information Service (Clarifying SDP requirement METNMIS-003)

This information service is about the provision and consumption of CBCF-service (Cross Border Convection Forecast). The forecasts are prepared collaboratively by METPs under the EUMETNET umbrella. A dedicated production system is used. The service is already available in the SWIM-registry.

The CBCF-forecasts are used as a basis to discuss between NM and ANSPs whether any sector restrictions might be necessary due to forecasted convection.

Provision of the service(s)

The provision of the CBCF service is done by DWD on behalf of all involved METPs. 'All involved METPs can declare CP1 compliance

Consumption of the service(s)

ANSPs:

ANSPs whose FIRs are covered by the CBCF-forecasts are mandated to consume the CBCF-service.

- Austria - Austro Control
- Belgium – Skeyes & MUAC
- Bulgaria - BULATSA
- Croatia - Croatia Control
- Cyprus - DCAC
- Czech Republic – ANS CZ
- France - DSNA
- Germany – DFS & MUAC
- Greece - HCAA
- Hungary – Hungaro Control
- Ireland – AirNav
- Italy - Enav
- Netherlands – LVNL & MUAC
- Poland - PANSA
- Portugal – NAV Portugal
- Romania - ROMATSA
- Slovakia - LPS
- Slovenia – Slovenia Control
- Spain - ENAIRE
- Switzerland - Skyguide

All ANSPs have access to the production system (EuFoCS) via which the current versions of the CBCF-forecasts can be displayed.

ANSPs using this HMI can declare compliance with CP1.

MET-Providers:

Local MET providers have access to the production system so do not need to consume the CBCF themselves via a SWIM service.

Network Manager

The NM is the main consumer of this information and therefore is mandated to consume the data via the provided SWIM-service. The NM also had direct access to the EuFoCS system.

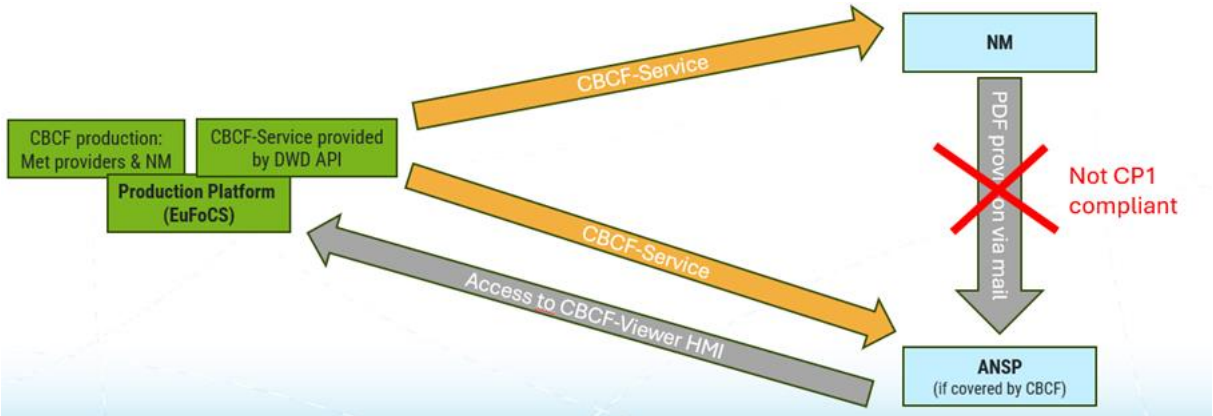


Figure 9. An example of approaches that ANSPs could take to consume the En-route and Approach Meteorological Information service

Family 5.6.1 Extended AMAN SWIM Service

As per the SDP System requirements and the EASA DS.GE-SoC, the Extended AMAN SWIM Service shall be implemented according to EUROCAE ED-254 "Arrival Sequence Service Performance Standard".

Initial edition ED-254 (2018) is conceived as technology agnostic and it is left to the implementers to make the appropriate design choices consistent with ED-254 requirements[6] invoking the SWIM TI YP specification.

The mandated scope as determined in the SDP 2024 features 20 service providers and 35 service consumer ACC's spread over 19 individual ANSPs, not counting additional voluntary implementations.

The practical consequence of the above is that, absent a prior and community-wide agreement, each provider-consumer pair would have to agree the requisite technological choice separately, including the exact definition of the interface and payload formats since ED-254 is not prescriptive in this regard. This would in turn impose an undue implementation burden on the mandated scope and consequently put timely compliance at risk.

EUROCAE resolved to respond to this risk by reactivating WG-104 in late 2024 and an updated ED-254 Change 1 is anticipated for publication in Q4 2025. It will express a preference for one of the technical implementations, but it will not exclude the other implementation options and, as far as practical, reflect contemporary industrywide best practice in service design.

In conclusion, stakeholders implementing the initial ED-254 must be reminded of their obligation to mutually agree the technical design of their service implementations. Stakeholders opting to implement the updated ED-254 may dispense with that obligation provided that they implement in accordance with updated ED254 recommendations.

[6] REQ 0172 and REQ 0200

AF6 - Initial Trajectory Information Sharing

AF6 was subject to the Industrialisation Target Date in 2023. To assess the readiness for deployment and availability of all the standardisation material required, EASA set up the CP1 Industrialisation Forum, to which SDM participated.

The industrialisation target date was passed successfully in June 2024 after EASA delivered an assessment report to EC and EC consulted with the Single Sky Committee (SSC). It was concluded that AF6 was ready for implementation and therefore it remains in the scope of CP1. (see COMMISSION IMPLEMENTING DECISION (EU) 2024/1663)The SDP recommends the implementation of the ADS-C Common Service. However, it has to be noted that this solution is not mandated by the CP1 Regulation. SDM, together with EUROCONTROL/NM co-led a workstream under the Operational Excellence Programme (OEP workstream 12.2) with the support of multiple stakeholders to draft the Technical Specifications that will support the implementation of the ADS-C Common Service. The Technical Specifications were published in December 2023 by EUROCONTROL after a public consultation. One of them addresses the Technical Requirements to establish the ADS-C Common Service, whilst the second one addresses the Technical Requirements to distribute the EPP data on the ground via SWIM Yellow Profile.

Besides the Technical Specifications, Guidance Material was also published by EUROCONTROL in December 2023 to support the stakeholders when deploying AF6 and making operational use of EPP. These specifications and guidelines are referred in chapter 4 of this document, under AF6.

All this material is based on the ADS-C CONOPS "ATS B2 early deployment in the systems", which is available at the following EUROCONTROL link CONOPS.

A brief overview of the CONOPS is reflected here[7]:

The Logon Service and an ADS-C Common Service (ACS) are functionally separated to clarify information flows. In practice, these can be merged meaning that the ADS-C common service would include the necessary logon functionalities acting as CM-server. The Logon Service implements DLIC datalink messages (CM-logon, CM-contact and CM-forward) acting as a CM-server as specified in ICAO Doc 9880 and EUROCAE/RTCA ATS B2 standards. Primarily, it stores and shares logon information with the ACS (to establish ADS-C contracts) and ANSPs (establishing CPDLC connections).

The ADS-C Common Service manages the ADS-C contracts with aircraft and provides a SWIM service interface so that remote ADS-C users can receive ADS-C/EPP data over ground infrastructure. The use of external flight status and positional data provided by NM will improve the management of contracts as currently demonstrated by SESAR PJ38.

Furthermore, under the lead of SDM, an international Datalink experts group elaborated a "Multilink Implementation and Air/Ground Application (ADS-C/EPP) Roadmap 2023", linking evolving requirements from Datalink new applications to the introduction of additional supporting technologies.

Last but not least, in April 2025, the AF6 Coordination Platform was established and kicked off by SDM. This initiative – which was agreed with the European Commission and formally supported by the SDM Supervisory Board by the end of 2024 – includes different activities to support all operational stakeholders mandated to implement ATM Functionality 6 in CP1.

The platform will coordinate and support solutions e.g. to:

- potential interoperability issues, e.g. aircraft equipped with ATS B2 in accordance with ED228B/229B may be not fully interoperable with ground systems in accordance with ED-228A/229A, the potential update of the DS-GE.CER/DEC,
- how the SES2+ Art. 11.6 has affected to the ACDLS initiative and how Logon / ADS-C common service (LACS) will be accelerated as it is of particular concern to facilitate compliance with the AF6.

[7] The following text has been extracted from the "ATS B2 early deployment in the systems" CONOPS

It is considered as an essential ad hoc instrument to promote, accelerate and synchronise the implementation of AF6, as a step towards Trajectory Based Operations (TBO), paramount to enable capacity increases and emission reduction.

2. Short-Term Deployment Approach 2024

Introduction

The SESAR Deployment Programme illustrates the Deployment Approach to be followed in the deployment of each ATM Functionality included in the scope of the Common Project 1. The Deployment Approach for each AF (and Sub-AF) represents the possible sequencing of the deployment activities (e.g., of specific Families) associated to an ATM Functionality and it corresponds to the preferred approach to be followed by operational stakeholders impacted by the CP1 Regulation, and therefore requested to invest in the implementation of new technologies and/or operational improvements.

By construction, the SDP Families and the recommended Deployment Approaches per ATM Functionalities are stable in time and could only be changed at the occasion of an evolution of the Common Project regulations or after the Industrialisation Target Date set in AF6 is passed. Given the need to adjust and better steer the overall deployment activities in Europe, the Short-Term Deployment Approach is an evolving and periodically updated guidance material to operational stakeholders, best placed to identify the short-term elements to be addressed in order to achieve the overall AFs deployment in accordance with the deadline set by the CP1 Regulation.

In this perspective, the intention is to integrate the stable Deployment Approach by proposing the required Short-Term Implementation Needs that should be addressed by operational stakeholders. These Short-Term Implementation Needs could also serve as the basis to identify priorities for financial incentives in support to Common Projects' deployment and ATM modernisation in general.

These short-term elements, identified through the SDP Families, may evolve, as the overall CP1 implementation progresses. This is therefore a living document whose aim is to reflect only the short-term needs.

The Short-Term Deployment Approach is supported by three fundamental pillars: technical considerations, status of implementation in Europe, and performance aspects. The combination of these three key pillars – which are detailed hereafter – will support the identification of the Short-Term Deployment Approach and will allow SDM to focus its efforts on monitoring and supporting the implementation of the identified Families by the required operational stakeholders.

Technical considerations

The technical aspects rely on the need to deploy a given Family to successfully achieve the overall AF or Sub-AF from a technology perspective (systems and procedures). This implicitly means that the Families identified in the Short-Term Deployment Approach are paramount to continue and progress with the deployment of the Functionality. In some cases, it also happens that the Families within an AF are directly linked with Families belonging to a different AF (this is the case of AF5). In these cases, it is key to provide a transversal view by highlighting the internal dependencies.

Status of implementation in Europe

The status of CP1 implementation, based on the SDP Monitoring View, gives the actual picture of the current deployment of a given Family in the requested locations, vis-à-vis the geographical scope where the CP1 mandates the deployment of each ATM Functionality. As the SESAR Deployment Programme serves as a tool to achieve the successful and timely deployment of all sub-ATM Functionalities, there is a need to identify where there are still gaps in terms of implementation initiatives to be undertaken, and to monitor how the deployment is progressing across Europe.

Depending on the implementation gaps identified within the SDP Monitoring View, it will be therefore paramount to push for timely deployment by focusing stakeholders' effort and resources. The Families thus identified following these criteria will be part of the Short-Term Deployment Approach.

It is important to note that being part of the Short-Term Deployment Approach does not necessarily imply that a Family is the most important within a specific Sub-AF, either from a performance or technical perspective. This simply means that the Family is only considered important for short-term deployment if there are delays or a lack of implementation across Europe.

For example, a Family can be currently part of the Short-Term Deployment Approach due to the lack of on-going implementation projects, but it could be removed from the Short-Term Deployment Approach in the

next update, should the implementation progress (i.e., implementation projects are in the pipeline). This could also be extended to the inclusion of another Family in the Short-Term Deployment Approach in the future, as a continuation of the implementation of the Sub-AF. There could also be the case that a Family requires an immediate focus due to the proximity of the deadline set in the CP1 Regulation and an overall lack of global European implementation.

Performance aspects

Finally, the performance aspects must be taken into account in order to secure the positive CBA of the CP1, and the timely realisation of these benefits. Those Families that are mostly contributing to performance improvements, to digitalisation and to the objectives of the European Green Deal require special attention and focus, both from the deployment and monitoring perspective. Therefore, the Short-Term Deployment Approach will be complemented with a description of the performance contribution from each Family, and when possible, these benefits will be monetised extrapolating them until 2040 (for further explanation on the methodology see Chapter 3).

It has to be noted that the monetisation of benefits, and the estimation of fuel, CO_2 and delay savings are based on the existing Implementation Projects under SDM direct coordination (i.e., real data) but also on an extrapolation of other projects and initiatives still to be implemented to achieve the full deployment of each Family.

How to interpret the Short-Term Deployment Approach diagrams

The Deployment Approach diagrams are represented following a GANTT-like orientation, using nodes and arrows to represent the milestones and activities. The aim of the Deployment Approach diagrams is both to show the dependencies between different Families and to illustrate their sequencing in time. This would help SDM not only to coordinate CP1 deployment activities and monitor its progress, but also to identify potential risks when the implementation is not progressing at the right pace, allowing ad hoc support from SDM to the relevant operational stakeholders.

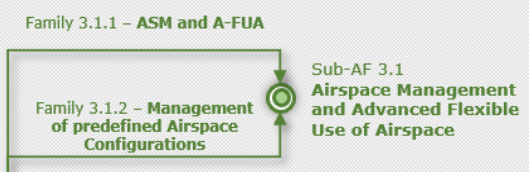


Figure 10. Example of the sequencing

Deployment Approach diagrams: Families and sub-AFs

Each Family is represented by an arrow, connecting different bubbles or nodes: these represent the intermediate steps of the Deployment Approach, meaning that a given Family or sub-ATM Functionality has been fully implemented and put into operations.

The Families have been represented taking into consideration their dependencies, meaning that some of the Families can be implemented in parallel, whilst others need to be implemented in sequence. Each Family (arrow) starts from a bubble or node and ends in another node.

In the first example (Figure 10) it has been represented that Family 3.1.1 and 3.1.2 are contributing to the deployment of Sub-AF 3.1 – Airspace Management and Advanced Flexible Use of Airspace. At the same time, the chart depicts how Family 3.1.1 and 3.1.2 can be implemented in parallel.

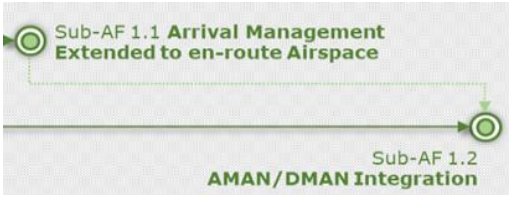


Figure 11. Example of interdependencies between sub-ATM Functionalities

To properly represent the sequencing and interdependencies of Families and sub-AFs, dotted lines have been added when a specific Family or a sub-ATM Functionality works as a predecessor or contributes to the full implementation of another sub-AF. The second example (Figure 11) explains how the full implementation of sub-AF 1.1 (AMAN upgrade to included Extended Horizon function) is significantly contributing to the subsequent implementation of sub-AF 1.2 (AMAN/DMAN integration).

Finally, the Families whose deployment is deemed more urgent and thus should be considered as priorities for the short-term are highlighted in the graph with a star.

To give a complete overview, charts showing the current status of implementation of the prioritised families have been included. For more details regarding those charts, please refer to the SDP Monitoring View 2023.

AF1 - Extended AMN and Integrated AMAN/DMAN in the High-Density TMAs

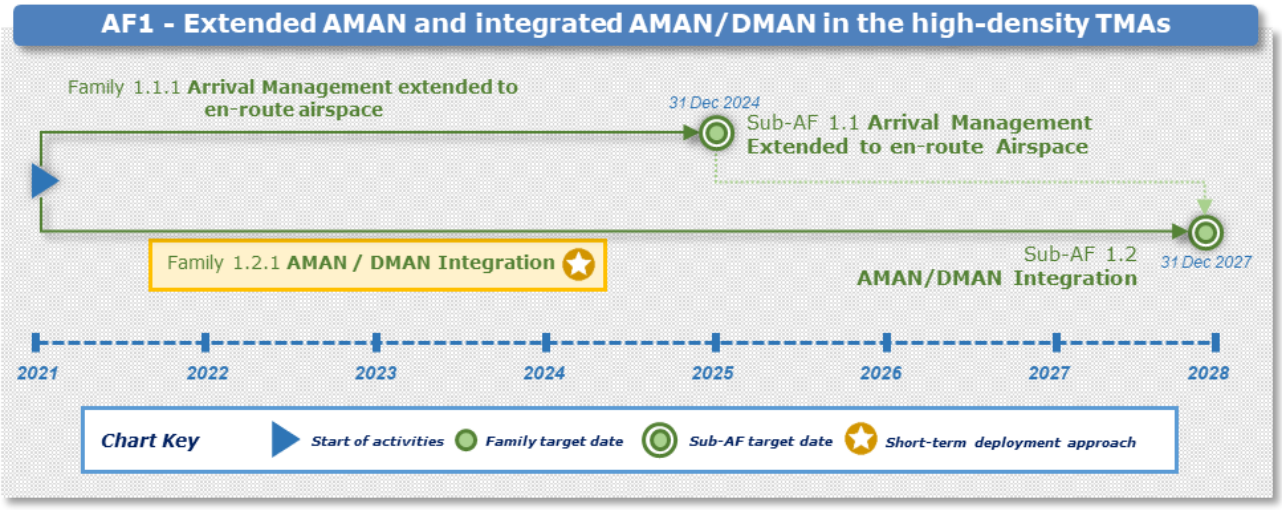


Figure 12. AF1 Short Term Deployment Approach

Introduction

In order to timely implement AF1, operational stakeholders need to deploy in parallel two sub-AFs and Families: Family 1.1.1 Arrival Management Extended to en-route Airspace and Family 1.2.1 AMAN/DMAN Integration, that carries the same pre-requisite technology (AMAN).

Rationale

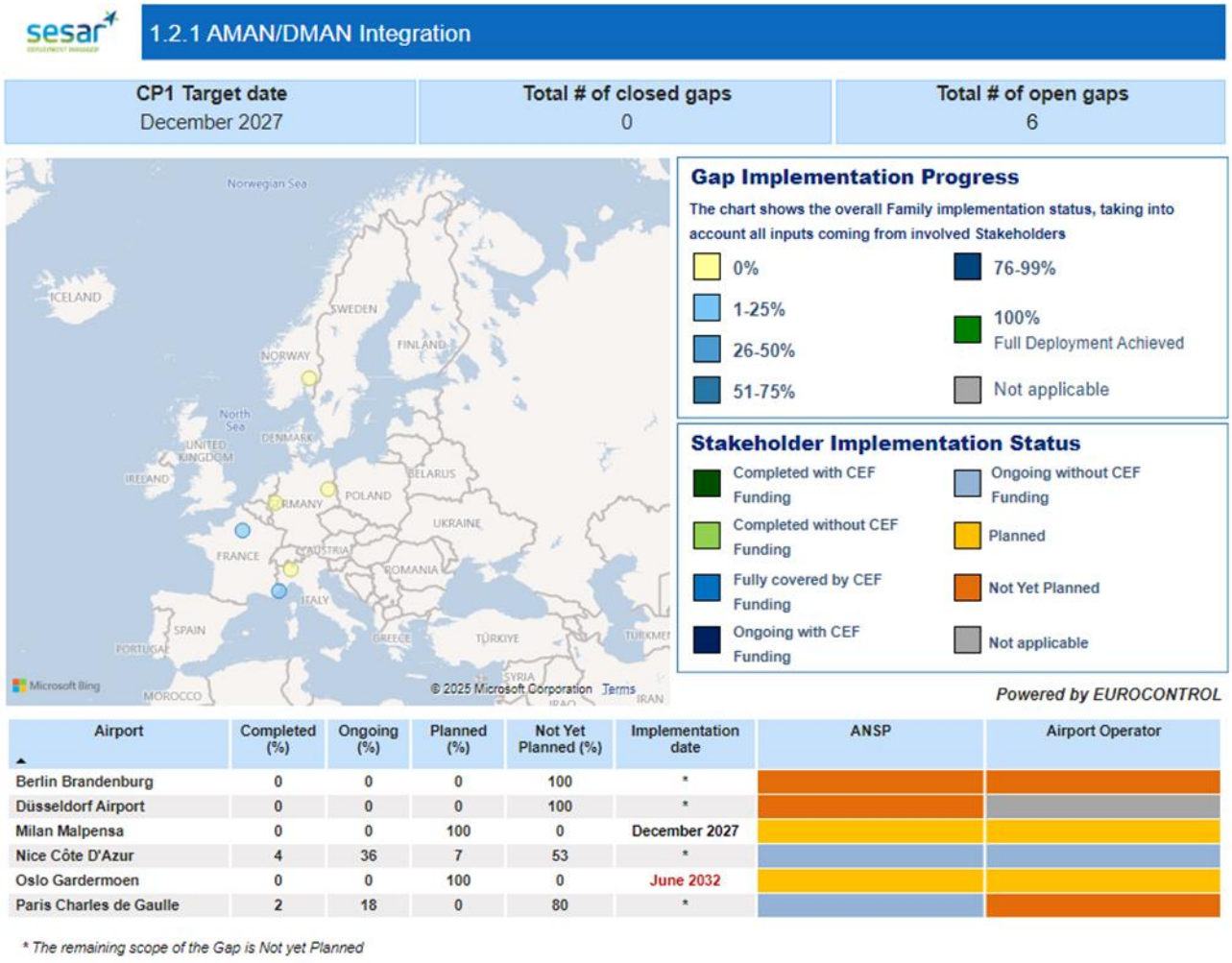
Family 1.2.1 AMAN/DMAN Integration must be ready by 31 December 2027, by the end of 2024 there will be 3 years left to complete the implementation at listed Airports. Considering the typical time of implementation projects (4 to 5 years) and that implementation projects have not formally being planned or initiated, it is suggested to focus the short-term deployment efforts on planning implementation projects for proper and timely implementation of Family 1.2.1.

The AMAN/DMAN integration applies to 5 airports in the CP1[8], which have single runway or dependent runways which may operate in mixed-mode or have departure runway linked with dependency to an arrival runway. Those airports are Berlin Brandenburg Airport, Düsseldorf International, Milan-Malpensa, Nice Côte d'Azur and Paris-CDG. The listed airports have overlapping extended horizon with each other, hence for homogeneous closing of Family AF-1 implementation, it is desirable to envisage more multistakeholder implementation projects with as many airports and ANSPs involved as possible. This will ensure efficiency and cross-facilitation among the participants to the implementation projects with the objective to achieve a timely and coordinated implementation of the Family.

Deployment approach and synchronisation

The implementation project should address the Deployment Milestones described in the SESAR Deployment Programme 2024. Family 1.2.1, especially DM1 for both ANSPs and AOs to ensure the coupling of the AMAN and DMAN systems, indicating properly which DMs are being covered by which stakeholders by linking specific tasks/activities to the corresponding DMs.

[8] On top of Berlin, Dusseldorf, Milan, Nice and Paris CDG, Oslo Gardermoen agreed to implement AMAN/DMAN integration according to "DECISION OF THE EEA JOINT COMMITTEE No 222/2022 (8 July 2022)". This is the reason why SDM is also monitoring its implementation (see figure 12).



Airport	Completed (%)	Ongoing (%)	Planned (%)	Not Yet Planned (%)	Implementation date	ANSP	Airport Operator
Berlin Brandenburg	0	0	0	100	*		
Düsseldorf Airport	0	0	0	100	*		
Milan Malpensa	0	0	100	0	December 2027		
Nice Côte D'Azur	4	36	7	53	*		
Oslo Gardermoen	0	0	100	0	June 2032		
Paris Charles de Gaulle	2	18	0	80	*		

** The remaining scope of the Gap is Not yet Planned*

Figure 13. Current status of implementation of Family 1.2.1

If there are ongoing implementation projects addressing some of the pre-requisites (i.e., AMAN or DMAN), these should be highlighted and those links or interdependencies should be described in the implementation projects.

To successfully deploy AF-1 Family 1.2.1, stakeholders should consider below interdependencies:

- The AF 2 - Family 2.1.1: Departure management, Synchronised with Pre-departure sequencing, to be considered as these are interdependent with AF-1 Families. Efforts be made to ensure that it is duly considered during the development of the implementation projects, and that proper coordination is taking place with the counterpart implementing those Families.
- The AF 4 - Family 4.2.1: there are interdependencies with Collaborative-NOP to coordinate reconciled target times for improved ATFCM and stabilised arrival/runway sequence policy. Make sure that it is duly considered during the development of the implementation projects, and that proper coordination is taking place with the counterpart implementing those Families.
- The AF5 - Family 5.4.1 Implement Meteorological Information exchange and Family 5.6.1 Flight Information Exchanges are to be considered as interdependent with AF1 Families. To ensure interoperability of data exchanges concerning AMAN/DMAN integration, whereas Extended AMAN is to be implemented as a SWIM service.

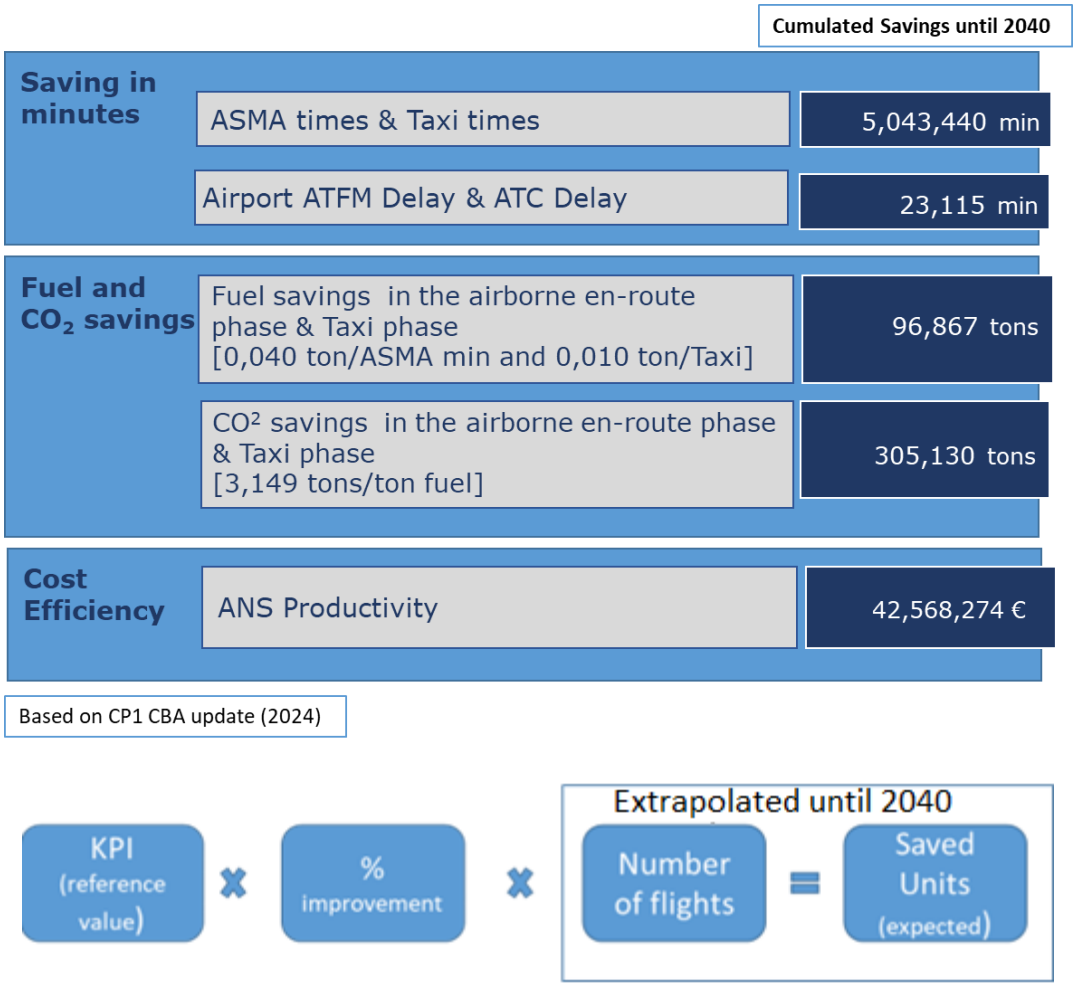
Deployment of targeted system and procedural changes should be synchronised with all affected ATS Units (ANSPs). Coordination, led by the ANSPs, needs to take place with impacted airports (Airport Operators), Airspace users (Airlines) and Air Traffic Flow Management Unit (ATFMU). AMAN/DMAN integration, in particular, requires synchronisation of investments among all affected ANSPs (ATS Units) and impacted Airport Operators in order to ensure optimised runway-use policy and ensure achieving all the associated performance objectives/benefits listed in the section below. Synchronisation is also needed for enhanced tactical runway scheduling by ensuring improved predictability and stability of arrival sequence managing

arrival fix metering time, target time of arrival as well as of linked departure sequence managing off-blocks times, start-up approval time and departure time (target take-off time).

Performance benefits

Integrated Arrival and Departure management aims at increasing airport and TMA throughput, resilience, and predictability by improved co-ordination between en-route/approach, local ATC and airports. Integration of runway sequence policy, respecting AMAN and DMAN constraints, allows for optimum utilisation of runway capacity with positive benefits of enhanced safety (reduced congestion and complexity in airport and in TMA), enhanced flight efficiency enabling reduction in fuel consumption and CO_2 as well as noise emissions.

Methodology of performance calculation for AF1



The workflow above shows the calculation of savings for each KPI. The reference value for each KPI is stemming from PRU dashboards[9], where they are published on a monthly and yearly basis.

SDM estimates the impact after implementation of the respective ATM Family by multiplying the KPI reference value with the percentage of improvement, then with the related number of movements. The result are the expected saved units, cumulated until 2040.

[9] https://ansperformance.eu/

AF2 – Airport Integration and Throughput

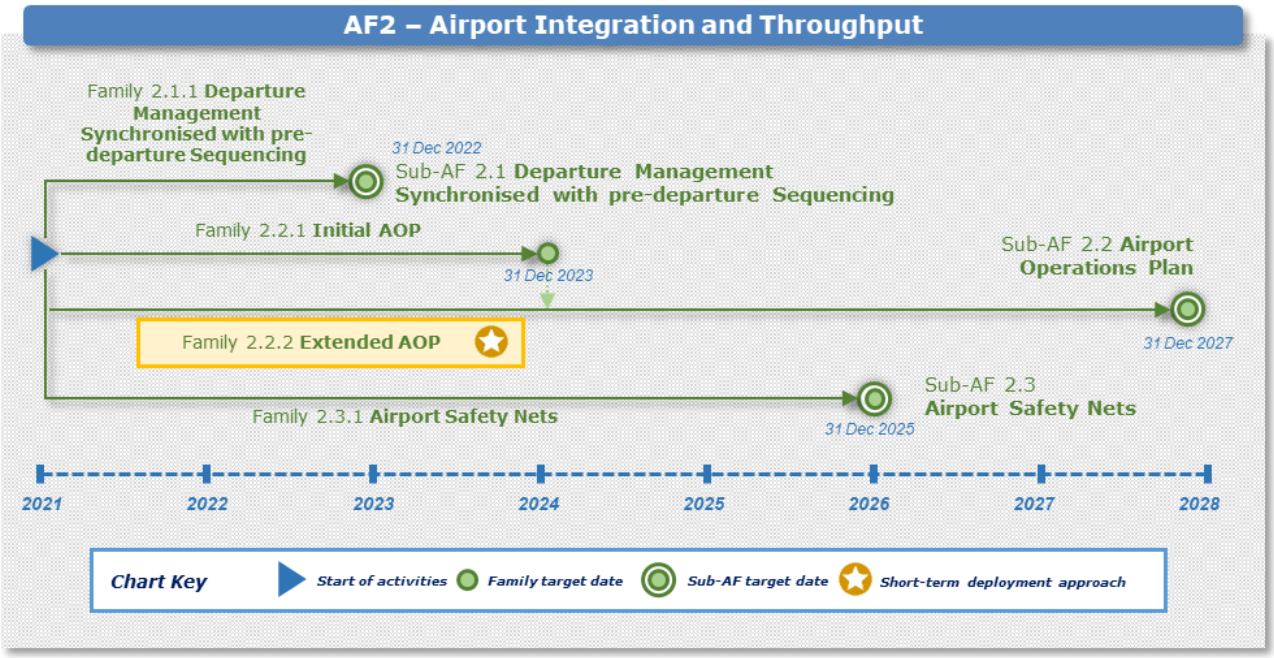


Figure 14. AF2 Short Term Deployment Approach

Introduction

AF2 is divided into four Families: 2.1.1 Departure Management Synchronised with Pre-departure sequencing, 2.2.1 Initial Airport Operations Plan, 2.2.2 Extended Airport Operations Plan and 2.3.1 Airport Safety Nets.

Rationale

The Short-Term Deployment Approach for AF2 focus on the Family 2.2.2 Extended Airport Operations Plan with a target date of 31/12/2027.

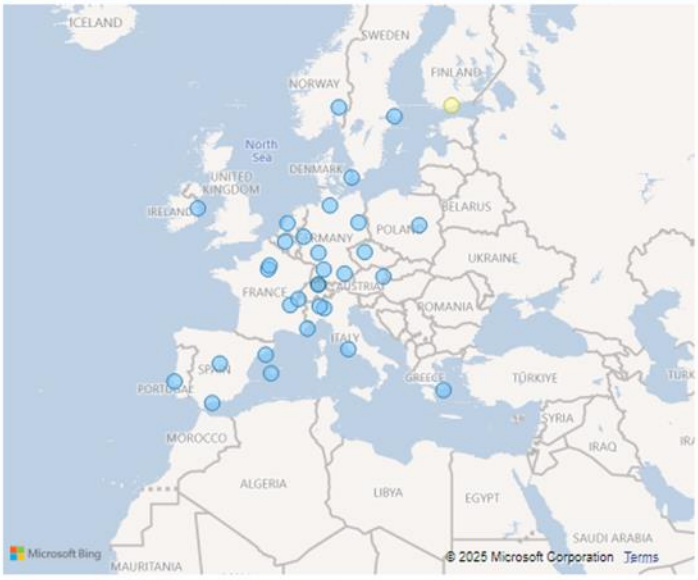
The rationale being that implementation of Families 2.1.1 DMAN synchronised with pre-departure sequencing 2.2.1 Initial AOP 2.3.1 Airport Safety Nets are already completed or well underway as can be noted in the monitoring process carried out by SDM (see Monitoring View 2023).

Furthermore, focusing on Family 2.2.2 will ensure all gaps under 2.2.2 can be covered by the regulation deadline of 31 December 2027.

Under two multi-stakeholder SDM actions CLEAN ATM in CEF 2022 consisting of 7 airports, 2 ANSPS, and the Network Manager (known as the BEACON project) and, CLEAN ATM 2 in CEF 2023, consisting of 17 airports, 1 ANSP, and the NM (known as the EXOPAN project) received co-funding from CINEA to implement. E-AOP and are actively engaged in projects to deliver this by the end of December 2027.

2.2.2 Extended AOP

CP1 Target date	Total # of closed gaps	Total # of open gaps
December 2027	0	31



Gap Implementation Progress

The chart shows the overall Family implementation status, taking into account all inputs coming from involved Stakeholders

- 0%
- 1-25%
- 26-50%
- 51-75%
- 76-99%
- 100% Full Deployment Achieved
- Not applicable

Stakeholder Implementation Status

- Completed with CEF Funding
- Completed without CEF Funding
- Fully covered by CEF Funding
- Ongoing with CEF Funding
- Ongoing without CEF Funding
- Planned
- Not Yet Planned
- Not applicable

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Airport	Completed (%)	Ongoing (%)	Planned (%)	Not Yet Planned (%)	Implementation date	ANSP	Airport Operator
Amsterdam Schiphol	2	15	33	50	*		
Athens Eleftherios Venizelos	2	20	78	0	December 2027		
Barcelona-El Prat Josep Tarradellas	5	40	55	0	December 2027		
Berlin Brandenburg	2	16	82	0	December 2027		
Brussels National	2	20	78	0	December 2027		
Copenhagen Kastrup	2	13	0	85	*		
Dublin Airport	15	70	15	0	December 2027		
Düsseldorf Airport	5	20	75	0	December 2027		
Frankfurt am Main	4	36	60	0	December 2027		
Geneva Airport	6	24	70	0	December 2027		
Hamburg Airport	9	31	60	0	December 2027		
Helsinki Vantaa	0	0	100	0	December 2027		
Lisbon Humberto Delgado	1	7	92	0	December 2027		
Lyon Saint-Exupéry	4	31	15	50	*		
Madrid-Barajas Adolfo Suárez	5	40	55	0	December 2027		
Málaga Costa del Sol	5	40	55	0	December 2027		
Milan Linate	3	27	70	0	December 2027		
Milan Malpensa	3	27	70	0	December 2027		
Munich Franz Josef Strauss	6	34	60	0	December 2027		
Nice Côte D'Azur	13	72	15	0	December 2027		
Oslo Gardermoen	6	39	55	0	December 2027		
Palma de Mallorca	5	40	55	0	December 2027		
Paris Charles de Gaulle	9	76	15	0	December 2027		
Paris Orly	9	76	15	0	December 2027		
Prague Václav Havel	5	40	55	0	December 2027		
Rome Fiumicino	7	11	82	0	December 2027		
Stockholm Arlanda	1	11	88	0	December 2027		
Stuttgart Airport	6	34	33	27	*		
Vienna Schwechat	9	76	15	0	December 2027		
Warsaw Chopin Airport	3	27	70	0	December 2027		
Zürich Kloten	36	56	8	0	December 2027		

** The remaining scope of the Gap is Not yet Planned*

Figure 15. (Pre-Release copy TBC) Current status of implementation of Family 2.2.2

Deployment approach and synchronisation

To successfully deploy Family 2.2.2, stakeholders should focus on:

- Achieving all Deployment Milestones for ANSPs and Airport Operators listed in the SESAR Deployment Programme (SDP) 2024.
- Ensuring that envisaged multi-stakeholder's projects, as based on recent experience, will ensure more efficiency and cross-fertilisation among the participants to the implementation projects.
- Ensuring proper consideration and coordination with Family 2.2.1 initial AOP (iAOP) and using as reference material the ACI EUROPE guidance to compliance for iAOP, and for the extended AOP (E-AOP) (see Standards and Regulations in this document).
- Making sure that AF4 Families 4.2.2 Initial AOP/NOP Information Sharing, and 4.4.1 AOP/NOP integration, are duly considered during the development of the implementation projects, and that proper coordination is taking place with the counterpart implementing those families. Use the EUROCONTROL Network Manager reference material implementation guides and roadmaps (see Standardisation and Regulations in this document).
- The AF5 Families 5.4.1 Meteorological Information Exchange and 5.5.1 Cooperative Network Information Exchange are to be considered as interdependent with Families 2.2.1 and 2.2.2.
- Considering full coordination and cooperation with the EUROCONTROL Network Manager (NM), also for the testing and validation activities.

The deployment of Airport Integration and Throughput Functionality shall be coordinated and synchronised among the airport stakeholders to reach the maximum network performance benefits. From a technical perspective, the deployment of targeted system and procedural changes shall be synchronised in order to ensure that the performance objectives are met this is key for the AOP/NOP integration, where the network performance benefits will grow with the number of airports exchanging AOP information with NM.

Performance benefits

The AOP is the principal source of information used and shared by all involved airport stakeholders. The extended AOP is the fundamental tool supporting the following four operational services:

- Steer Airport Performance Service
- Monitor Airport Performance service
- Manage Airport Performance service
- Perform Post-Operations Analysis service

by improving the overall operational efficiency and increasing resilience of the airport and the network to resist disruptions such as but not limited to, adverse weather conditions, closure of a runway, security alerts measuring airport performance (overall and individual operators).

SESAR Deployment Manager acknowledges that the existing CBA model reflects only the performance benefits of pure ATM processes, while the extended AOP aims to benefit the journey processes before and beyond the pure ATM processes. Extended AOP is considered to have a strong multiplier effect and benefit on the end-to-end service chain, so to large parts of the door-to-door journey. This cannot be reflected properly in the pure ATM KPIs on which the CBA is based. As stakeholders update their intentions, or accurate flight progress information is received, the extended AOP is refined and used to manage resources and coordinate operations. Integration with the NOP extends the scope and time horizon of planning activities to include air traffic demand and improved target time coordination for the whole 4D flight trajectory under a holistic service perspective, balancing airspace/airside with terminal/landside operations. The aim is to provide processes and tools to maintain airport performance in all operating conditions, and to share information with the wider network. Ultimately, the extended AOP makes airports more resilient to disruptions, allowing more efficient management of airport demand capacity balancing and operations during adverse weather conditions or any other circumstance that might jeopardize smooth operations. More seamless and smooth processes lead to higher predictability in operations thus minimizing the negative impact on all stakeholders and ultimately the passenger. Through increased predictability in airport and network operations the extended AOP and the AOP management support tool(s) contributes to

- a better and more cost-efficient use of existing/ available network and airport resources (runways, taxiways, aprons, and terminal/landside), thus paying a significant contribution to efficiencies,

- as well as optimization of resources usage, in a more sustainable manner (greater environmental benefits.

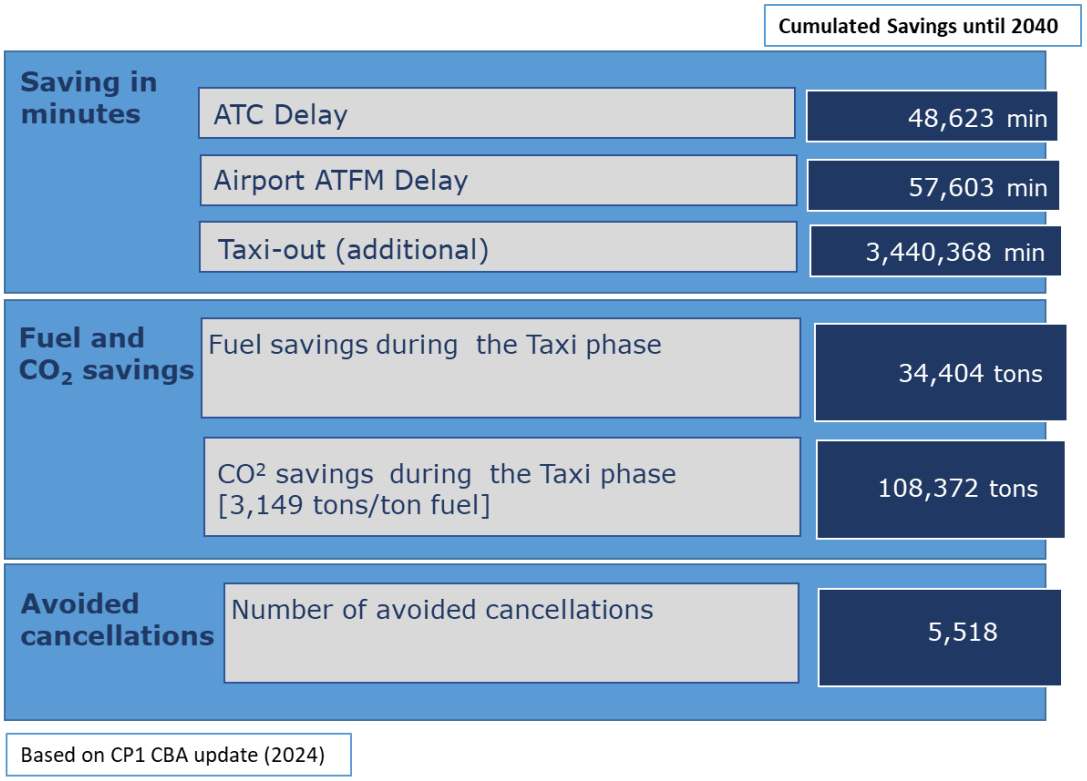
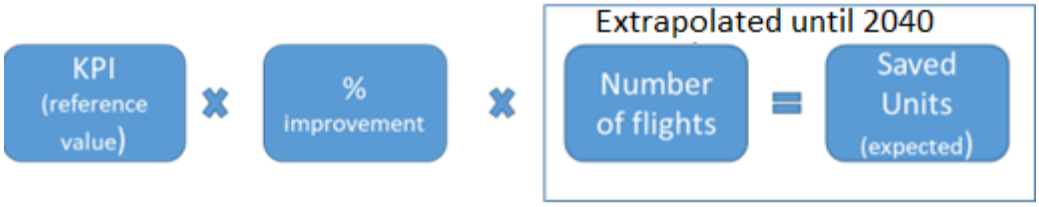


Figure 16. Benefit expected for Family 2.2.2

The depicted savings shows the calculation result for 31 airports fulfilling the Family 2.2.2 plus the calculation of 12 new airports for Family 2.2.1, which is a prerequisite to gain the savings out of Family 2.2.2

Because the 12 additional airports (AGP, ATH, GVA, HAM, HEL, LIN, LIS, LYS, OSL, PRG, STR, and WAW) were published in the CP1 regulation EU 2021/116, these savings were calculated from 2019 onwards.

Methodology of performance calculation for AF2



The workflow above shows the calculation of savings for each KPI. The reference value for each KPI is stemming from PRU dashboards, where they are published on a monthly and yearly basis.

SDM estimates the impact after implementation of the respective ATM Family by multiplying the KPI reference value with the percentage of improvement, then with the related number of movements. The result are the expected saved units, cumulated until 2040.

AF3 – Flexible ASM and Free Route Airspace

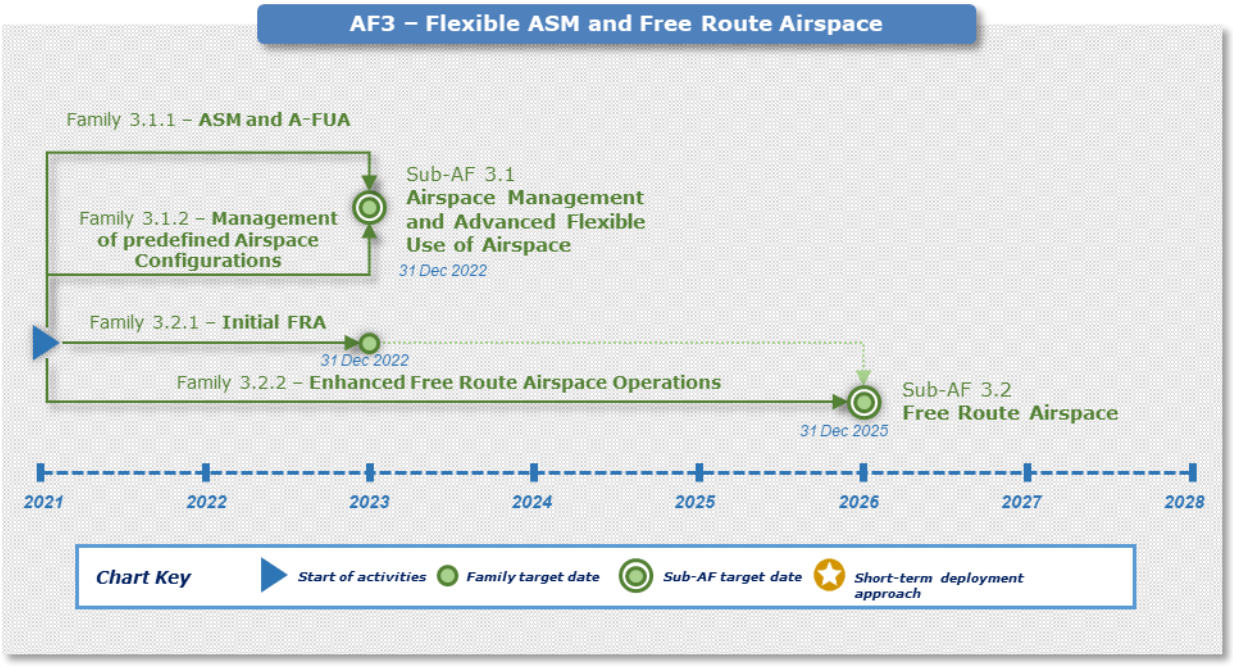


Figure 17. AF3 Short Term Deployment Approach

For AF3, Families 3.1.1, 3.1.2 and 3.2.1 have already passed the regulatory deadline. The only Family left to implement in the coming years is 3.2.2, Enhanced Free Route Airspace Operations. This functionality has already been implemented in several States and others have submitted implementation projects to extend their FRA operations. Thus, it is considered not necessary to prioritise this Family any longer.

AF4 – Network Collaborative Management

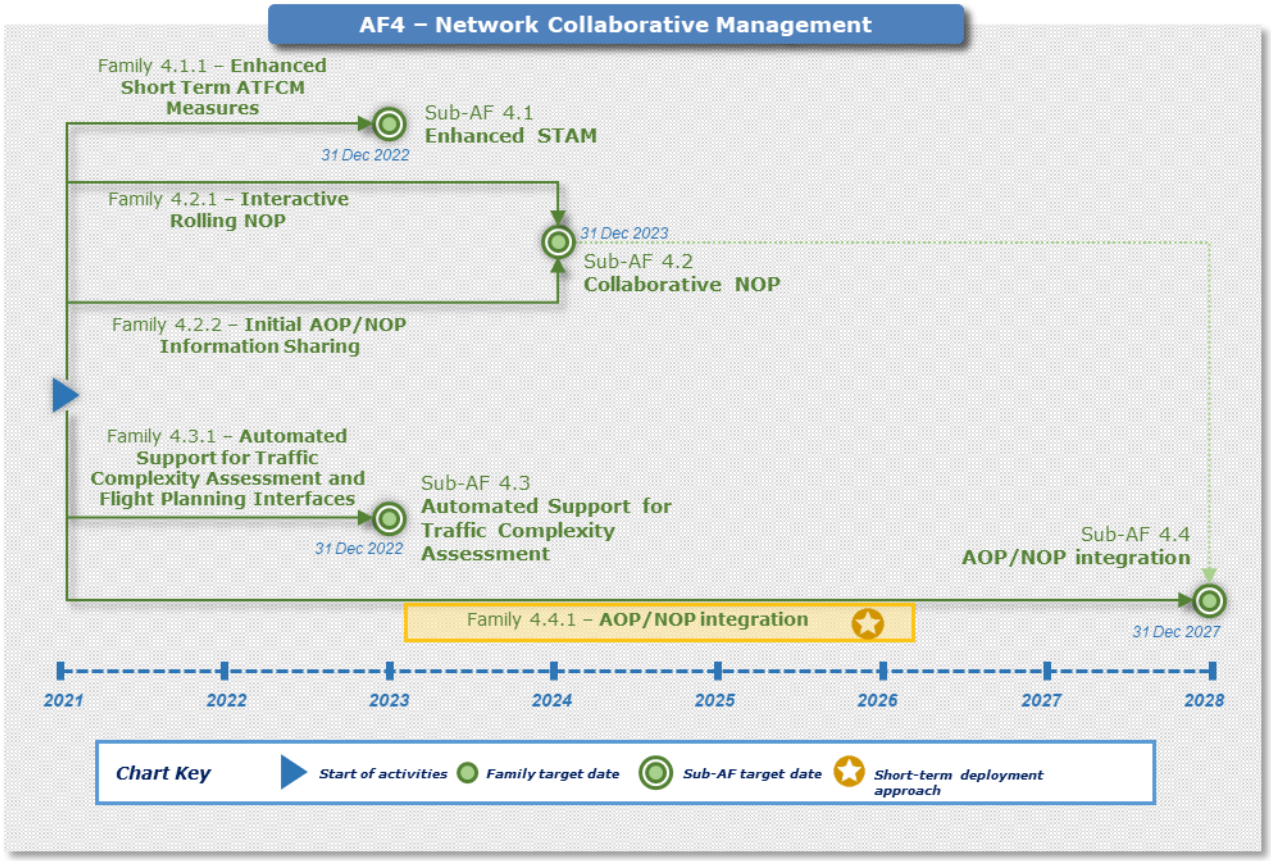


Figure 18. AF4 Short Term Deployment Approach

Introduction

The Short-Term Deployment Approach for AF 4 should focus on Family 4.4.1 AOP/NOP integration. Family 4.4.1 has to be seen as the continuation of Family 4.2.2.

Rationale

The integration of the airport planning is of utmost importance for the European ATM Network. In order to improve the European ATM network performance, notably capacity, predictability and flight efficiency through exchange, modification and management of planning details, there is a clear need for information sharing between the AOP and the NOP.

The initial AOP/NOP integration is the technical data layer for the collaborative NOP information sharing. It includes the provision to NM of different types of Departure Planning Information (DPI) and Arrival Planning Information (API); the integration of these information with the Network Operation Plan (NOP) provides a rolling picture of the overall network and airport situation used by stakeholders to prepare and update their plans and inputs to the network CDM processes, with a focus on the availability of shared operational planning and real-time data.

Considering that in the frame of initial AOP/NOP several projects are already on going with the majority of airports involved, this will pave the way for the implementation of Family 4.4.1 AOP/NOP integration, which implementation target date is 2027.

4.4.1 AOP/NOP Integration

CP1 Target date	Total # of closed gaps	Total # of open gaps
December 2027	0	32

Gap Implementation Progress

The chart shows the overall Family implementation status, taking into account all inputs coming from involved Stakeholders

- 0%
- 1-25%
- 26-50%
- 51-75%
- 76-99%
- 100% Full Deployment Achieved
- Not applicable

Stakeholder Implementation Status

- Completed with CEF Funding
- Completed without CEF Funding
- Fully covered by CEF Funding
- Ongoing with CEF Funding
- Ongoing without CEF Funding
- Planned
- Not Yet Planned
- Not applicable

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Airport	Completed (%)	Ongoing (%)	Planned (%)	Not Yet Planned (%)	Implementation date	ANSP	Airport Operator
Amsterdam Schiphol	53	0	47	0	December 2027		
Athens Eleftherios Venizelos	48	0	52	0	December 2027		
Barcelona-El Prat Josep Tarradellas	51	25	24	0	December 2027		
Berlin Brandenburg	48	0	52	0	December 2027		
Brussels National	48	0	52	0	December 2027		
Copenhagen Kastrup	59	17	24	0	December 2027		
Dublin Airport	48	0	52	0	December 2027		
Düsseldorf Airport	51	25	24	0	December 2027		
Frankfurt am Main	51	25	24	0	December 2027		
Geneva Airport	48	0	0	52	*		
Hamburg Airport	51	25	24	0	December 2027		
Helsinki Vantaa	53	43	4	0	December 2027		
Lisbon Humberto Delgado	71	25	4	0	December 2027		
Lyon Saint-Exupéry	18	52	5	25	*		
Madrid-Barajas Adolfo Suárez	51	25	24	0	December 2027		
Málaga Costa del Sol	51	25	24	0	December 2027		
Milan Linate	48	0	52	0	December 2027		
Milan Malpensa	48	0	52	0	December 2027		
Munich Franz Josef Strauss	51	25	24	0	December 2027		
Nice Côte D'Azur	14	21	65	0	December 2027		
Oslo Gardermoen	52	32	16	0	December 2027		
Palma de Mallorca	51	25	24	0	December 2027		
Paris Charles de Gaulle	14	21	65	0	December 2027		
Paris Orly	14	21	65	0	December 2027		
Prague Václav Havel	51	25	24	0	December 2027		
Rome Fiumicino	48	0	52	0	December 2027		
Stockholm Arlanda	48	0	52	0	December 2027		
Stuttgart Airport	51	25	24	0	December 2027		
Vienna Schwechat	59	17	24	0	December 2027		
Warsaw Chopin Airport	48	0	52	0	December 2027		
Zürich Kloten	61	34	5	0	December 2027		

** The remaining scope of the Gap is Not yet Planned*

	Completed (%)	Ongoing (%)	Planned (%)	Not Yet Planned (%)	Implementation date	Network Manager
Network Manager	25	0	0	75		

Figure 19. Current status of implementation of Family 4.4.1

Deployment approach and synchronisation

The implementation projects addressing 4.4.1 AOP/NOP integration could be linked with those in Family 4.2.2 as their natural continuation. Notwithstanding, the gaps and DMs covered on each Family should be clearly described and assessed. The emphasis should be given on the provision by the airports of Extended Departure Planning Information and Arrival Planning Information and their integration within NOP. In addition, the airports need be capable to consume flight updates published by NM (NMB2B equivalent of FUM). Additional airports information like runway configurations, airport performance measurement might also need to be exchanged with NOP based on the bilaterally agreed protocol.

Concerning Family 4.4.1, special attention should be given to the definition of data for the extended AOP/NOP integration and testing and validation of airport interfaces with NM.

The integration of Airport Operation Plan (AOP) with Network Operation Plan (NOP) for optimisation and synchronisation of planning for big airports at the network level is paramount to increase the Network performance, also in combination with AF2 synchronisation aspects. Network Manager will provide tools for any users to be able to interact with it (such as the NOP portal and CHMI - Collaborative Human Machine Interface -), even the non-European or very small airspace users and small airports or not constrained ANSPs.

It is very important that a full coordination at requirement level occurs so that data exchange requested by NM would be fully understood and ready by the other stakeholders in time. The synchronisation needs to be done in planning phase between the Network Manager, the airspace users, all the ANSP of the zone, and the main airports, and in execution phase between Network Manager and the ANSP, in coordination with the main airports and the airspace users.

To better prepare for the integration activities between the NM and the mandated airports both sides should elaborate validation plans and undertake the necessary preparatory activities as soon as possible.

Performance benefits

The integration of the airport planning will improve the European ATM network performance, notably capacity, predictability and flight efficiency through exchange, modification, and management of planning details.

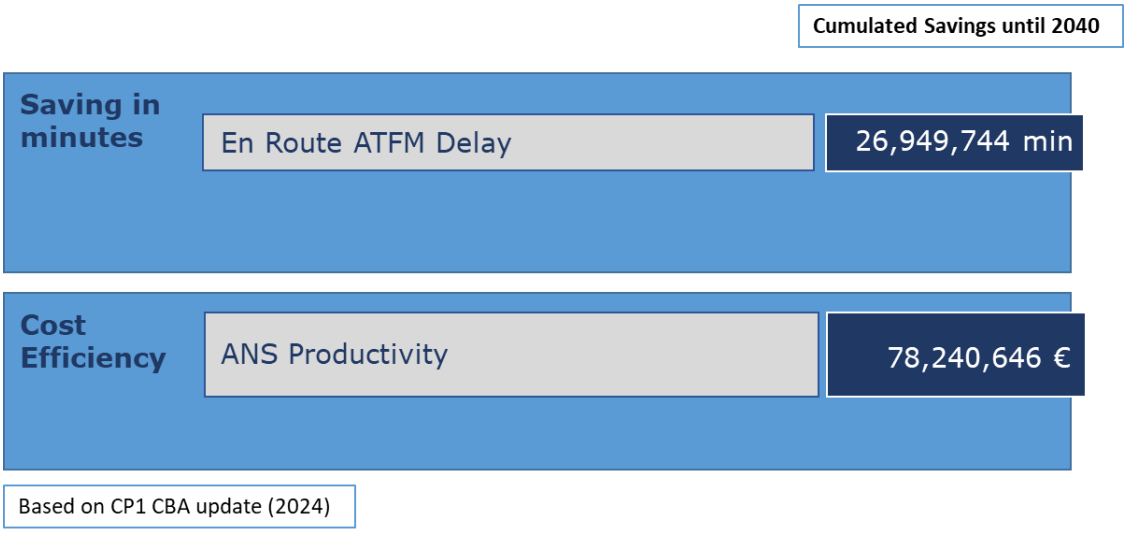


Figure 20. Benefit expected for Family 4.4.1

Methodology of performance calculation for AF4

The savings for "en-route ATFM delays" (Capacity) are stemming from a Network simulation, whereas Capacity gains are calculated against a "do-nothing scenario", meaning the estimated savings are measured against the increase of delays when project implementations or procedure changes will not take place.

The tables of benefits depict therefore the cumulated savings.

AF5 – SWIM

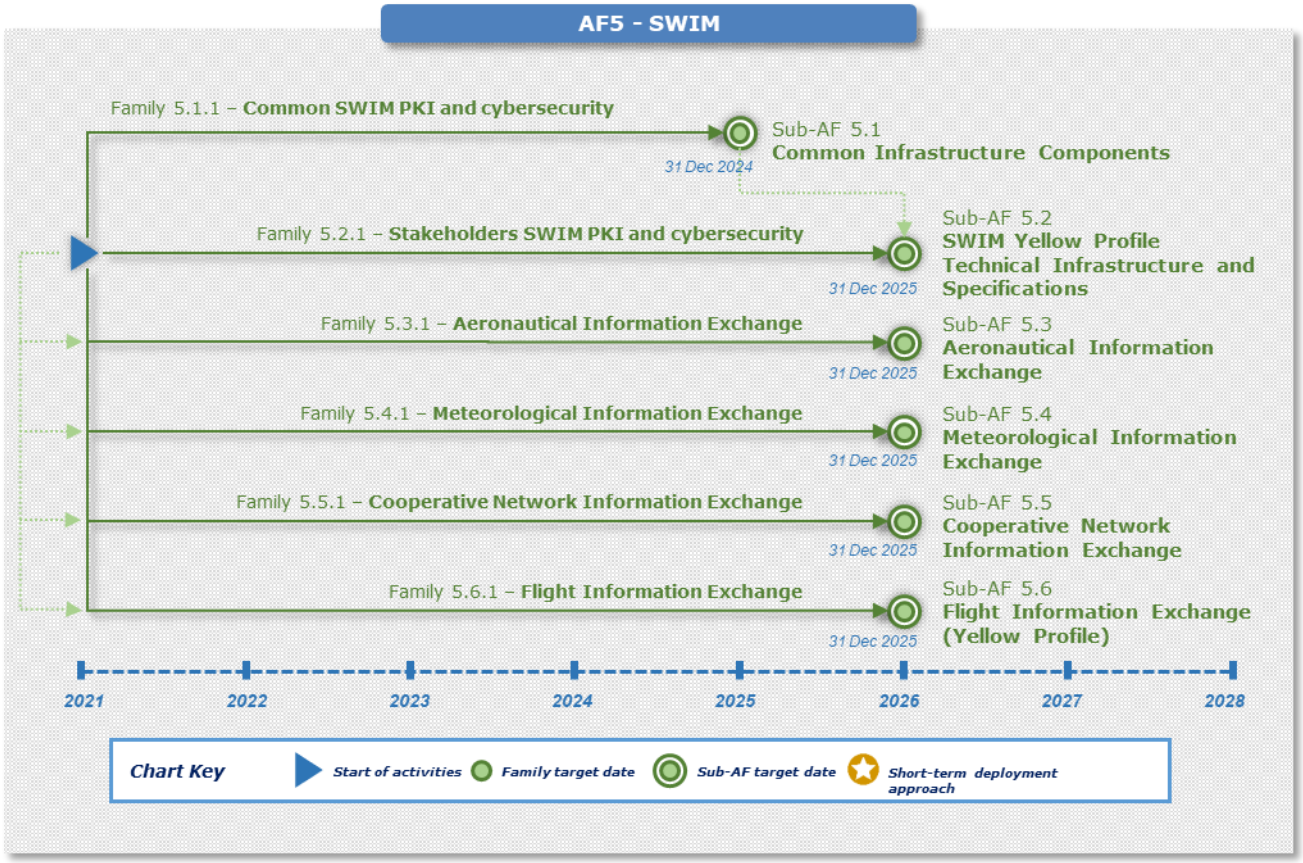


Figure 21. AF5 Short Term Deployment Approach

Introduction

The timely planning and implementation of CP1 SWIM services is paramount for an overall successful CP1 deployment because the full set of benefits from all ATM functionalities will be fully realized only once SWIM is implemented. As per the Regulation AF5 must be ready by 31 December 2025, therefore, by the end of 2024 there will be only 1 year left to complete the implementation in all EATMN for all mandated stakeholders. Thus, there is no margin to prioritise these families any longer.

AF6 – Initial Trajectory Information Sharing

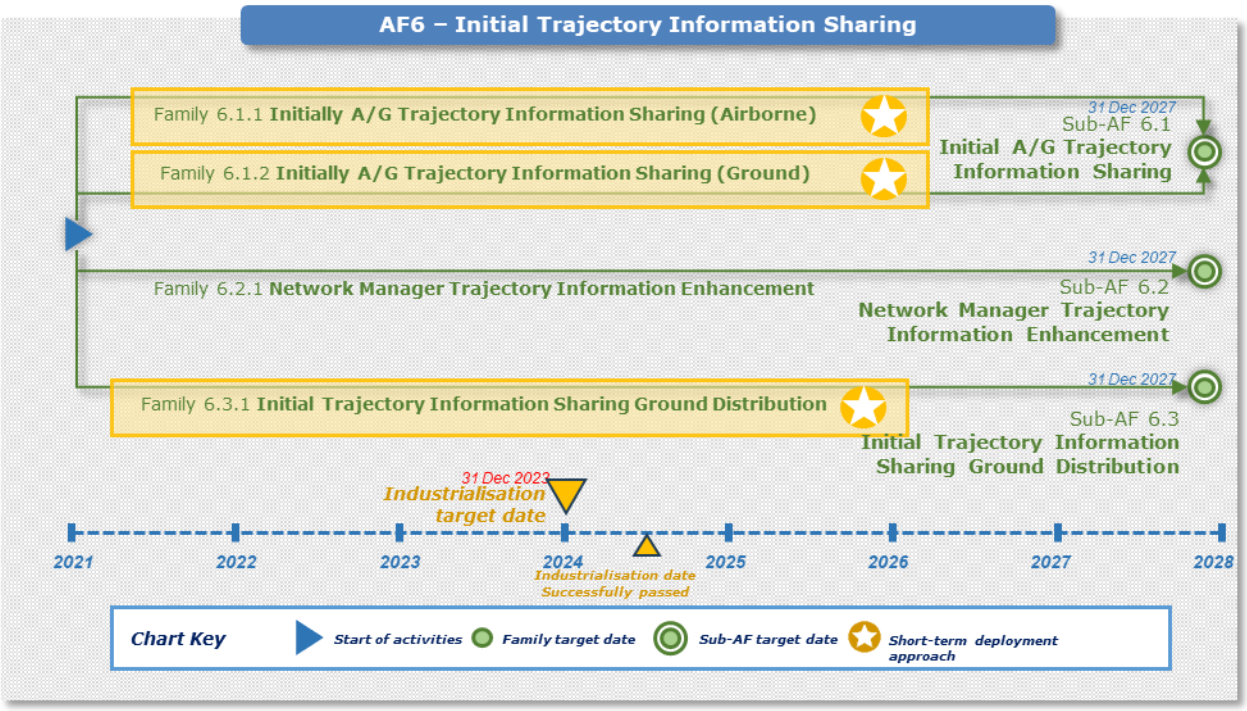


Figure 22. AF6 Short Term Deployment Approach

All the Families in AF6 were subject to an industrialisation target date at the end of 2023. At that time, the readiness for implementation and the availability of all the standards needed was assessed by EC with the support of EASA. EASA established in February 2023 a CP1 Industrialisation Forum, inviting SDM, NM, S3JU and EUROCAE, to coordinate all the related activities required to pass successfully the industrialisation target date. This industrialisation target date was passed successfully in June 2024 after EASA delivered an assessment report to EC and EC consulted with the SSC. It was concluded that AF6 was ready for implementation and therefore it remains in the scope of CP1 (see COMMISSION IMPLEMENTING DECISION (EU) 2024/1663).

Whilst the ADS-C Common Service (ACS) is the proposed approach described in the SDP to meet the requirements of AF6, SDM, EUROCONTROL/NM and several stakeholders, including the manufacturing industry, elaborated the technical specifications and guidance material that will support the implementation of the ACS. These technical specifications and guidance material were published by EUROCONTROL after a public consultation by the end of 2023.

SDM is proposing this year to start prioritising certain Families in AF6. This would allow the operational stakeholders (ANSPs, AUs and NM) to start planning the implementation of ADS-C/EPP, ideally following the recommended centralised approach (LACS), with the elaboration of implementation projects that could begin in 2025 after a firm decision has been taken by EC.

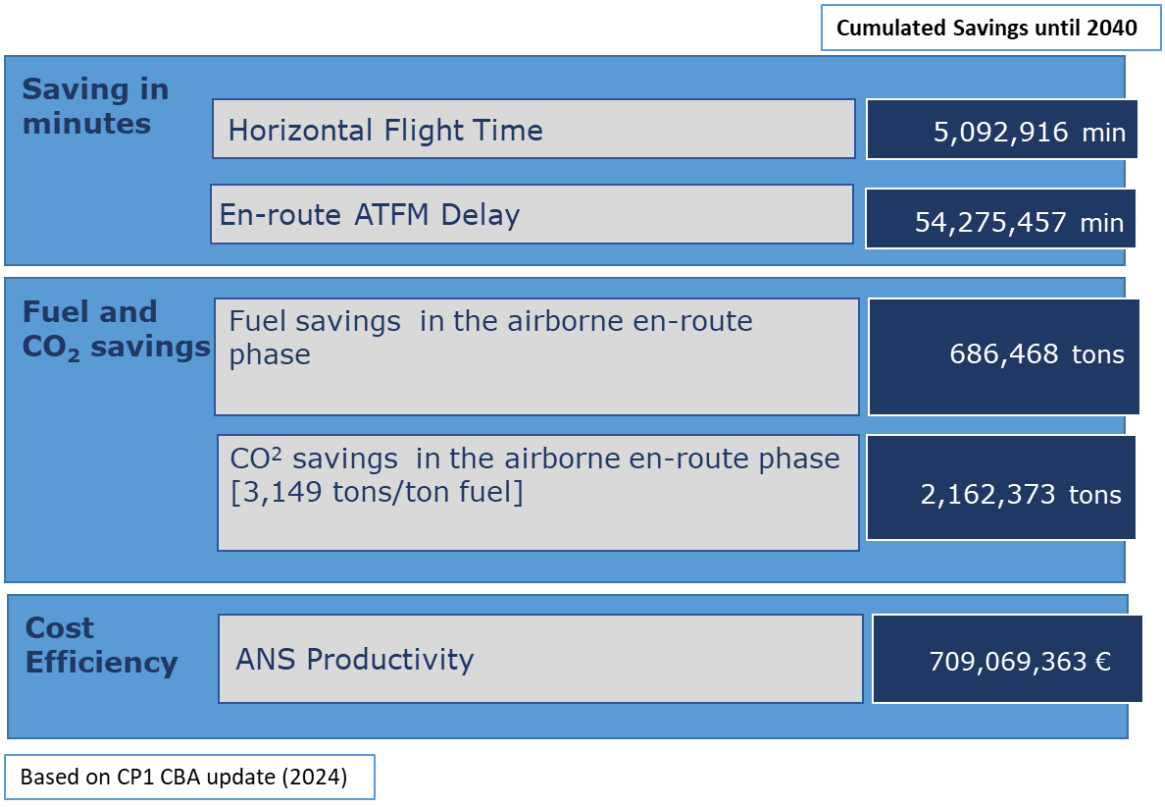
The main activity to be monitored for Family 6.1.1 is the equipage. Aircraft operators have to ensure the procurement of ADS-C/EPP functionalities as described in the ATS B2 standard (for aircraft affected by the mandate). Therefore, the implementation process by aircraft operators regarding the future aircraft configuration definition needs to start in a timely manner.

CP1 only mandates to forward-fit the new aircraft from 31 December 2027 onwards, but CP1 also requires in AF6 to have a "A reliable, fast and efficient air/ground communication infrastructure shall support initial trajectory information sharing". Considering the capacity issues that VDL M2 may suffer in the near future, it is also recommended, while fostering development and testing of new technologies (e.g., LDACS and Hyperconnected ATM), to support further deployment of available technologies (i.e., SATCOM - Iris that is already used operationally for ATC services and supports ADS-C) and support also any initiative aiming at optimizing AOC traffic to alleviate the VDL M2 congestion. This is already being done in the short term with

the introduction of SATCOM to complement VDL M2 in a multilink configuration. At the same time, having a centralised ADS-C service would reduce the number of links between the airborne and the ground systems, hence the recommendation to support the ADS-C Common Service for Family 6.1.1, and the participation of all ANSP to anticipate a harmonised ground deployment.

Family 6.1.2 requires the ANSPs to upgrade their ground ATM systems to receive and process the EPP data. It also requires to upgrade the CWP to display the trajectory discrepancies to the ATCOs. These are local implementations which can be customized according to the local needs. In guidelines included in chapter 4 of this document (EUROCONTROL Guidelines for Initial Trajectory Information Sharing, Edition 1.0) an example of a potential implementation to full fill the requirement of family 6.1.2 is described.

Family 6.3.1 addresses the ground distribution of the EPP data. Based on the SESAR results and the work done in the OEP, the EPP data could be distributed through a SWIM service (based on the EUROCONTROL SWIM specification). This is considered to be the most efficient mechanism, which would also harmonise the ground distribution of EPP across EU, and therefore will be used by ADS-C Common Service if this approach is followed. Although not ideal, for those ANSPs who opt to be disconnected from the ADS-C Common Service, they can implement their own dedicated SWIM service for widespread dissemination of the EPP information they download, preferably following the specifications produced by the OEP. Other legacy distribution mechanisms like AMHS and FMTP remain available, although they are not standardized and are pre point-to-point connection and thus will be far less efficient than a SWIM service.



3. Performance Assessment & CBA methodology

Savings cumulated until 2040

SDM and the European Commission have agreed to extend the CP1 CBA timeframe until 2040 (instead of 2030) and show cumulated savings until 2040 for several reasons:

- to counterbalance the COVID impact, that translated into implementation postponements (as set out in the CP1 regulation compared to the PCP), losses of benefits in the period 2020-2023 when traffic was too low to generate significant savings, and shortage of operational resources in the immediate post-COVID era.
- to better reflect the improvements from ATM functionalities 5 and 6, that are cornerstones of the CP1 implementation and are pathing the way forward to new future functionalities, but will start generating most of their benefits later than 2030.

KPAs, KPIs and their monetisation

The Key Performance Areas (KPAs) that are monitored at deployment level are those of the SES performance regulation (EU IR 2019/317) and those reflected in the ATM Master Plan.

The following table gives the Key Performance Indicators (KPIs) used by SDM, in relation to their KPAs.

KPAs	KPIs
Cost Efficiency (ANS productivity)	**Gate to Gate ANS cost (in €)**
Capacity	**Departure Delay (in minute):** • Airport ATFM Delay • En-Route ATFM Delay • ATC Delay
	Cancellations (in number of events)
Operational Efficiency	**Flight Time (in minute):** • Unimpeded ASMA[10] Time • Additional ASMA Time • Unimpeded Taxi-in Time • Additional Taxi-in Time • Unimpeded Taxi-out Time • Additional Taxi-out Time • Horizontal Flight Time
	Fuel consumption (in tons of fuel)
Environment	**CO_2 emissions (in tons of CO_2)**

Table 1 - KPAs and KPIs

For each KPI, improvements can be monetised by multiplying the savings (expressed in their respective unit) by a valorisation factor: euros per minute, euros per ton of fuel or ton of CO_2 etc.

The monetisation factors currently in use are derived from the version 10.0.3 of the Eurocontrol "Standard Inputs for Cost and Benefits Analyses" published in 2023.

[10] ASMA: Arrival Sequencing and Metering Area

KPI	Monetisation factor until 2023	Monetisation factor after 2023
Airport ATFM delay – €/min	€ 38	€ 45
En-route ATFM delay – €/min	€ 38	€ 45
ATC delay – €/min	€ 38	€ 45
ASMA time (unimpeded) – €/min	€ 37	€ 41
ASMA time (additional) – €/min	€ 45	€ 52
Taxi-out time (unimpeded) – €/min	€ 37	€ 41
Taxi-out time (additional) – €/min	€ 45	€ 52
Flight time – €/min	€ 37	€ 41
Cancellations – €/cancellation	€ 17,650	€ 20,930

Table 2 - Monetisation factors

In the SESAR Deployment Programme, an update of the monetization factors will be performed whenever deemed necessary, in particular following the release of a new version of the Eurocontrol "Standard Inputs for Cost and Benefits Analyses".

For Fuel and CO_2 price, a continuous update is performed to give the most realistic and up-to-date view of the benefits: after each calendar year-end, once the actual past fuel and CO_2 prices and more updated forecasts are available, the assumptions are reviewed.

The fuel and CO_2 prices that were used for the CP1 CBA update (edition 2024) are the following:

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023-2026	2027-2040
Jet fuel price (€/tonne)	€ 698	€ 487	€ 370	€ 458	€ 571	€ 560	€ 332	€ 543	€ 1,040	€ 819	€ 819
CO_2 allowance (€/tonne)	€ 7.2	€ 8.2	€ 6.6	€ 8.1	€ 24.6	€ 21.7	€ 32	€ 53	€ 82	€ 83	€ 125

Table 3 - Fuel and CO_2 prices

Enrichment of the Performance framework

To a vast extent, KPIs that have been used so far have been driven by the content of the Performance and Charging scheme IR. Recent studies have shown the need to broaden the performance framework in order to fully reveal the benefits ATM/ANS can deliver. It is of particular importance, as, for the next decade, improvement in operations (along with the ramped-up usage of SAF) is a vital ingredient to accompany the decarbonisation trajectory.

This led in particular to the work of the ATM/ANS Environmental Transparency Working Group, the report of which presenting other indicators (in particular to assess the vertical efficiency of flights) has been released. Further analyses are now conducted by its successor the AVENIR (Aviation Environmental Reporting) Working Group.

Such new performance indicators have the potential to enrich the performance framework and are being investigated by the SDM.

Traffic forecast

To perform the Deployment Programme Performance Assessment and CBA analysis, an update of the traffic scenario is performed, when necessary, in particular following the release of new traffic forecasts by STATFOR. The traffic forecast reference is systematically mentioned in any CBA analysis performed by SDM.

The CP1 CBA update Edition 2024 is based on the 'base' scenario from STATFOR released in October 2023 (Figure below)[11].

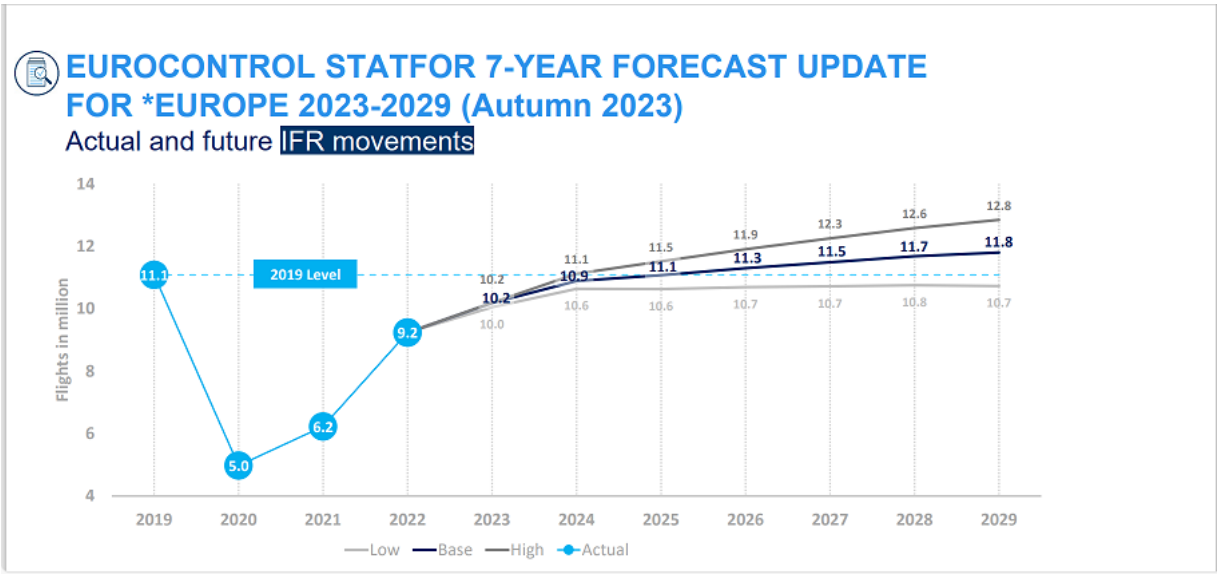


Figure 23 - 2019-2029 Europe traffic forecast by STATFOR (October 2023)

[11] The new forecast released by Eurocontrol in February 2024, showing minor differences, came too late to be effectively retained in the CP1 CBA update.

4. Standardisation and Regulation support to CP1 deployment

The main modifications implemented in this chapter compared with the last version (2024) are the following:

- Extended AMAN non-applicability assessment process.
- Arrival Management Best practices on AF1.
- CP1 FF-ICE/R1 Information Exchange requirements and FF-ICE/R1 Use Cases
- Guidelines for Initial Trajectory Information Sharing by EUROCONTROL has been published.
- *Extended AMAN SWIM service implementation (expected by summer 2025)*
- Specification for Data Link Ground Distribution SWIM Services and Specification for Data Link Common Services for the Aeronautical Telecommunication Network (ATN), by EUROCONTROL haven been published.
- Delivery dates for all documents have been reviewed and updated according to the last published version of A-RDP.

The **Standardisation and Regulation** supporting material is a key document, developed with the primary objective of providing an accurate **snapshot** of the current **state of play of Standards and Regulations** mapped with the 25 Families in the SESAR Deployment Programme (SDP). It also provides information on the on-going work related to supporting material and regulation.

The Annex is a **living document that will be regularly updated** throughout SESAR Deployment Programme's lifetime.

The presentation of information included within Standardisation and Regulation supporting material follows the "ATM Concept Lifecycle Model", where V0-V3 are covered by R&D under responsibility of SESAR 3 Joint Undertaking (S3JU). The subsequent Industrialisation includes development of material supporting deployment and development of products by manufacturing industry and Very Large-Scale Demonstrations (VLD) as support to industrialisation. Deployment coordination is under SESAR Deployment Manager (SDM) responsibility.

The Standardisation and Regulation supporting material is intended to be used as a common reference for the implementation of the SESAR Deployment Programme and a useful instrument for liaising with organisations and bodies responsible for developing guidance material, specifications, standards (all normally referred to as "standards"), certification documents, Acceptable Means of Compliance (AMC) as well as regulations.

Different approval methodologies are applied in aviation. For airborne equipment, "certification" is used based on specifications, standards and "Technical Specification Orders" (TSO). Certified equipment can be installed and used on board aircraft, on the condition that installation on board such aircraft has been certified as well. Ground system constituents are accompanied by "declaration of conformity or suitability for use" issued by the manufacturers. The service provider presents a "declaration of verification of systems", a demonstration of compliance with the regulation, to a competent authority i.e. the National Supervisory Authority (NSA), which oversees the service provider to ensure that safety requirements are met. In some cases, the regulation is very prescriptive with precise requirements, but in most cases only guidance is provided.

The Standardisation and Regulation supporting material presented in this document is structured as follows:

- **Essential material (green tables):** The documents listed in the green tables are essential for the deployment of the Families according to the requirements described in the SESAR Deployment Programme.

- **Supporting material (yellow tables):** The documents listed in the yellow tables are, according to SESAR Deployment Manager's point of view, supporting and guidance material for the deployment of the Families according to the requirements described in the SESAR Deployment Programme.

Early implementations before formal standards and regulatory material are available is possible subject to NSA approval. However, it might be necessary to adjust the implementations once formal standards and regulatory material become available at the end of industrialisation phase.

The content of the Standardisation and Regulation supporting material is based on:

- European Commission Implementing Regulation No 116/2021, Common Project 1 (CP1), repealing Commission Implementing Regulation (EU) No 716/2014 known as the Pilot Common Project (PCP), and especially the related indicative Roadmap with respect to standardisation and regulation needs);
- the ATM Master Plan references including the Integrated Roadmap Dataset 20;
- SESAR Solutions, i.e. deliverables from SESAR R&D mapped to ATM Master Plan Level 2 Operational Improvements (OIs);
- related plans or further development according to SESAR 2020 plans; and
- the Rolling Development Plan version 20 developed by the European ATM Standardisation Coordination Group (EASCG), summarising on-going and planned activities within bodies involved in development of standards and regulation.

The information reported in the document is elaborated and analysed by SDM in coordination with **EASA, EDA, EUROCONTROL, NM and SJU**, as well as with **EUROCAE and ESOs through the EASCG** which contributions and inputs were pivotal towards the finalisation of the Standardisation and Regulation supporting material.

In order to limit the volume and increase the readability of the Standardisation and Regulation supporting material, some high-level reference documents setting up the "legislative" framework are not included in the following tables. It should be noted that these documents are however always applicable and should be taken into account when introducing new and changing existing services. Such high-level reference documents include amongst others:

Regulations:

- EASA Basic Regulation No 2018/1139.
- Single European Sky (SES) legislation.
- Implementing Regulation (EU) No 2017/373 laying down common requirements for providers of air traffic management, air navigation services and other air traffic management network functions and their oversight, repealing Regulation (EC) No 482/2008, Implementing Regulations (EU) No 1034/2011, Regulation (EU) No 1035/2011 and Regulation (EU) No 2016/1377 and amending Regulation (EU) No 677/2011. The regulation is constructed of a "cover regulation" with thirteen annexes addressing different areas and it is applicable from 2 January 2020. However, the part related to "data service providers" is applicable from 1 January 2019.
- Commission Regulation (EU) No 139/2014 of 12 February 2014 laying down requirements and administrative procedures related to aerodromes pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council Text with EEA relevance. This regulation is amended by Commission Implementing Regulation (EU) 2020/469 as referenced in the following line.
- Commission Implementing Regulation (EU) 2020/469 of 14 February 2020 amending Regulation (EU) No 923/2012, Regulation (EU) No 139/2014 and Regulation (EU) 2017/373 as regards requirements for air traffic management/air navigation services, design of airspace structures and data quality, runway safety and repealing Regulation (EC) No 73/2010.

- Commission Implementing Regulation (EU) No 409/2013 of 3 May 2013 on the definition of common projects, the establishment of governance and the identification of incentives supporting the implementation of the European Air Traffic Management Master Plan European Commission Implementing Regulation No 116/2021, Common Project 1 (CP1), amending Commission Implementing Regulation (EU) No 409/2013 and repealing Commission Implementing Regulation (EU) No 716/2014 known as the Pilot Common Project (PCP).
- Directive 2013/40/EU of the European Parliament and of the Council of 12 August 2013 on attacks against information systems.
- The Network and Information Security (NIS) Directive (2016/1148).

Standards:

- ISO 27000 family of standards, focused on information security matters, as listed in the Cybersecurity section.
- ISO 28000 Specification for security management systems for the supply chain.

It should also be mentioned that Airlines Electronic Engineering Committee (AEEC) is developing material defining "form, fit and function" of airborne equipment published as ARINC documents. Not all of these documents are included in the Standardisation and Regulation supporting material. The ARINC 660-B "CNS/ATM Avionics Architectures Supporting NEXTGEN/SESAR Concepts" provides an overview of the expected impact on airborne equipment when deploying the SESAR solutions.

Furthermore, considering that global interoperability is a paramount for aviation, SESAR deployment is strongly linked to the Global Air Navigation Plan (GANP) defined by ICAO, which is related to the European ATM Master Plan. Therefore, some high-level ICAO reference documents, which may be considered in the deployment of the families, are listed below:

- ICAO Annexes to the Chicago Convention.
- ICAO Annex 17 – Aviation Security (safeguards civil aviation against unlawful interference and recommends protection of critical information and communication systems).
- ICAO IMP SARPs on AIRM.
- ICAO PANS-IM covering AIRM (TBD).
- ICAO Doc 9985 – Restricted (Air Traffic Management Security Manual).
- ICAO Doc 8973 – Restricted (Aviation Security Manual).

Cybersecurity

In order to complement Cybersecurity guidance section in the SESAR Deployment Programme Planning View, this section provides a list of regulations, standards and guidance documents specifically related to cybersecurity aspects, which are sometimes targeting a specific audience but may inspire good practises across the whole community.

For States and "operators of essential services"

- The Network and Information Security (NIS) Directive (2016/1148) requests Member States to identify "operators of essential services" by 9 November 2018 and lists for air transport the following organisations: air carriers, airport managing bodies and traffic management control operators. The NIS directive also requests the States to ensure that "operators of essential services" take:
  1. *"Appropriate and proportionate technical and organisational measures to manage the risks posed to the security of network and information systems which they use in their operations. Having regard to the state of the art, those measures shall ensure a level of security of network and information systems appropriate to the risk posed"*
  2. *"Appropriate measures to prevent and minimise the impact of incidents affecting the security of the network and information systems used for the provision of such essential services, with a view to ensuring the continuity of those services"*
- EASA Basic Regulation 2018/1139 of July 4th, 2018, highlights in article 4:
  1. *"Interdependencies between the different domains of aviation safety, and between aviation safety, cyber security and other technical domains of aviation regulation"*
- ECAC Doc 30. ECAC Policy Statement in the field of Civil Aviation Facilitation.

For all Air Navigation Service Providers:

- Commission Implementing Regulation (EU) No 2017/373 of 1st of March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight, in its requirement "ATM/ANS.OR.D.010 Security Management" states that:
  - *(a) Air navigation services and air traffic flow management providers and the Network Manager shall, as an integral part of their management system as required in point ATM/ANS.OR.B.005, establish a security management system […].*
  - *(d) Air navigation services and air traffic flow management providers and the Network Manager shall take the necessary measures to protect their systems, constituents in use and data and prevent compromising the network against information and cyber security threats which may have an unlawful interference with the provision of their service.*
- Commission Implementing Regulation (EU) No 2023/203 lays down rules for the identification and management of information security risks in aviation organizations and aviation competent authorities, including EASA.
- Commission Delegated Regulation (EU) 2023/1768 of 14 July 2023 laying down detailed rules for the certification and declaration of air traffic management/air navigation services systems and air traffic management/air navigation services constituents

- Commission Implementing Regulation (EU) 2023/1769 of 12 September 2023 laying down technical requirements and administrative procedures for the approval of organisations involved in the design or production of air traffic management/air navigation services systems and constituents and amending Implementing Regulation (EU) 2023/203
- ED-205A "Process standard for Security Certification and Declaration of ATM ANS Ground Systems".
- CEN EN 16495 "Information security for organisations supporting civil aviation" builds on the structure of the ISO/IEC 27000 Family - Information security management systems.
- ICAO Doc 9985 – Restricted (Air Traffic Management Security Manual).

For all stakeholders:

- ICAO Annex 17 – Aviation Security (safeguards civil aviation against unlawful interference and recommends protection of critical information and communication systems).
- ICAO Doc 8973 – Restricted (Aviation Security Manual).
- General Data Protection Regulation (GDPR) (Regulation (EU) No 2016/679) on the protection of natural persons with regard to the processing of personal data and on the free movement of such data.
- Regulation 2019/2019/881 on ENISA (the European Union Agency for Cybersecurity) and on information and communications technology cybersecurity certification.
- ITU X.1205 "Overview of Cybersecurity".
- ISO 27000 family of standards are focused on information security matters.
- ISO 27001 - Information technology — Security techniques — Information security management systems — Requirements.
- ISO 27002 - Information technology — Security techniques — Code of practice for information security management.
- ISO 27003 - Information Technology — Security techniques — Information security management system implementation guidance.
- ISO 27004 - Information technology — Security techniques — Information security management — Measurement.
- ISO 27005 - Information technology — Security techniques — Information security risk management.
- ISO 27006 - Information technology — Security techniques — Requirements for bodies providing audit and certification of information security management systems.
- NIST Cybersecurity Framework.
- ISA/IEC 62443 – Industrial Automation and Control Systems (IACS) security.

AF1 - Extended AMAN and Integrated AMAN/DMAN in the High-Density TMAs

Family 1.1.1 – Arrival Manager extended to en-route airspace

EOC: Airport and TMA performance

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#05 "Extended Arrival Management (AMAN) horizon"		SESAR Release 4 (2014)
Demonstration Activities		**Date**
PJ.25 XSTREAM "Cross Border SESAR Trials for Enhanced Arrival Management"		SESAR Release 9 (2020)

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
Detailed Specifications and Acceptable Means of Compliance & Guidance Material for statement of compliance of ATM/ANS ground equipment (DS-GE.SoC)	EASA	Published
Acceptable Means of Compliance and Guidance Material for the certification and declaration of air traffic management/air navigation services systems and air traffic management/air navigation services constituents	EASA	Published
SPEC-0106 On-Line Data Interchange (OLDI) Edition 5.1	EUROCONTROL	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Family 1.1.1 Extended AMAN non-applicability assessment process	SESAR Deployment Manager	Published
List of In-horizon Airports Impacting AF1 Implementation	SESAR Deployment Manager	Published

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
API Implementation Guide Edition	EUROCONTROL	Published
DPI Implementation Guide Edition 2.5/15-05-2022	EUROCONTROL	Published
Airport Collaborative Decision Making (A-CDM) Implementation Manual	EUROCONTROL	Published
AF1 Arrival Management - Best practices	SESAR Deployment Manager	Published
ED-141 Minimum Technical Specifications for A-CDM Systems	EUROCAE	Published
ETFMS and DDS	EUROCONTROL	Published

SDM Deployment Assessment	
Target Date	12/2024
SDM put in place a process to formalize the deployment to a distance less than 180NM where local considerations so warrant; details are found in the Annex to the SESAR Deployment Programme 2024.	

Family 1.2.1 – AMAN/DMAN Integration

EOC: Airport and TMA performance

TRL6-Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#54 "Flow-based integration of arrival and departure management"	TS-0308	SESAR Release 4 (2014)
#106 "DMAN Baseline for integrated AMAN DMAN"	TS-0201	SESAR Release 1 (2011)
PJ.02-08-01 "Integrated Runway Sequence for full traffic Optimization on Single and Multiple Runway Airports"	TS-0301	SESAR Release 9 (2019)
PJ.02-08-02 " Optimised use of runway configuration for multiple runway airports"	TS-0313	SESAR Release 9 (2019)
Demonstration Activities		**Date**
VLD03 W2 SORT		SESAR Release 13 (2023)
PJ.25 XSTREAM (VLD)		SESAR Release 9 (2020)

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
API Implementation Guide Edition 2.5/15-05-2022	EUROCONTROL	Published
DPI Implementation Guide Edition 2.5/15-05-2022	EUROCONTROL	Published

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
None	N/A	N/A

SDM Deployment Assessment	
Target Date	12/2027
wo candidate solution are available, PJ.02-08-01 and PJ.02-08-02 in the SESAR Catalogue; either may be implemented to meet the system requirements of the Regulation. See Chapter *1. SDP Further Clarifications* for details.	

AF2 – Airport Integration and Throughput

Family 2.1.1 – Departure Management Synchronised with Pre-Departure Sequencing

EOC: Airport and TMA performance

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#53 "Pre-Departure Sequencing supported by Route Planning"	TS-0202	SESAR Release 4 (2014)
#106 "DMAN Baseline for integrated AMAN DMAN"	TS-0201	SESAR Release 1 (2011)
Demonstration Activities		**Date**
PJ.28 IAO "Integrated Airport Operations"		SESAR Release 9 (2020)

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) 2021/116 of 01 February 2021	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
EN 303 212 (V1.1.1) Airport Collaborative Decision Making (A-CDM) Community Specification (Communication 2010/C 168/04)	ETSI	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
ED-87D MASPS for Advanced Surface Movement Guidance and Control Systems (A-SMGCS)	EUROCAE	Published
ED-141 Minimum Technical Specification for the Airport Collaborative Decision Making (Airport-CDM)	EUROCAE	Published
ED-145 Airport-CDM Interface Specification	EUROCAE	Published
Guidance Material / Specifications / Standards		
References	**References**	**References**
Airport CDM Implementation Manual Version 5	EUROCONTROL	Published
SPEC-171 Edition 2.0 Specification for Surface Advanced-Surface Movement Guidance and Control System (A-SMGCS)	EUROCONTROL	Published

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
EN 303 213-1 CS on ASMGCS Part 1: surveillance service including external interfaces (V 2.1.1)	ETSI	Published
EN 303 213-2 CS on ASMGCS Part 2: airport safety support service (V 2.1.1)	ETSI	Published
EN 303 213-3 CS on ASMGCS Part 3: deployed cooperative sensor including its interfaces (V 2.1.1)	ETSI	Published
EN 303 213-4-1 A-SMGCS; Part 4: Community Specification for a deployed non-cooperative sensor including its interfaces; Sub-part 1: Generic requirements for non-cooperative sensor (V 1.1.1)	ETSI	Published
EN 303 213-4-2 A-SMGCS; Part 4: Community Specification for a deployed non-cooperative sensor including its interfaces; Sub-part 2: Specific requirements for a deployed Surface Movement Radar sensor (V 1.1.1)	ETSI	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Doc 9426 Air Traffic Services Planning Manual	ICAO	Published
Doc 9830, Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual	ICAO	Published
B0 - RSEQ Improved Traffic Flow through Runway Sequencing (AMAN/DMAN)	ICAO	Published
B1 - RSEQ Improved Airport Operations through Departure, Surface and Arrival Management	ICAO	Published
B2-RSEQ Linked AMAN/DMAN	ICAO	Published
B3 - RSEQ Integrated AMAN/DMAN/SMAN	ICAO	Published

SDM Deployment Assessment	
Target Date	31/12/2022
The existing standardisation material and regulations shown here were sufficient to deploy the Family in a harmonised way. For those still to complete Family 2.1.1 the standards remain the same.	

Family 2.2.1 – Initial AOP

EOC: ATM interconnected network

TRL6 Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#21 "Airport Operations Plan and AOP-NOP Seamless Integration"	AO-0801-A	SESAR Release 5 (2016)
Demonstration Activities		**Date**
VLD PJ.24 "Network Collaborative Management' NCM		N/A SESAR Release 9 (2020)

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) 2021/116 of 01 February 2021	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
EN 303 212 (V1.1.1) Airport Collaborative Decision Making (A-CDM) Community Specification (Communication 2010/C 168/04)	ETSI	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
DPI Implementation Guide	EUROCONTROL	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
API Implementation Guide	EUROCONTROL	Published
Departure Planning Information (DPI) & Arrival Planning Information (API) implementation roadmap	EUROCONTROL/NM	Published
EUROCONTROL A-CDM webpage	EUROCONTROL	Published
Airport CDM Implementation Manual	EUROCONTROL	Published

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) 2021/116 of 01 February 2021	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
EN 303 212 (V1.1.1) Airport Collaborative Decision Making (A-CDM) Community Specification (Communication 2010/C 168/04)	ETSI	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
DPI Implementation Guide	EUROCONTROL	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
API Implementation Guide	EUROCONTROL	Published
Departure Planning Information (DPI) & Arrival Planning Information (API) implementation roadmap	EUROCONTROL/NM	Published
EUROCONTROL A-CDM webpage	EUROCONTROL	Published
Aeronautical Information Exchange Model AIXM Edition 5.1.1	EUROCONTROL	Published

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) 2021/116 of 01 February 2021	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
EN 303 212 (V1.1.1) Airport Collaborative Decision Making (A-CDM) Community Specification (Communication 2010/C 168/04)	ETSI	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
DPI Implementation Guide	EUROCONTROL	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
API Implementation Guide	EUROCONTROL	Published
Departure Planning Information (DPI) & Arrival Planning Information (API) implementation roadmap	EUROCONTROL/NM	Published
EUROCONTROL A-CDM webpage	EUROCONTROL	Published
NM B2B Reference Manuals	EUROCONTROL/NM	Published
NM B2B Services webpage	EUROCONTROL/NM	Published

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) 2021/116 of 01 February 2021	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
EN 303 212 (V1.1.1) Airport Collaborative Decision Making (A-CDM) Community Specification (Communication 2010/C 168/04)	ETSI	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
DPI Implementation Guide	EUROCONTROL	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
API Implementation Guide	EUROCONTROL	Published
Departure Planning Information (DPI) & Arrival Planning Information (API) implementation roadmap	EUROCONTROL/NM	Published
EUROCONTROL A-CDM webpage	EUROCONTROL	Published
Airport Network Integration - concept for establishment of an Airport Operations Plan (AOP) Ed1.1 – 07/11/2018	EUROCONTROL	Published

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) 2021/116 of 01 February 2021	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
EN 303 212 (V1.1.1) Airport Collaborative Decision Making (A-CDM) Community Specification (Communication 2010/C 168/04)	ETSI	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
DPI Implementation Guide	EUROCONTROL	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
API Implementation Guide	EUROCONTROL	Published
Departure Planning Information (DPI) & Arrival Planning Information (API) implementation roadmap	EUROCONTROL/NM	Published
EUROCONTROL A-CDM webpage	EUROCONTROL	Published
iAOP-NOP_Implementation_Guide	ACI EUROPE	Published

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) 2021/116 of 01 February 2021	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
EN 303 212 (V1.1.1) Airport Collaborative Decision Making (A-CDM) Community Specification (Communication 2010/C 168/04)	ETSI	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
DPI Implementation Guide	EUROCONTROL	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
API Implementation Guide	EUROCONTROL	Published
Departure Planning Information (DPI) & Arrival Planning Information (API) implementation roadmap	EUROCONTROL/NM	Published
EUROCONTROL A-CDM webpage	EUROCONTROL	Published
Guidance on Compliance to the CP1 (IR 2021/116) - For the Initial AOP and information sharing of the initial AOP with the Network Operations Plan	ACI EUROPE	Published

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
ED-141 Minimum Technical Specification for the Airport Collaborative Decision Making (Airport-CDM)	EUROCAE	Published
ED-145 Airport CDM Interface Specification	EUROCAE	Published
ED-146 Guidelines for Test and Validation related to A-CDM interoperability	EUROCAE	Published

SDM Deployment Assessment	
Target Date	31/12/2023

The existing standardisation material and regulations shown here were sufficient to deploy the Family in a harmonised way. For those airports still to complete 2.2.1 the standards remain the same and are therefore stable. It should be noted that while the API, DPI roadmaps and guides are listed here the validation testing that they describe in connecting to the NM for data sharing takes place in the Family 4.2.2.

Family 2.2.2 - Extended AOP

EOC: ATM interconnected network

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#21 "Airport Operations Plan and AOP-NOP Seamless Integration"	AO-0801-A AO-0802-A AO-0803 DCB-0310	SESAR Release 5 (2016)
		Date
VLD PJ.24 "Network Collaborative Management' NCM		N/A SESAR Release 9 (2020)

Industrialization Phase. Essential material		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) 2021/116 of 01 February 2021	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Guidance on Compliance to the CP1 (IR 2021/116) - For the Initial AOP and information sharing of the initial AOP with the Network Operations Plan	ACI EUROPE	Published
Guidance to the CP1 (IR 2021/116) - For the Extended AOP and integration of the E-AOP with the Network Operations Plan	ACI EUROPE	Published
Airport CDM Implementation Manual	EUROCONTROL	Published
DPI Implementation Guide	EUROCONTROL	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
API Implementation Guide	EUROCONTROL	Published
Departure Planning Information (DPI) & Arrival Planning Information (API) implementation roadmap	EUROCONTROL/NM	Published
EUROCONTROL A-CDM webpage	EUROCONTROL	Published
NM B2B Services webpage	EUROCONTROL/NM	Published
NM B2B Reference Manuals	EUROCONTROL/NM	Published
iAOP-NOP_Implementation_Guide	ACI EUROPE	Published
Airport Network Integration - concept for establishment of an Airport Operations Plan (AOP) Ed1.1 – 07/11/2018	EUROCONTROL	Published
E-AOP-NOP Implementation Guide	ACI EUROPE	Published
AOP Practical Guide	ACI EUROPE	Published

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
EN 303 212 (V1.1.1) Airport Collaborative Decision Making (A-CDM) Community Specification (Communication 2010/C 168/04)	ETSI	Published
Network Strategy Plan (NSP): 2020-2029: Strategic Objectives 2, 4 and, 5 are relevant even though the document was written referencing the PCP.	EUROCONTROL/NM	Published

SDM Deployment Assessment	
Target Date	31/12/2027

The existing standardisation material and regulations shown here will be sufficient to deploy the Family in a harmonised way. Existing published documents can already be used. It should be noted that while the API, DPI roadmaps and other implementation guides are listed here the validation testing that they describe in connecting to the NM for data sharing takes place in the Family 4.4.1.

Family 2.3.1 – Airport Safety Nets

EOC: Airport and TMA performance

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#02 "Airport Safety Nets for controllers: conformance monitoring alerts and detection of conflicting ATC clearances"	AO-0104-A	SESAR Release 5 (2016)
#04 "Enhanced Traffic Situational Awareness and Airport Safety Nets for the vehicle drivers"	AO-0105 AO-0204	SESAR Release 5 (2016)
Demonstration Activities		**Date**
PJ.28 IAO "Integrated Airport Operations"		SESAR Release 9 (2020)

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) 2021/116 of 01 February 2021	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
EN 303 213-1 CS on ASMGCS Part 1: surveillance service including external interfaces (V 2.1.1)	ETSI	Published
EN 303 213-2 CS on ASMGCS Part 2: airport safety support service (V 2.1.1)	ETSI	Published
EN 303 213-3 CS on ASMGCS Part 3: deployed cooperative sensor including its interfaces (V 2.1.1)	ETSI	Published
EN 303 213-4-1 A-SMGCS; Part 4: Community Specification for a deployed non-cooperative sensor including its interfaces; Sub-part 1: Generic requirements for non-cooperative sensor (V 1.1.1)	ETSI	Published
EN 303 213-4-2 A-SMGCS; Part 4: Community Specification for a deployed non-cooperative sensor including its interfaces; Sub-part 2: Specific requirements for a deployed Surface Movement Radar sensor (V 1.1.1)	ETSI	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
ED-116 MOPS for Surface Movement Radar Sensor Systems for use in A-SMGCS	EUROCAE	Published
ED-117A MOPS for Mode S MLAT Systems for use in A-SMGCS	EUROCAE	Published
ED-163 Safety, Performance and Interoperability Requirements document for ADS-B Airport Surface surveillance application (ADS-B APT)	EUROCAE	Published
ED-102B / DO-260CMOPS for 1090 MHz Extended Squitter Automatic Dependent Surveillance Broadcast (ADS-B) and Traffic Information Services Broadcast (TIS-B)	EUROCAE / RTCA	Published
ED-102B / DO-C MOPS for 1090 MHz Extended Squitter Automatic Dependent Surveillance Broadcast (ADS-B) and Traffic Information Services Broadcast (TIS-B) (Ch1)	EUROCAE / RTCA	Published
SPEC-171 Edition 2.0 Specification for Advanced-Surface Movement Guidance and Control System (A-SMGCS) Services	EUROCONTROL	Published
European Action Plan for the Prevention of Runway Incursions (EAPPRI)	EUROCONTROL	Published

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Doc 7030/5, (EUR/NAT) Regional Supplementary Procedures, Section 6.5.6 and 6.5.7	ICAO	Published
Doc 9426 Air Traffic Services Planning Manual	ICAO	Published
Doc 9830, Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual	ICAO	Published
Doc 9871, Technical Provisions for Mode S Services and Extended Squitter	ICAO	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Doc 9924, Aeronautical Surveillance Manual	ICAO	Published
B0 - RSEQ Improved Traffic Flow through Runway Sequencing (AMAN/DMAN)	ICAO	Published
B1 - RSEQ Improved Airport Operations through Departure, Surface and Arrival Management	ICAO	Published
B2-RSEQ Linked AMAN/DMAN	ICAO	Published
B3 - RSEQ Integrated AMAN/DMAN/SMAN	ICAO	Published

SDM Deployment Assessment	
Target Date	31/12/2025
The existing standardisation material and regulations shown here are sufficient to deploy the Family in a harmonised way.	

AF3 - Flexible Airspace Management and Free Route Airspace

Family 3.1.1 – ASM and A-FUA

EOC: Fully dynamic and optimised airspace

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#31 "Variable profile military reserved areas and enhanced (further automated) civil-military collaboration"	AOM-0206-A AOM-0202-A	SESAR Release 5 (2016)
#66 "Automated Support for Dynamic Sectorisation"	CM-0102-A	SESAR Release 2 (2012)
Demonstration Activities		**Date**
None		N/A

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Regulation (EC) No 2150/2005 of 23 December 2005 laying down common rules for the flexible use of airspace	European Commission	Published
Commission Implementing Regulation (EU) 2019/123 of 24 January 2019 laying down detailed rules for the implementation of air traffic management (ATM) network functions and repealing Commission Regulation (EU) No 677/2011	European Commission	Published
Commission Implementing Regulation (EU) (EU) 2018/1139 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
None	N/A	N/A

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
SPEC-166 Specification for Airspace Management (ASM) Support System Requirements supporting the ASM processes at local and FAB level Part I-II	EUROCONTROL	Published
SPEC-166 Specification for Airspace Management (ASM) Support System Requirements supporting the ASM processes at local and FAB level - Part I Edition 1.1	EUROCONTROL	Q4/2024
SPEC-179 Specification for Airspace Management (ASM) Support System Requirements supporting the ASM processes at local and FAB level - Part II Edition 1.1	EUROCONTROL	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
SPEC-0112 Specification for the application of the Flexible Use of Airspace (FUA)	EUROCONTROL	Published
LARA (Local and sub-Regional Airspace Management Support System)	EUROCONTROL	Published
Advanced FUA Concept	EUROCONTROL	Published
Civil-military ATM Performance Framework	EUROCONTROL	Published
NOP Protected Portal User Guide	EUROCONTROL/NM	Published
NOP Public Portal User Guide	EUROCONTROL/NM	Published
Aeronautical Information Exchange Model AIXM Edition 5.1.1	EUROCONTROL	Published
Aeronautical Information Exchange Model AIXM Edition 5.2	EUROCONTROL	Q3/2024
European Route Network Improvement Plan (ERNIP) Part 3 - Airspace Management Handbook - Guidelines for Airspace Management	EUROCONTROL/NM	Published
Flexible Use of Airspace (FUA) AMC/CADF Operations Manual	EUROCONTROL/NM	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Network Strategy Plan 2020-2029	EUROCONTROL/NM	Published
GUID-185 Guidelines for ASM Support Systems Interfaces Implementation	EUROCONTROL	Published

SDM Deployment Assessment	
Target Date	31/12/2022

According to the reports received from the States, most of them are currently exchanging ASM data through the NM systems, while carrying out, in parallel, the implementation of a local ASM tool. Few states, on the other hand, reported that they are already exclusively working with their own ASM tool.

Overall, this snapshot of the current situation allows SDM to confirm that stakeholders are fully aware of what the next AF5 objectives on ASM will be.

About ASM-ATC interoperability, AF3 allowed to manual trigger the reserved areas on Air Traffic Controllers' CWPs. To be compliant with AF5 requirements, however, this interoperability has to be physically deployed as SWIM compliant.

Family 3.1.2 – Management of Predefined Airspace Configurations

EOC: Fully dynamic and optimised airspace

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#31 "Variable profile military reserved areas and enhanced (further automated) civil-military collaboration"	AOM-0206-A AOM-0202-A	SESAR Release 5 (2016)
#66 "Automated Support for Dynamic Sectorisation"	CM-0102-A	SESAR Release 2 (2012)
Demonstration Activities		**Date**
None		N/A

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Regulation (EC) No 2150/2005 of 23 December 2005 laying down common rules for the flexible use of airspace	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
None	N/A	N/A

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
SPEC-166 Specification for Airspace Management (ASM) Support System Requirements supporting the ASM processes at local and FAB level Part I-II	EUROCONTROL	Published
SPEC-166 Specification for Airspace Management (ASM) Support System Requirements supporting the ASM processes at local and FAB level - Part I Edition 1.1	EUROCONTROL	Q4/2024
SPEC-179 Specification for Airspace Management (ASM) Support System Requirements supporting the ASM processes at local and FAB level - Part II Edition 1.1	EUROCONTROL	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
SPEC-0112 Specification for the application of the Flexible Use of Airspace (FUA)	EUROCONTROL	Published
LARA (Local and sub-Regional Airspace Management Support System)	EUROCONTROL	Published
Advanced FUA Concept	EUROCONTROL	Published
European Route Network Improvement Plan (ERNIP) Part 3 - Airspace Management Handbook - Guidelines for Airspace Management	EUROCONTROL/NM	Published
Flexible Use of Airspace (FUA) AMC/CADF Operations Manual	EUROCONTROL/NM	Published
Network Strategy Plan 2020-2029	EUROCONTROL/NM	Published
NM B2B web services	EUROCONTROL/NM	Published
ATFCM User's Manual	EUROCONTROL/NM	Published
ATFCM Operations Manual	EUROCONTROL/NM	Published
CHMI ATFCM Reference Guide	EUROCONTROL	Published
CHMI ATFCM Map Reference Guide	EUROCONTROL	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
CHMI ASM Function Reference Guide	EUROCONTROL	Published
CHMI (via internet) Installation Guide	EUROCONTROL	Published

SDM Deployment Assessment	
Target Date	31/12/2022
Most of the States are using NM systems. Despite this, the ideal and most recommended solution, with a view to increasingly automate and synchronise the sharing of information, would be to establish a link between the various ATM systems involved.	

Family 3.2.1 – Initial FRA

EOC: Fully dynamic and optimised airspace

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#32 "Free Route through the use of Direct Routing"	AOM-0500	SESAR Release 5 (2016)
#33 "Free Route through Free Routing for Flights both in cruise and vertically evolving above a specified Flight Level"	AOM-0501	SESAR Release 5 (2016)
#66 "Automated Support for Dynamic Sectorisation"	CM-102-A	SESAR Release 5 (2016)
Demonstration Activities		**Date**
None		N/A

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) 2019/123 of 24 January 2019 laying down detailed rules for the implementation of air traffic management (ATM) network functions and repealing Commission Regulation (EU) No 677/2011	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
None	N/A	N/A

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
European Route Network Improvement Plan (ERNIP) Part 1 - European Airspace Design Methodology - Guidelines	EUROCONTROL/NM	Published
European Route Network Improvement Plan (ERNIP) Part 2 - European ATS Route Network	EUROCONTROL/NM	Published
European Route Network Improvement Plan (ERNIP) Part 3 - Airspace Management Handbook	EUROCONTROL/NM	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
European Route Network Improvement Plan (ERNIP) Part 4 - Route Availability Document User's Manual	EUROCONTROL/NM	Published
NM Flight Planning Requirements - Guidelines	EUROCONTROL/NM	Published
Network Strategy Plan 2020-2029	EUROCONTROL/NM	Published
IFPS User's Manual	EUROCONTROL/NM	Published
SPEC-0107 EUROCONTROL Specification for ATS Data Exchange Presentation (ADEXP) Edition 3.3, Community Specification	EUROCONTROL	Published
SPEC-0107 EUROCONTROL Specification for ATS Data Exchange Presentation (ADEXP), Edition 3.4	EUROCONTROL	Published
SPEC-0106 On-Line Data Interchange (OLDI) Edition 5.1	EUROCONTROL	Published
SPEC-139 Specification for Medium-Term Conflict Detection (MTCD) Edition 2.0	EUROCONTROL	Published
SPEC-142 Specification for Monitoring aids (MONA)	EUROCONTROL	Published
SPEC-143 Specification for Trajectory Prediction	EUROCONTROL	Published
GUID-161 Guidelines for area proximity warning (APW) Part I-III	EUROCONTROL	Published

SDM Deployment Assessment	
Target Date	31/12/2022
Deployment successfully completed everywhere. States are completing the deployment of the Enhanced FRA elements (Final FRA, FRA connectivity with TMAs and Cross-border dimension), as required by Family 3.2.2.	

Family 3.2.2 – Enhanced Free Route Airspace Operations

EOC: Fully dynamic and optimised airspace

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#32 "Free Route through the use of Direct Routing for flights both in cruise and vertically evolving in cross ACC/FIR borders and in high complexity environments"	AOM-0500	SESAR Release 5 (2016)
#65 "User Preferred Routing"	AOM-0500	SESAR Release 5 (2016)
#33 "Free Route through the use of Free Routing for flights both in cruise and vertically evolving in cross ACC/FIR borders and within permanently low to medium complexity environments"	AOM-0501	SESAR Release 5 (2016)
#66 "Automated Support for Dynamic Sectorisation"	CM-0102-A	SESAR Release 5 (2016)
PJ.06-01 " Optimized traffic management to enable Free Routing in high and very high complexity cross border environments"	AOM-0505	SESAR Release 9 (2020)
Demonstration Activities		**Date**
None		N/A

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
None	N/A	N/A

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
European Route Network Improvement Plan (ERNIP) Part 1 - European Airspace Design Methodology - Guidelines	EUROCONTROL/NM	Published
European Route Network Improvement Plan (ERNIP) Part 2 - European ATS Route Network	EUROCONTROL/NM	Published
European Route Network Improvement Plan (ERNIP) Part 3 - Airspace Management Handbook	EUROCONTROL/NM	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
European Route Network Improvement Plan (ERNIP) Part 4 - Route Availability Document User's Manual	EUROCONTROL/NM	Published
Network Strategy Plan 2020-2029	EUROCONTROL/NM	Published
IFPS User's Manual	EUROCONTROL/NM	Published
SPEC-0107 EUROCONTROL Specification for ATS Data Exchange Presentation (ADEXP) Edition 3.3, Community Specification	EUROCONTROL	Published
SPEC-0107 EUROCONTROL Specification for ATS Data Exchange Presentation (ADEXP), Edition 3.4	EUROCONTROL	Published
SPEC-0106 On-Line Data Interchange (OLDI) Edition 5.1	EUROCONTROL	Published
SPEC-139 Specification for Medium-Term Conflict Detection (MTCD) Edition 2.0	EUROCONTROL	Published
SPEC-142 Specification for Monitoring aids (MONA)	EUROCONTROL	Published
SPEC-143 Specification for Trajectory Prediction	EUROCONTROL	Published
GUID-161 Guidelines for area proximity warning (APW) Part I-III	EUROCONTROL	Published

SDM Deployment Assessment	
Target Date	31/12/2025

FRA enhancement includes the deployment of Final FRA, FRA connectivity with TMAs and Cross-border FRA with at least one neighbouring State.
All three dimensions are almost implemented everywhere.

AF4 – Network Collaborative Management

Family 4.1.1 – Enhanced Short Term ATFCM Measures

EOC: ATM interconnected network

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#17 "Advanced Short ATFCM Measures (STAM)"	DCB-0308	SESAR Release 5 (2016)
Demonstration Activities		**Date**
PJ.24 NCM "Network Collaborative Management"		SESAR Release 9 (2020)

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) 2019/123 of 24 January 2019 laying down detailed rules for the implementation of air traffic management (ATM) network functions	European Commission	Published
Commission Implementing Regulation (EU) No 716/2014 has been repealed by the now established "Commission Implementing Regulation (EU) 2021/116 (CP1)" published on 01/02/2021	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
STAM Operational Concept (October 2015)	EUROCONTROL/NM	Published
ATFCM Operations Manual	EUROCONTROL/NM	Published
NM B2B Reference Manuals	EUROCONTROL/NM	Published

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Network Strategy Plan (NSP): SO 2/3, SO 4/2 and SO 4/5	EUROCONTROL/NM	Published

SDM Deployment Assessment	
Target Date	31/12/2022
Enhanced Short Term ATFCM Measures reached its CP1 regulatory target date on 31st December 2022. For 23 out of 30 countries and for MUAC, the implementation was completed by December 2022, whereas for the remaining 6 countries plus Network Manager, the implementation has been completed in the course of 2023, resulting in the completion of the entire Family.	

Family 4.2.1 – Interactive Rolling NOP

EOC: ATM interconnected network

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#20 "Collaborative NOP for Step 1"	DCB-0103-A	SESAR Release 5 (2016)
#18 "CTOT and TTA"	DCB-0208	SESAR Release 5 (2016)
Demonstration Activities		**Date**
PJ.24 NCM "Network Collaborative Management"		SESAR Release 9 (2020)

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Regulation (EU) No 255/2010 of 25 March 2010 laying down common rules on air traffic flow management	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Collaborative NOP	EUROCONTROL/NM	Published
ATFCM Operations Manual	EUROCONTROL/NM	Published

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
NOP User Guide; Edition 26.0. Date:07JUNE 2022	EUROCONTROL/NM	Published
Network Strategy Plan (NSP): SO 2/1, SO 2/2, SO 2/3, SO 4/2 and SO 4/5	EUROCONTROL/NM	Published

SDM Deployment Assessment	
Target Date	31/12/2023
Implementation in progress. Mainly link with Network Manager releases. Documentation continuously maintained by Network Manager to ensure harmonised implementation.	

Family 4.2.2 – Initial AOP/NOP Information Sharing

EOC: ATM interconnected network

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#20 "Collaborative NOP for Step 1"	DCB-0103-A	SESAR Release 5 (2016)
#21 "Airport Operations Plan and AOP-NOP Seamless Integration"	AO-0801-A	SESAR Release 5 (2016)
Demonstration Activities		**Date**
PJ.24 NCM "Network Collaborative Management"		N/A SESAR Release 9 (2020)

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) 2019/123 of 24 January 2019 laying down detailed rules for the implementation of air traffic management (ATM) network functions and repealing Commission Regulation (EU) No 677/2011	European Commission	Published
Commission Regulation (EU) No 255/2010 of 25 March 2010 laying down common rules on air traffic flow management	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
DPI Implementation Guide	EUROCONTROL/NM	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
API Implementation Guide	EUROCONTROL/NM	Published
NM B2B Services webpage	EUROCONTROL/NM	Published
NM B2B Reference Manuals	EUROCONTROL/NM	Published
iAOP-NOP Implementation Guide	EUROCONTROL/ACI Europe	Published
Guidance on Compliance to the CP1 (IR 2021/116) - For the Initial AOP and information sharing of the initial AOP with the Network Operations Plan	ACI EUROPE	Published
Departure Planning Information (DPI) & Arrival Planning Information (API) implementation roadmap	EUROCONTROL/NM	Published

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Specification for A-CDM	EUROCONTROL	Q3/2024
EUROCONTROL A-CDM webpage	EUROCONTROL	Published
NOP User Guide; Edition 26.0. Date:07JUNE 2022	EUROCONTROL/NM	Published
Network Strategy Plan (NSP): SO 4/4 SO 5/2	EUROCONTROL/NM	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Airport CDM Implementation - The Manual	EUROCONTROL/NM	Published
Airport Network Integration - concept for establishment of an Airport Operations Plan (AOP) Ed1.1 – 07/11/2018	EUROCONTROL	Published

SDM Deployment Assessment	
Target Date	31/12/2023

19 airports are required to implement this Family. As part of an Implementation Project, a planning is in place to avoid accumulation of airports wanting to implement close to the target date as the testing process typically requires several months.

Documentation sufficient to deploy in a harmonised way.

Family 4.3.1 – Automated Support for Traffic Complexity Assessment and Flight Planning Interfaces

EOC: ATM interconnected network

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#19 "Automated support for Traffic Complexity Detection and Resolution"	CM-0103-A CM-0104-A	SESAR Release 5 (2016)
PJ.18-02C "eFPL Distribution to ATC"	POI-0049-IS	SESAR Release 9 (2020)
Demonstration Activities		**Date**
PJ.24 NCM "Network Collaborative Management"		SESAR Release 9 (2020)

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) 2019/123 of 24 January 2019 laying down detailed rules for the implementation of air traffic management (ATM) network functions and repealing Commission Regulation (EU) No 677/2011	European Commission	Published
Commission Regulation (EU) No 255/2010 of 25 March 2010 laying down common rules on air traffic flow management	European Commission	Published
Commission Regulation (EU) No 1033/2006 - Requirements on procedures for flight plans in the pre-flight phase for the single European sky	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
ATFCM Operations Manual	EUROCONTROL/NM	Published
IFPS USERS MANUAL	EUROCONTROL/NM	Published (Continuously maintained)
Flight Plan and Flight Data Evolution Implementation Strategy	EUROCONTROL/NM	Published
FPFDE Implementation Guidelines (Volumes 1 and 2)	EUROCONTROL/NM	Published

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
ICAO Doc 4444 PANS-ATM Procedures for Air Navigation Services: Air Traffic Management	ICAO	Published
Doc 9965 Manual on Flight and Flow Information for a Collaborative Environment (FF-ICE)	ICAO	Published
Network Strategy Plan (NSP): SO 4/2, SO 4/3, SO 4/4, SO 4/5 and SO 4/7	EUROCONTROL/NM	Published
NM Flight Progress Messages Document; Edition 2.6 (July 2020)	EUROCONTROL/NM	Published

SDM Deployment Assessment	
Target Date	31/12/2022

FF-ICE initial implementation and trajectory update are in progress. FF-ICE is an essential enabler for Trajectory Based Operations. Documentation on trajectory (flight planning and updates) is sufficient for a harmonized implementation. Basic requirements on complexity are available. The roll out of eFPL Functionality follows different timeline in each of the airlines. Information is exchanged using SWIM and the resolution of some technical B2B issues is in progress.

Family 4.4.1 – AOP/NOP Integration

EOC: ATM interconnected network

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#21 "Airport operations plan and AOP-NOP seamless integration"	AO-0801–A AO-0802–A AO-0803 DCB-0310	SESAR Release 5 (2016)
#20 "Collaborative NOP for Step 1"	DCB-0103-A	SESAR Release 5 (2016)
#18 "CTOT and TTA"	DCB-0208	SESAR Release 5 (2016)
Demonstration Activities		**Date**
PJ.24 NCM "Network Collaborative Management"		SESAR Release 9 (2020)

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) 2019/123 of 24 January 2019 laying down detailed rules for the implementation of air traffic management (ATM) network functions and repealing Commission Regulation (EU) No 677/2011	European Commission	Published
Commission Regulation (EU) No 255/2010 of 25 March 2010 laying down common rules on air traffic flow management	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
DPI Implementation Guide	EUROCONTROL	Published
API Implementation Guide	EUROCONTROL	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Departure Planning Information (DPI) & Arrival Planning Information (API) implementation roadmap	EUROCONTROL/NM	Published
Guidance on Compliance to the CP1 (IR 2021/116) - For the Initial AOP and information sharing of the initial AOP with the Network Operations Plan	ACI EUROPE	Published
Guidance to the CP1 (IR 2021/116) - For the Extended AOP and integration of the E-AOP with the Network Operations Plan	ACI EUROPE	Q1/2023
iAOP-NOP Implementation Guide	EUROCONTROL/ACI Europe	Published
E-AOP-NOP Implementation Guide	ACI Europe/EUROCONTROL	Published
NM B2B Reference Manuals	EUROCONTROL/NM	Published
NM B2B Services webpage	EUROCONTROL/NM	Published

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
AOP practical guide	ACI Europe	Published
Airport Network Integration - concept for establishment of an Airport Operations Plan (AOP) Ed1.1 – 07/11/2018	EUROCONTROL	Published
Network Strategy Plan (NSP): SO 4/4, SO 4/5 and SO 5/2	EUROCONTROL/NM	Published
EUROCONTROL A-CDM webpage	EUROCONTROL	Published

SDM Deployment Assessment	
Target Date	31/12/2027

The Data elements to be exchanged in this Family have been agreed among the stakeholders.

31 airports are required to implement this Family. A planning, including test and validation activities with NM, has been established to avoid accumulation of airports wanting to implement close to the target date.

Documentation sufficient to deploy in a harmonised way, considering update to DPI Implementation guide foreseen in 2025.

AF5 – System Wide Information Management (SWIM)

Family 5.1.1 – Common SWIM PKI and cybersecurity

EOC: ATM interconnected network

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#46 "Initial system-wide information management (SWIM) technology solution"	IS-0901-A	SESAR Release 5 (2016)
VLDs		**Date**
None		N/A

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
SWIM Common PKI policies & Procedures	IP 2017_084_AF5	Published www.sesardeploymentmanager.eu
Trust Framework	IP 2017_084_AF5	Published www.sesardeploymentmanager.eu
EACP Criteria and Methodology for Interoperability	IP 2017_084_AF5	Published www.sesardeploymentmanager.eu
Common PKI policies and processes	IP 2017_084_AF5	Published www.sesardeploymentmanager.eu
SWIM interfaces to Common PKI	IP 2017_084_AF5	Published www.sesardeploymentmanager.eu
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Guidance for SWIM Providers and consumers	IP 2017_084_AF5	Published www.sesardeploymentmanager.eu
Certificate policy	IP 2017_084_AF5	Published www.sesardeploymentmanager.eu

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
None	N/A	N/A

SDM Deployment Assessment	
Target Date	31/12/2024
The EACP has been successfully deployed and is now in operational use. All guidance material produced by the IP has been handed over to and is administratively managed by EUROCONTROL. With this deployment, the EACP is operational and in compliance with CP1.	

Family 5.2.1 – Stakeholders SWIM PKI and cybersecurity

EOC: ATM interconnected network, Airport and TMA performance

TRL6– Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#46 "Initial system-wide information management (SWIM) technology solution"	IS-0901-A	SESAR Release 5 (2016)
VLDs		**Date**
None		N/A

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
SWIM Common PKI policies & Procedures	IP 2017_084_AF5	Published www.sesardeploymentmanager.eu
Trust Framework	IP 2017_084_AF5	Published www.sesardeploymentmanager.eu
SWIM interfaces to Common PKI	IP 2017_084_AF5	Published www.sesardeploymentmanager.eu
Guidance for SWIM Providers and Consumers	IP 2017_084_AF5	Published www.sesardeploymentmanager.eu

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Guidance for SWIM Providers and Consumers	EUROCONTROL	Update expected H2/2025

SDM Deployment Assessment	
Target Date	31/12/2025

Thanks to community engagement in the European Common PKI project, there is a high level of awareness regarding the technical and security requirements. Consequently, the adaptation of local systems should be carried out in parallel with the implementation of the Service Families. However, a prerequisite for this adaptation are the necessary updates of the Information Security Management System (ISMS), including the EACP end-user agreement for service providers. Existing service consumers should only be aware about the change of certificate provider (EACP) and adjust the certificate validation to reflect this.

Several training sessions on stakeholder implementation of AF 5.2.1 have been conducted by EUROCONTROL and the SDM in collaboration. A follow-up session is scheduled for June 2025.

This Family serves as a key enabler for other Service Families (AF 5.3.1, AF 5.4.1, AF 5.5.1, and AF 5.6.1), as the use of a trusted certification authority (EACP) is a fundamental component of the European aviation trust framework and a requirement for conformance with the System Wide Information Management (SWIM) TI Yellow Profile.

Future evolutions of the EACP that may necessitate local adaptations, such as signing and validation services, are comprehensively outlined in the guidance material (see reference above). SDM will continue to monitor progress until full implementation is achieved across all stakeholders.

Family 5.3.1 – Aeronautical Information Exchange

EOC: ATM interconnected network

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#34 "Digital integrated briefing" Digital integrated briefing"	IS-0205	SESAR Release 5 (2016)
PJ.15-10 "Aeronautical Data Service"	SDM-0405	SESAR Release 9 (2019)
PJ.15-11 "Aeronautical Digital Map Service"	SDM-0406	SESAR Release 9 (2019)
#46 "Initial system-wide information management (SWIM) technology solution"	IS-0901-A	SESAR Release 5 (2016)
VLDs		**Date**
None		N/A

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
EU Reg 373/2017 Part AIS	EASA	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
Aeronautical Information Request Service Definition	EUROCONTROL/NM	Published
Aeronautical Aerodrome Map Request Service Definition	EUROCONTROL/NM	Published
Digital NOTAM Subscription and Request Service Definition	EUROCONTROL/NM	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Supporting material for SWIM foundational specifications (online) reference.swim.aero	EUROCONTROL/NM	Published
AIRM model v1.1.0 (AIRM Community area)	AIRM CCB	Published
SPEC-168 SWIM Service Description Edition 2.0	EUROCONTROL/NM	Published
SPEC-169 SWIM Information Definition Edition 1.0	EUROCONTROL/NM	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
SPEC-170 SWIM Technical Infrastructure Yellow Profile Edition 1.1	EUROCONTROL/NM	Published
Supporting AIM SWIM Service implementation		
Digital Notam Specification Edition 1.0	EUROCONTROL/NM	Published
Update of Digital Notam Specification Edition 1.0	EUROCONTROL/NM	Q3/2025
Aeronautical Information Exchange Model AIXM Edition 5.1.1	EUROCONTROL/NM	Published
Supporting ASM SWIM Service implementation		
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
SPEC-179 Specification for Airspace Management (ASM) Support System Requirements supporting the ASM processes at local and FAB level - Part II Edition 1.1	EUROCONTROL/NM	Published
NM B2B Reference Manuals (incl. Interfaces needed)	EUROCONTROL/NM	Published

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
ICAO Annex 15	ICAO	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
None	N/A	N/A

SDM Deployment Assessment	
Target Date	31/12/2025

Deployment is very limited despite the availability of key reference material. There are, however, planned deployment activities involving a significant number of stakeholders that could bring firm progress by the end of the year. The availability of airspace structure and availability services are the most notable achievements. Airspace Reservation services (ARES) together with Digital NOTAM, Aeronautical information feature (AIFS) and Aerodrome mapping services have also progressed during the last years based on the availability of enhanced reference material and the wide collaboration among stakeholders to ensure harmonized and coordinated implementation.

Family 5.4.1 – Meteorological Information Exchange

EOC: ATM interconnected network

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#34 "Digital integrated briefing"	IS-0205	SESAR Release 5 (2016)
#35 "MET Information Exchange"	MET-0101	SESAR Release 5 (2016)
#46 "Initial system-wide information management (SWIM) technology solution"	IS-0901-A	SESAR Release 5 (2016)
Demonstration Activities		**Date**
TOPMET (LD) - Demonstrating the exchange and use of new meteorological Information		2012-2014

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
EU Reg 373/2017 Part MET	EASA	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
AMC & GM to Part-MET (EU Reg 373/2017)	EASA	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
WMO No. 306 (updated 2023) Manual on Codes, Volume I.2 - International Codes, Part B – Binary Codes (BUFR, GRIB)	WMO	Published
WMO No. 306 (updated 2023) Manual on Codes, Volume I.3 - International Codes, Part D – Representation derived from data models (IWXXM)	WMO	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
ICAO EUR Doc 018 (updated 2025) EUR OPMET Data Management Handbook	ICAO	Published
ICAO MET SWIM Roadmap	ICAO	Published
ICAO MET SWIM Plan	ICAO	Published
Supporting material for SWIM foundational specifications (online) reference.swim.aero	EUROCONTROL/NM	Published
AIRM model v1.1.0 (AIRM Community area)	AIRM CCB	Published
SPEC-168 SWIM Service Description Edition 2.0	EUROCONTROL/NM	Published
SPEC-169 SWIM Information Definition Edition 1.0	EUROCONTROL/NM	Published
SPEC-170 SWIM Technical Infrastructure Yellow Profile Edition 1.1	EUROCONTROL/NM	Published

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
ICAO Annex 3 (amendment 80)	ICAO	Published
Updated ICAO Annex 3 (amendment 81)	ICAO	Q4/2025
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
ICAO EUR Doc 7754 (EUR Air Navigation Plan), Volume II	ICAO	Published

SDM Deployment Assessment	
Target Date	31/12/2025

Deployment by MET Service Providers across Europe has been ongoing for some time and it is visible with the 24 MET SWIM services already in the SWIM registry. There is however a slowdown in implementation, mostly because of a lack of adoption of guidance on the implementation of MET SWIM services when CP1 was set into force. This changed significantly with the implementation of the MET3SG (MET SWIM Services Sub Group) in May 2022. It is highly recommended that stakeholders participating to the MET3SG jointly discussed and defined such guidance and are now requirements for the work on the implementation of specific MET SWIM services, both for the provision and consumption.

Family 5.5.1 – Cooperative Network Information Exchange

EOC: ATM interconnected network

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#46 "Initial system-wide information management (SWIM) technology solution"	IS-0901-A	SESAR Release 5 (2016)
Demonstration Activities		**Date**
PJ.24 NCM "Network Collaborative Management"		SESAR Release 9 (2020)

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
NM B2B technical documentations (incl. interfaces)	EUROCONTROL/NM	Published
Supporting material for SWIM foundational specifications (online) reference.swim.aero	EUROCONTROL/NM	Published
AIRM model v1.1.0 (AIRM Community area)	AIRM CCB	Published
SPEC-168 SWIM Service Description Edition 2.0	EUROCONTROL/NM	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
SPEC-169 SWIM Information Definition Edition 1.0	EUROCONTROL/NM	Published
SPEC-170 SWIM Technical Infrastructure Yellow Profile Edition 1.1	EUROCONTROL/NM	Published

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
NM B2B Services webpage	EUROCONTROL/NM	Published
NM B2B Reference Manuals	EUROCONTROL/NM	Published

SDM Deployment Assessment	
Target Date	31/12/2025
All services in this Family have been implemented by NM and are in the SWIM Registry. However, the usage of the services is low, due to the availability of other exchange mechanisms.	

Family 5.6.1 – Flight Information Exchange

EOC: ATM interconnected network

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#46 "Initial system-wide information management (SWIM) technology solution"	IS-0901-A	SESAR Release 5 (2016)
Demonstration Activities		**Date**
None		N/A

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Supporting material for SWIM foundational specifications (online) reference.swim.aero	EUROCONTROL/NM	Published
AIRM model v1.1.0 (AIRM Community area)	AIRM CCB	Published
SPEC-168 SWIM Service Description Edition 2.0	EUROCONTROL/NM	Published
SPEC-169 SWIM Information Definition Edition 1.0	EUROCONTROL/NM	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
SPEC-170 SWIM Technical Infrastructure Yellow Profile Edition 1.1	EUROCONTROL/NM	Published
Related to FF-ICE R1 implementation		
ICAO Doc 9965 Volume II	ICAO	Q3/2025
FPFDE NFPM Implementation Guidelines Volume I	EUROCONTROL/NM	Published
FPFDE FF-ICE/R1 Mixed Mode Transition Operations	EUROCONTROL/NM	2024
CP1 FF-ICE/R1 Information Exchange requirements	SDM	2024
FF-ICE/R1 Use Cases	SDM & EUROCONTROL NM	2024
FIXM 4.3.0 User Manual	FIXM CCB	Published
FIXM Core v4.3.0 and related FIXM "FF-ICE Message" Application component	FIXM CCB	Published
NM B2B technical documentation (incl. interfaces)	EUROCONTROL/NM	Published
Related to Extended AMAN SWIM service implementation		
ED-254 Arrival Sequence Service Performance Standard	EUROCAE	Published
ED-254 Ch1 Arrival Sequence Service Performance Standard	EUROCAE	Q3 2025

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
ICAO Doc 4444 PANS-ATM Procedures for Air Navigation Services: Air Traffic Management	ICAO	Published
ICAO Doc 9965 Volume I	ICAO	2026
NM B2B Services webpage	EUROCONTROL/NM	Published
NM B2B Reference Manuals	EUROCONTROL/NM	Published
IFPS Users Manual	EUROCONTROL/NM	Published

SDM Deployment Assessment	
Target Date	31/12/2025

Significant delay is expected with this major change impacting ANSP core systems. Progress is observed but still many uncertainties exist related to the full roll out operationally to AUs from their CFSPs and on the ground in the planning of the major system updates. It is therefore expected that more delay will occur before an improvement can be observed. Furthermore, a thorough planning of the required validation between NM and operational stakeholders is key as well as the full filing of mandated information by Air space users.

AF6 – Initial Trajectory Information Sharing

Family 6.1.1 – Initial air-ground Trajectory Information Sharing (Airborne Domain)

EOC: Trajectory-based operations

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#115 Extended projected profile (EPP) availability on ground	IS-0303-A	SESAR Release 5 (2016)
Demonstration Activities		**Date**
PJ.31 "Initial Trajectory Information Sharing"		SESAR Release 9 (2020)
PJ.38 ADSCENSIO "ADS-C Enables and Supports Improved ATM Operations"		SESAR Release 12 (2022)

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) No 2023/1770 laying down provisions on aircraft equipment required for the use of the Single European Sky airspace and operating rules related to the use of the Single European Sky airspace and repealing Regulation (EC) No 29/2009 and Implementing Regulations (EU) No 1206/2011, (EU) No 1207/2011 and (EU) No 1079/2012	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
Certification Specifications and Acceptable Means of Compliance for Airborne Communications, Navigation and Surveillance (CS-ACNS) Issue 5	EASA	Published
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
ED 228A / RTCA DO-350A Safety and Performance Requirements Standard for Baseline 2 ATS Data Communications[12]	EUROCAE / RTCA	Published

[12] ED-228, 229 and 231 Revision A of the standards were available when the Reg 2021/116 ''CP1'' was published to define the scope of AF 6 and therefore they provide a detailed description of the minimum CP1 implementation required for ADS-C EPP as part of ATS B2 and CPDLC based on ATN-B1. According to CS-ACNS issue 5, GM2 ACNS.B.DLS.001.

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
ED 229A / RTCA DO-351A Interoperability Requirements Standard for Baseline 2 ATS Data Communications (Baseline 2 Interop Standard)[13]	EUROCAE / RTCA	Published
ED 231A / RTCA DO-353B Interoperability Requirements Standard for Baseline 2 ATS Data Communications and ATN Baseline 1 Accommodation (ATN Baseline 1 - Baseline 2 Interop Standard)	EUROCAE / RTCA	Published

[13] Applicability, EASA recognises that ATS B2 in accordance with ED-228A and ED-229A (or later acceptable revisions) is the reference application for data link services in the future. EASA will accept and support applications for the approval of systems that offer ATS B2 data link services in lieu of ATN B1 systems.
Applicants are encouraged to contact EASA at their earliest convenience to discuss the means to demonstrate compliance with the relevant applicable standards.

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Doc 10037 - Global Operational Data Link (GOLD) Manual	ICAO	Published
ED-120 Change 3 - Safety and Performance Requirements Standard for Air Traffic Data Link Services in Continental Airspace	EUROCAE	Published
ED-92C VDL 2 Airborne MOPS (Minimum Operational Performance Standard (MOPS) for an Airborne VDL Mode-2 System Operating in the Frequency Range 118-136.975 MHz)	EUROCAE	Published
ED-92D VDL 2 Airborne MOPS	EUROCAE WG-92	Pending
EUROCONTROL Guidelines for Initial Trajectory Information Sharing, Edition 1.0	EUROCONTROL	Published

ED 228B / RTCA DO-350B Safety and Performance Requirements Standard for Baseline 2 ATS Data Communications	EUROCAE / RTCA	Published
ED 229B / RTCA DO-351B Interoperability Requirements Standard for Baseline 2 ATS Data Communications (Baseline 2 Interop Standard)	EUROCAE / RTCA	Published
ED 230A / RTCA DO-352A Interoperability Requirements Standard for Baseline 2 ATS Data Communications and FANS 1/A Accommodation (FANS 1/A – Baseline 2 Interop Standard)[14]	EUROCAE / RTCA	Published
ED 230B / RTCA DO-352B Interoperability Requirements Standard for Baseline 2 ATS Data Communications and FANS 1/A Accommodation (FANS 1/A – Baseline 2 Interop Standard)[15]	EUROCAE / RTCA	Published
ED 231B / RTCA DO-353B Interoperability Requirements Standard for Baseline 2 ATS Data Communications and ATN Baseline 1 Accommodation (ATN Baseline 1 - Baseline 2 Interop Standard)	EUROCAE / RTCA	Published

[14] ED-230A describes TANS 1/A which is not mandated in Europe

[15] ED-230B describes TANS 1/A which is not mandated in Europe

SDM Deployment Assessment	
Target Date	31/12/2027

ADS-C/EPP is available on Airbus A320 Family and A330.
For other aircraft types, development/industrialisation and deployment roadmaps are monitored by SDM..
Minimum implementation of ADS-C/EPP required compliance to Revision A of ED-228A/RTCA DO-350A, ED 229A/RTCA DO-351A, ED 230A/RTCA DO-352A and ED 231A/RTCA DO-353A as required in CS-ACNS Issue 5.

Family 6.1.2 – Initial Air-Ground Trajectory Information Sharing (ground domain)

EOC: Trajectory-based operations

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#115 "Extended projected profile (EPP) availability on ground"	IS-0303-A	SESAR Release 5 (2016)
NETWORK-TBO Solution 0442 "Trajectory synchronisation in execution "	POI-0011-IS	TRL6 planned SESAR Release 16 (2026)
Demonstration Activities		**Date**
PEGASE		SESAR Release 5 (2016)
PJ.31 "Initial Trajectory Information Sharing"		SESAR Release 9 (2020)
PJ.38 ADSCENSIO "ADS-C Enables and Supports Improved ATM Operations"		SESAR Release 12 (2022)

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) No 2023/1768 laying down detailed rules for the certification and declaration of air traffic management/air navigation services systems and air traffic management/air navigation services constituents	European Commission	Published
Commission Implementing Regulation (EU) 2017/373 of 1 March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight, repealing Regulation (EC) No 482/2008, Implementing Regulations (EU) No 1034/2011, (EU) No 1035/2011 and (EU) 2016/1377 and amending Regulation (EU) No 677/2011 (Text with EEA relevance)	European Commission	Published
Commission Implementing Regulation (EU) 2023/1769 of 12 September 2023 laying down technical requirements and administrative procedures for the approval of organisations involved in the design or production of air traffic management/air navigation services systems and constituents and amending Implementing Regulation (EU) 2023/203	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
Detailed Specifications and Acceptable Means of Compliance & Guidance Material for certification or declaration of design compliance of ATM/ANS ground equipment (DS-GE.CER/DEC)	EASA	Published

Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
ED 228A / RTCA DO-350A Safety and Performance Requirements Standard for Baseline 2 ATS Data Communications	EUROCAE / RTCA	Published
ED 229A / RTCA DO-351A Interoperability Requirements Standard for Baseline 2 ATS Data Communications (Baseline 2 Interop Standard)	EUROCAE / RTCA	Published
ED 231A / RTCA DO-353A Interoperability Requirements Standard for Baseline 2 ATS Data Communications and ATN Baseline 1 Accommodation (ATN Baseline 1 - Baseline 2 Interop Standard)	EUROCAE / RTCA	Published
ED-228B Safety and Performance Standard for Baseline 2 ATS Data Communication[16]	EUROCAE WG-78	Published
ED-229B Interoperability Standard for Baseline 2 ATS Data Communication Via ATN[17]	EUROCAE WG-78	Published
ED 231B / RTCA DO-353A Interoperability Requirements Standard for Baseline 2 ATS Data Communications and ATN Baseline 1 Accommodation (ATN Baseline 1 - Baseline 2 Interop Standard) [18]	EUROCAE / RTCA	Published

[16] Required to address interoperability with mixed airborne implementations (some A/C with REV A, some with REV B)
[17] Required to address interoperability with mixed airborne implementations (some A/C with REV A, some with REV B)
[18] Required to address interoperability with mixed airborne implementations (some A/C with REV A, some with REV B)

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) No 2023/1770 laying down provisions on aircraft equipment required for the use of the Single European Sky airspace and operating rules related to the use of the Single European Sky airspace and repealing Regulation (EC) No 29/2009 and Implementing Regulations (EU) No 1206/2011, (EU) No 1207/2011 and (EU) No 1079/2012	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
Doc 10037 - Global Operational Data Link (GOLD) Manual	ICAO	Published

ED-110B / RTCA DO-280B Interoperability Requirements Standard for ATN Baseline 1 (Interop ATN B1)	EUROCAE	Published
ED-120 Change 3 - Safety and Performance Requirements Standard for Air Traffic Data Link Services in Continental Airspace	EUROCAE	Published
ED-276 - Guidance on Air to Ground VDL Mode 2 Interoperability	EUROCAE	Published
EUROCONTROL-GUID-194 - EUROCONTROL Guidelines for Initial Trajectory Information Sharing, Edition 1.0 and CORRIGENDUM	EUROCONTROL	Published
EUROCONTROL-SPEC-193 - EUROCONTROL Specification for Data Link Ground Distribution SWIM Services, Edition 1.0	EUROCONTROL	Published
EUROCONTROL-SPEC-192 - EUROCONTROL Specification for Data Link Common Services for the Aeronautical Telecommunication Network (ATN) , Edition 1.0	EUROCONTROL	Published
ED 230A / RTCA DO-352A Interoperability Requirements Standard for Baseline 2 ATS Data Communications and FANS 1/A Accommodation (FANS 1/A – Baseline 2 Interop Standard) [19]	EUROCAE / RTCA	Published
ED 230B / RTCA DO-352B Interoperability Requirements Standard for Baseline 2 ATS Data Communications and FANS 1/A Accommodation (FANS 1/A – Baseline 2 Interop Standard) [20]	EUROCAE / RTCA	Published

[19] ED-230 describes TANS 1/A which is not mandated in Europe

[20] ED-230 describes TANS 1/A which is not mandated in Europe

SDM Deployment Assessment	
Target Date	31/12/2027
6.1.2 functionalities are already deployed and in operational use in the Maastricht Upper Airspace Control Center (MUAC). Other ANSPs are considering how to address the implementation in line with the outputs of the OEP12.2 work (see also AF6.3.1). The major ground equipment supplier's development/industrialisation and deployment roadmaps are monitored by SDM . Minimum implementation of ADS-C/EPP required compliance to Revision A of ED 228A/RTCA DO-350A, ED 229A/RTCA DO-351A, ED 230A/RTCA DO-352A and ED 231A/RTCA DO-353A as required in CS-ACNS Issue 5.	

[1] Maastricht UAC already uses the operational downlinking and processing of ADS-C/EPP data.

Family 6.2.1 – Network Manager Trajectory Information Enhancement

EOC: Trajectory-based operations

TRL6 – Development Phase		
SESAR Solutions	**Ois**	**TRL6 Achievement Date**
NETWORK-TBO Solution 0442 "Trajectory synchronisation in execution "	POI-0011-IS	TRL6 planned SESAR Release 16 (2026)
Demonstration Activities		**Date**
None		N/A

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
None	N/A	N/A

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
None	N/A	N/A

SDM Deployment Assessment	
Target Date	31/12/2027
No information received.	

Family 6.3.1 – Initial Trajectory Information Sharing Ground Distribution

EOC: ATM interconnected network

TRL6 – Development Phase		
SESAR Solutions	**OIs**	**TRL6 Achievement Date**
#115 "Extended projected profile (EPP) availability on ground"	IS-0303-A	SESAR Release 5 (2016)
PJ.38-01 "ADS-C common service"	POI-0081-COM	SESAR Release 13 (2023)
Demonstration Activities		**Date**
PJ.31 "Initial Trajectory Information Sharing"		SESAR Release 9 (2020)
PJ.38 ADSCENSIO "ADS-C Enables and Supports Improved ATM Operations"		SESAR Release 12 (2022)

Industrialization Phase. Essential material.		
Regulation		
References	**Organization**	**Delivery**
Commission Implementing Regulation (EU) No 2023/1768 laying down detailed rules for the certification and declaration of air traffic management/air navigation services systems and air traffic management/air navigation services constituents	European Commission	Published
Commission Implementing Regulation (EU) 2017/373 of 1 March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight, repealing Regulation (EC) No 482/2008, Implementing Regulations (EU) No 1034/2011, (EU) No 1035/2011 and (EU) 2016/1377 and amending Regulation (EU) No 677/2011 (Text with EEA relevance)	European Commission	Published
Commission Implementing Regulation (EU) 2023/1769 of 12 September 2023 laying down technical requirements and administrative procedures for the approval of organisations involved in the design or production of air traffic management/air navigation services systems and constituents and amending Implementing Regulation (EU) 2023/203	European Commission	Published
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
None	N/A	N/A

ED 228A / RTCA DO-350A Safety and Performance Requirements Standard for Baseline 2 ATS Data Communications	EUROCAE / RTCA	Published
ED 229A / RTCA DO-351A Interoperability Requirements Standard for Baseline 2 ATS Data Communications (Baseline 2 Interop Standard)	EUROCAE / RTCA	Published
ED 231A / RTCA DO-353A Interoperability Requirements Standard for Baseline 2 ATS Data Communications and ATN Baseline 1 Accommodation (ATN Baseline 1 - Baseline 2 Interop Standard)	EUROCAE / RTCA	Published
ED 228B / RTCA DO-350B Safety and Performance Requirements Standard for Baseline 2 ATS Data Communications	EUROCAE / RTCA	Published
ED 229B / RTCA DO-351B Interoperability Requirements Standard for Baseline 2 ATS Data Communications (Baseline 2 Interop Standard)	EUROCAE / RTCA	Published
ED 231B / RTCA DO-353B Interoperability Requirements Standard for Baseline 2 ATS Data Communications and ATN Baseline 1 Accommodation (ATN Baseline 1 - Baseline 2 Interop Standard)[21]	EUROCAE / RTCA	Published

[21] Required to address interoperability with mixed airborne implementations (some A/C with REV A, some with REV B)

Industrialization Phase. Supporting material.		
Regulation		
References	**Organization**	**Delivery**
None	N/A	N/A
Means of Compliance and/or Certification		
References	**Organization**	**Delivery**
None	N/A	N/A
Guidance Material / Specifications / Standards		
References	**Organization**	**Delivery**
EUROCONTROL-GUID-194 - EUROCONTROL Guidelines for Initial Trajectory Information Sharing, Edition 1.0 and CORRIGENDUM	EUROCONTROL	Published
EUROCONTROL-SPEC-193 - EUROCONTROL Specification for Data Link Ground Distribution SWIM Services, Edition 1.0	EUROCONTROL	Published
EUROCONTROL-SPEC-192 - EUROCONTROL Specification for Data Link Common Services for the Aeronautical Telecommunication Network (ATN) , Edition 1.0	EUROCONTROL	Published

SDM Deployment Assessment	
Target Date	31/12/2027

A common service as described in the EUROCONTROL Guidelines for Initial Trajectory Information Sharing, Edition 1.0, EUROCONTROL Specification for Data Link Ground Distribution SWIM Services, Edition 1.0 and EUROCONTROL Specification for Data Link Common Services for the Aeronautical Telecommunication Network (ATN) , Edition 1.0. is not mandated in CP1, PJ38 is demonstrated that deployment of AF6.3.1 Family in Europe will greatly benefit from the implementation of a Common European ADS-C Service (also a clear benefit for AF6.1.2).). In this case, the implementation of AF6.3.1 includes two parts:

- The provision of an Logon and ADS-C Common services (LACS), which is implemented through the ANSPs' participation to the ACDLS Governance initiative.
- The reception of the ADS-C/EPP data locally, either integrated on the ATM System or by a standalone endpoint, which needs to be deployed by each ANSP.

ANSPs choosing not to participate to the Common European Logon and ADS-C Common services, shall implement their own capabilities to ensure logon functionalities (acting as CM-server), and manage ADS-C contracts with ATS-B2 equipped aircraft. They shall also implement their own dedicated services for widespread dissemination of the EPP information downlink from the equipped aircraft.

Minimum implementation of ADS-C/EPP required compliance to Revision A of ED 228A/RTCA DO-350A, ED 229A/RTCA DO-351A, ED 230A/RTCA DO-352A and ED 231A/RTCA DO-353A as required in CS-ACNS Issue 5.

5. Acronyms

Acronym	Description
#	
4D	*Four Dimensional: x, y, z and time*
A	
A3SG	*AIM SWIM Services Subgroup*
A6	*A6 Alliance*
ACC	*Area Control Centre*
A-CDM	*Airport Collaborate Decision Making*
ACH	*ATC Change Message (ICAO format, NMOC special)*
ACS	*ADS-C Common Service*
ADEXP	*ATS Data Exchange Presentation*
ADR	*Airspace Data Repository*
ADS	*Automatic Dependent Surveillance*
ADS-C	*Automatic Dependent Surveillance Contract*
ADS-C EPP	*Automatic Dependent Surveillance Contract Extended Project Profile*
AF	*ATM Functionality*
AFI	*Arrival Free Intervals*
AFP	*ATC Flight Plan proposal Message (ICAO)*
AFTN	*Aeronautical Fixed Telecommunications Network*
AFUA	*Advanced Flexible Use of Airspace*
AIM	*Aeronautical Information Manual*
AIP	*Aeronautical Information Publication*
AIRAC	*Aeronautical Information Regulation and Control*
AIRM	*Aeronautical Information Reference Model*
AIS	*Aeronautical Information Service*
AISP	*Aeronautical Information Service Provider*
AIXM	*Aeronautical Information Exchange Model*
AMA	*Arrival Manager Constraint message (OLDI)*
AMAN	*Arrival Manager*

Acronym	Description
AMC	*Airspace Management Cell*
AMC	*Acceptable Means of Compliance*
AMHS	*ATS Message Handling System*
AMXM	*Aerodrome Mapping Exchange Model*
ANSP	*Air Navigation Service Provider*
AO	*Airline Operator /Airport Operator*
AOC	*Airline Operating Centre /Airline Operating Communication*
AOM	*Aircraft Operations Manual*
AOP	*Airport Operations Plan*
API	*Application Interface /Arrival Planning Information*
APL	*ATC Flight Plan Message (ICAO)*
APOC	*Airport Operations Centre*
APP	*Approach Control Unit /Approach Control Position*
APW	*Area Proximity Warning*
A-RDP	*ATM Rolling Development Plan*
ARES	*Airspace Reservation*
ARO	*Air Traffic Services Reporting Office*
AROS	*Aeronautical Reporting Office*
ARR	*ICAO ATS Arrival Message*
ASM	*Airspace Management*
A-SMGCS	*Advanced Surface Movement Guidance and Control System*
ATC	*Air Traffic Control*
ATCO	*Air Traffic Controller*
ATFCM	*Air Traffic Flow and Capacity Management*
ATFM	*Air Traffic Flow Management*
ATFMU	*Air Traffic Flow Management Unit*
ATN	*Aeronautical Telecommunications Network*
ATOT	*Actual Take Off Time*
ATS	*Air Traffic Service*
ATSU	*Air Traffic Service Unit*

Acronym	Description
AU	*Airspace User*
AUP	*Airspace Use Plan*
AVSEC	*Aviation Security*
B	
B1	*Baseline 1*
B2	*Baseline 2*
B2B	*Business to Business*
BFD	*Basic Flight Data (DFS version of an IFPL)*
C	
CA	*Conflict Alert /Contractual Management*
CACD	*Central Airspace and Capacity Database*
CATC	*Conflicting ATC Clearances*
CBA	*Cross Border Area*
CDM	*Collaborative Decision Making*
CDO	*Continuous Descent Operations*
CEF	*Connecting Europe Facility*
CFD	*Change to Flight Data*
CFPS	*Computer Flight Plan Software Provider*
CFSP	*Computer Flight Planning Service Providers*
CFT	*Call for Tender*
CHMI	*Collaborative Human Machine Interface*
CIAM	*Collaborative Interface for Airspace Management*
CMAC	*Civil-Military ATM Coordination*
CNS	*Communications, Navigation and Surveillance*
CONOPS	*Concept of Operations*
COP	*Coordination Point*
CORA	*Conflict Resolution Advisory*
COTS	*Commercial Off-The-Shelf*
COVID	*Corona Virus Disease*
CP1	*Common Project 1*

Acronym	Description
CPDLC	*Controller Pilot Data Link Communications*
CSP	*Communication Service Provider*
CTOT	*Calculated Take Off Time*
CWP	*Controller Working Position*
D	
DCT	*Direct Routing*
DEP	*ICAO ATS Departure Message*
DLS	*Data Link Service*
DM	*Deployment Milestone*
DMAN	*Departure Manager*
DPI	*Departure Planning Information*
DSP	*Data Link Service Provider*
E	
EACP	*European Aviation Common PKI*
EAD	*European AIS Database*
EAOP	*Extended Airport Operations Plan*
EAP	*EU ATC Harmonisation and Integration Programme Alignment Process*
EASA	*European Aviation Safety Agency*
EATMN	*European Air Traffic Management Network*
EAUP	*European Airspace Use Plan*
EC	*European Commission*
ECI	*Electronic Clearance Input*
ED	*EUROCAE Document*
EDA	*European Defense Agency*
EFD	*EFTMS Flight Data*
EFPS	*Electronic Flight Progress Strip*
EFS	*Electronic Flight Strip*
EIBT	*Estimated In-Block Time*
EN	*European Norm*
EOC	*Essential Operational Changes*

Acronym	Description
EPP	*Extended Projected Profile*
ERNIP	*European Route Network Improvement Plan*
ESA	*European Space Agency*
ESCP	*European Strategic Coordination Platform*
ESSP	*European Satellite Service Provider*
ETFMS	*Enhanced Tactical Flow Management System*
ETOT	*Estimated Take-Off Time*
ETSI	*European telecommunication Standardisation Institute*
EU	*European Union*
EUR	*European Region*
EUROCONTROL	*European Organisation for the Safety of Air Navigation*
EUUP	*European Update Airspace Use Plan*
F	
FAA	*Federal Aviation Administration*
FAB	*Functional Airspace Block*
FDP	*Flight Data Processing*
FDPS	*Flight Data Processing System*
FF-ICE	*Flight and Flow Information for a Collaborative Environment*
FIXM	*Flight Information Exchange Model*
FL	*Flight Level*
FMP	*Flow Management Position*
FMS	*Flight Management System*
FMTP	*Flight Message Transfer Protocol*
FOC	*Flight Operations Contro*
FPL	*Flight Plan Message (ICAO)*
FRA	*Free Route Airspace or Fraport*
FUA	*Flexible use of Airspace*
FUM	*Flight Update Message*
G	
GA	*General Aviation*

Acronym	Description
GANP	*Global Air Navigation Plan (ICAO)*
GAT	*General Aviation Traffic*
GIS	*Geographical Information System*
GML	*Geography Mark-up Language*
GUFI	*Global Unique Flight Identifier*
H	
HMI	*Human Machine Interface*
HVAC	*Heating, Ventilating and Air Conditioning*
I	
iAOP	*Initial Airport Operations Plan*
IATA	*International Air Transport Association*
IATF	*International Aviation Trust Framework*
ICAO	*International Civil Aviation Organisation*
ICD	*Interface Control Document*
ICS	*Industrial Control System*
IFPS	*Integrated Initial Flight Plan Processing System*
INAP	*Integrated Network Management and Extended ATC Planning*
IP	*Internet Protocol*
IR	*Implementing Rule /Integrated Receiver*
IT	*Information Technology*
IWXXM	*ICAO Meteorological Information Exchange Model*
K	
KPA	*Key Performance Area*
KPI	*Key Performance Indicator*
L	
LARA	*Local and Regional ASM Application*
LDACS	*L-Band Digital Aeronautical Communication System*
LOA	*Letter of Agreement*
LVP	*Low Visibility Procedure*
M	

Acronym	Description
MASPS	*Minimum Aircraft System Performance Specification*
MCDM	*Measure Collaboration Decision Making*
MET	*Meteorological*
METAR	*Meteorological Aviation Routine Report*
MOC	*Memorandum of Cooperation*
MONA	*Monitoring Aids*
MOU	*Memorandum of Understanding*
MP	*Measurement Plan*
MSP	*Multi-sector Planner*
MTCD	*Medium Term Conflict Detection*
MWO	*Meteorological Watch Office*
N	
NES	*n-CONNECT*
NIA	*Network Impact Assessment*
NM	*Nautical Mile /Network Manager*
NMOC	*Network Manager Operation Centre*
NOP	*Network Operations Plan*
NOTAM	*Notice to Airmen*
NPV	*Net Present Value*
NPZ	*No Planning Zone*
NSA	*National Supervisory Authority*
O	
OAT	*Operational Air Traffic*
OEP	*Operational Excellence Programme*
OJEU	*Official Journal of the EU*
OLDI	*On-Line Data Interchange*
OPS	*Operational*
OSI	*Open Systems Interconnection*
OT	*Operational Technology*
OTMV	*Occupancy Traffic Monitoring Values*

Acronym	Description
P	
PCP	*Pilot Common Project*
PDPI	*Pre-Departure Information*
PDS	*Pre-Departure Sequencing System*
PENS	*Pan-European Network Service*
PIB	*Pre-flight Information Bulletins*
PJ	*SESAR JU Project*
PKI	*Public Key Infrastructure*
PSR	*Primary Surveillance Radar*
R	
RAD	*Route Availability Data*
RMCA	*Runway Monitoring and Conflict Alerting*
RPA	*Remotely Piloted Aircraft*
RRP	*Re-routing Proposal Message*
RWY	*Runway*
S	
SAM	*Slot Allocation Message (ETFMS)*
SARP	*Standard and Recommended Practice (ICAO)*
SCADA	*Supervisory Control and Data Acquisition*
SDM	*SESAR Deployment Manager*
SDP	*SESAR Deployment Programme*
SES	*Single European Sky*
SESAR	*Single European Sky ATM Research*
SHAPE	*Solutions for Human-Automation Partnerships in European ATM*
SIGMET	*Significant Meteorological Advisory*
SJU	*SESAR Joint Undertaking*
SMAN	*Surface Management*
SMS	*Safety Management System*
SPEC	*Specification*
SPECI	*Special Aerodrome Weather Report*

Acronym	Description
SRM	*Slot Revision Message (ETFMS)*
SSR	*Secondary Surveillance Radar*
STAM	*Short Term ATFM Measures*
SUP	*Supervisor/Supplement*
SWA	*Software Assurance*
SWIM	*System Wide Information Management*
SYSCO	*System Supported Coordination*
T	
TAC	*Tactical Air Navigation*
TAF	*Terminal Aerodrome Forecast*
TBO	*Trajectory Based Operations*
TCA	*Terminal Conflict Alert*
TCT	*Tactical Controller Tool*
TFSG	*Trust Framework Study Group*
TI	*Technical Infrastructure*
TLS	*Target Levels of Safety*
TMA	*Terminal Manoeuvring Area*
TOBT	*Target Off Block Time*
TOT	*Take Off Time*
TRA	*Temporary Reserved Airspace/Temporary Restricted Area*
TS	*Time Server*
TSA	*Temporary Segregated Area*
TSAT	*Target Start-Up Approval Time*
TSO	*Technical Specification Orders*
TT	*Technical Topic (Technical Topics Database)*
TTA	*Target Time of Arrival*
TTO	*Target Time Over*
TTOT	*Target Take Off Time*
TWY	*Taxiway*
U	

Acronym	Description
UAC	*Upper Area Control Centre*
UAS	*Unmanned Aircraft System*
UUP	*Updated Airspace Use Plan*
V	
VA	*Validation Authority*
VAA	*Volcanic Ash Advisory*
VAAC	*Volcanic Ash Advisory Centre*
VACP	Volcanic Ash Contingency Plan
VDL	Very-High Frequency Digital Link
VDL2	VDL Mode 2
VFR	Visual Flight Rules
VLD	Very Large-Scale Demonstrations
VME	VDL Management Entity
VPA	Variable Profile Areas
VTTs	Variable Taxi Times
W	
WAFC	World Area Forecast Centre
WOC	Wing Operations Centre
Y	
YP	Yellow Profile