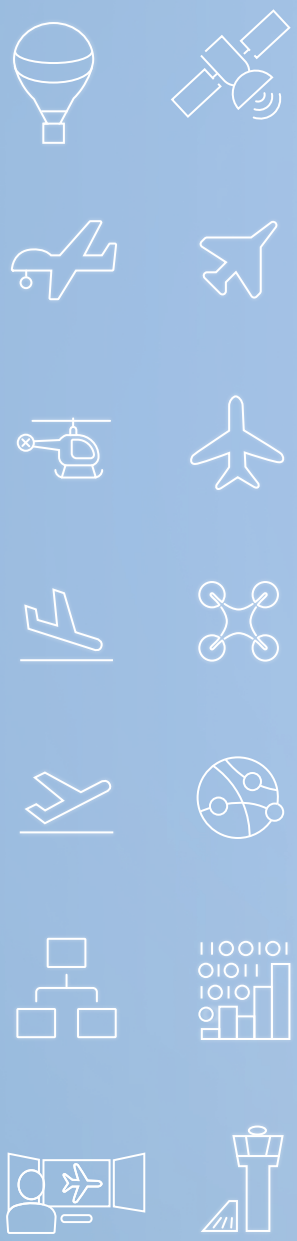
# EUROPEAN ATM MASTER PLAN

Digitalising Europe's Aviation Infrastructure

## Implementation view



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# Plan 2019

# EUROPEAN ATM MASTER PLAN

Digitalising Europe's Aviation Infrastructure

Implementation view

Plan 2019-draft

*The EUROCONTROL Provisional Council has endorsed the new and substantially changed Implementation Objectives of the Plan 2019 in May 2019. The full content of the draft European ATM Master Plan Level 3 Implementation Plan is pending the approval by the SJU Administrative Board.*

# EXECUTIVE SUMMARY

## What is the role of the European ATM Master Plan Level 3 Implementation Plan?

This Implementation Plan constitutes the "Implementation view" or Level 3 of the European ATM Master Plan (MP).

The Implementation Plan brings together and provides the framework for the commonly agreed actions to be taken by ECAC stakeholders, in the context of the implementation of SESAR.

These actions are consolidated in the form of 'Implementation Objectives', addressing those elements in SESAR which have reached the necessary operational and technical maturity and for which stakeholders have expressed an interest in their operational introduction. Implementation Objectives address validated SESAR Solutions and also account for the existing (EU) regulations in ATM.

## The evolution of the Implementation Plan for 2019

- **The Level 3 as part of the overall Master Plan update campaign**

As an integral part of the Master Plan, the Level 3 ensures full consistency of its Implementation Objectives with the elements that inform it: Operational Changes, SESAR Solutions and Deployment Scenarios described in the Executive View (Master Plan level 1) and detailed in the Planning and Architecture View (Master Plan Level 2). In addition, coordination with the SESAR Deployment Manager allows keeping alignment with the Deployment Programme.

- **Improve the monitoring on SESAR 1 Solutions implementation**

One of the main drivers of the Implementation Plan is to provide the ATM community with a full view of the overall lifecycle of the SESAR Solutions. Striving for this, the Implementation Plan 2019 edition, focuses to incorporate as much as possible the results of the SESAR 1 Programme, thus allowing for a more accurate monitoring of the deployment of the SESAR Solutions linked to Implementation Objectives.

- **Contributing to the extension of SESAR to the ECAC area**

The ambition of the Master Plan remains to reach all the States within the ECAC area. For this, EUROCONTROL provides the working arrangements that serve as vehicle to extend the agreed implementation actions to the whole of ECAC.

Implementation Objectives that are associated to elements of the ICAO Global Air Navigation Plan (GANP), are always associated to an ECAC scope.

- **Substantial changes to implementation objectives**

In the Implementation Plan, a 'substantial change' is a change that may affect the stakeholder commitment to implement an objective (e.g. implementation deadline, applicability area, etc.) and therefore requiring the highest level of consultation.

In line with the drivers for change described above, the objectives that have been substantially changed in this edition of the Implementation Plan are marked with a "(c)" in the tables in the following sections. The details of the changes can be seen in the individual objective Deployment Views in Section 4 of the document.

## The strategic dimension of the Implementation Plan

The long-term vision of the SESAR project is enabled through the effective sharing of information between air and ground actors across the Network from a gate-to-gate perspective along with the optimisation of the enabling technical infrastructure, making greater use of standardised and interoperable systems, with advanced automation ensuring a more cost-efficient and performance-based service provision.

This long-term vision is expressed through the SESAR Target Concept and is supported by SESAR through the implementation of a number of operational changes. The Implementation Plan addresses planned and expected evolutions in the mid-term horizon by structuring its strategic view by "**Major ATM Changes**". This concept, firstly introduced in the Level 3 Report 2015, breaks down the four Key Features (**Optimised ATM network services**; **Advanced air traffic services**; **High-performing airport operations**; **Enabling aviation infrastructure)** into more concrete elements and provides a logical grouping of the implementation objectives. This allows for a better understanding of the current status and future evolution of the different lines of change of the Master Plan as a whole, and the Level 3 in particular.

## The Airspace Architecture Study Transition Plan

DG MOVE established a "Wise Persons Group" on the future of the Single European Sky (SES) to produce recommendations for the direction that European ATM should take, in order to deliver better performance and better services while taking into account the continuous growth of air traffic. [Ref.: Foreword of the Wise Persons Group report of April 2019].

Some of the WPS recommendations to address the challenges that the ATM System is facing, and in particular: the ability to accommodate the growth in traffic demand, the fragmentation of the ATM system and the lack of scalable capacity are analysed in the Airspace Architecture Study.

The Airspace Architecture Study, developed by the SJU with support from the Network Manager and delivered to the Commission on 5 February 2019, aims at addressing the capacity challenge through, for the first time, a coupling of airspace, operations and technical evolution, accompanied by proposed evolution of service provision supported as needed by the relevant regulatory measures.

The objective of this study is to propose a future European airspace architecture, with an associated transition strategy, starting addressing the capacity shortage in the short term, and also developing an architecture robust enough to ensure the safe, seamless and efficient accommodation of all air traffic in the long term. The Study targets completion and full implementation by 2035,. SEAS[1] should be achieved via a progressive transition strategy in three 5 year-periods, while building on known good practices and quick wins, as well as existing initiatives such as SESAR. The aim is to enable progressively additional capacity in order to cope with the significant growth in traffic, while maintaining safety, improving flight efficiency and reducing environmental impact.

The final aim by 2035, the network should operate at its optimum capability having fully evolved from a system based on punctuality to a system based on predictability across a network that can safely and effectively accommodate 16 million flights (+50% compared to 2017).

As reflected in the European ATM Master Plan – Executive view, *"the content, approach and key milestones of the study are fully synchronised with, and making use of, the technology that is developed within the SESAR programme, combined with operational improvements."*

This plan identifies the technical and operational elements that have to be implemented in order to achieve the vision set up in the AAS.

The objectives of both the AAS and WPG recommendations, to have a Single European Airspace System and Digital European Sky are achieved by tackling the following challenges:

- Non-optimal airspace organisation and unbalance between ANSP supply and Airspace users demand;
- Limited automation in ATCO support tools, Data communication and Network tools;
- Fragmentation in ATM i.e. airspace, ANSP, ATS systems and CNS fragmentation;
- Poor scalability due to limited flight trajectory predictability, information sharing, interoperability, rigid use of ATCO resources.

For the short to medium term, the structural enhancements required for each of these challenges are addressed within the Major ATM changes hereafter.

[1] Draft, European ATM Master Plan Edition 2019, Level 1, Executive View, Chapter 5.1.4

## Air Traffic Flow and Capacity Management (ATFCM)

Air traffic flow and capacity management (ATFCM) endeavours to optimise traffic flows according to air traffic control capacity, while enabling airlines to operate safe and efficient flights. The implementation of the ATFCM major ATM change will see a deeper integration of all the operational stakeholders with regard to information sharing. The NM will play a central role, as information integrator in the creation of a more agile still more predictable Network.

The aim of this major ATM change is to pave the way from local-centric operations, planning and decision making to the SESAR target concept of flight and flow-centric operations where airspace users fly their preferred trajectories in a context where all actors share and access information, enabling a full collaborative decision making process.

The Implementation Plan addresses ATFCM through six implementation objectives and one additional SESAR Solution.

| | | | | |
|---|---|---|---|---|
| Pre-SESAR | - | Collaborative Flight Planning [FCM03] | - | AM-1.14 |
| | - | Short-Term ATFM Measures - Phase 1 [FCM04.1] (*) | - | - |
| SESAR 1 | - | Traffic Complexity Assessment [FCM06] (c) | PCP | AM-1.13 |
| | - | Calculated Take-Off Times to Target Times for ATFCM Purposes [FCM07] | PCP | AM-1.9 |
| | - | Short-Term ATFM Measures - Phase 2 [FCM04.2] | PCP | AM-1.11 |
| | - | Enhanced ATFM Slot Swapping [FCM09] | - | - |
| | - | User-Driven Prioritisation Process (UDPP) - Departure [Sol #57] | - | - |

*(c) Substantial change*

*(*) FCM04.1 was achieved in 2018 and therefore removed from the Implementation Plan 2019. It is kept in this table for traceability purposes but no deployment view is presented in the next chapters.*

## Network operations planning

The Network Operations Plan (NOP) is an overview of consolidated network flow and capacity, enabling operational partners to anticipate or respond to events and to increase their mutual understanding of the situation from the strategic phase to the real-time operation phase, followed by post operational analysis. The operations planning process consolidates forecasts and plans from all partners involved in ATM operations (ANSPs, airports, AOs, MIL) and from the NM's units in charge of flow, capacity, and airspace management. Starting with the strategic planning of capacity, the process progresses to an operational level with the development of derived seasonal, weekly and daily plans (the so-called 'NOP Coordination'). The seasonal segment of the NOP is extracted and electronically hosted on the network operations portal of the NM. A seasonal segment of the NOP is developed each year to address the 'Transition Plan for Major Projects in Europe'.

The aim of this major ATM change is to pave the way from local-centric operations planning and decision making to the SESAR Target Concept of flight and flow-centric operations, where all actors

share and access information, enabling a full collaborative planning and decision-making process with the NM in the core of the European ATM Network..

NOP is reflected in the current Plan through two implementation objectives:

| | | | |
|---|---|---|---|
| Pre-SESAR | - Collaborative Flight Planning [FCM03] | - | AM-1.14 |
| SESAR 1 | - Interactive Rolling NOP [FCM05] | PCP | AM-1.12 |

## Advanced Flexible Use of Airspace (AFUA)

The basic principle of flexible use of airspace (FUA) is that airspace is no longer designated as military or civil but is considered as a single continuum, used flexibly on a day-to-day basis. All users have access, and based on their specific needs, their requirements are managed to ensure the most efficient use of airspace. Wherever possible, permanent airspace segregation should be avoided.

Through a closer civil-military partnership and exchange of real-time airspace management (ASM) information, advanced FUA (AFUA) will enhance the efficiency of airspace use providing the ability to manage airspace reservations more flexibly in response to airspace user requirements. In an increasingly complex environment, AFUA will enable the implementation of other SES and SESAR concepts, in particular free route airspace.

The implementation objectives that cover this major ATM change are:

| | | | |
|---|---|---|---|
| Pre-SESAR | - Harmonise OAT and GAT Handling [AOM13.1] | - | - |
| SESAR 1 | - ASM Support Tools [AOM19.1] | PCP | AM-1.8 |
| | - ASM Management of Real Time Airspace Data [AOM19.2] | PCP | AM-1.8 |
| | - Full Rolling ASM/ATFCM Process [AOM19.3] | PCP | AM-1.8 |
| | - Management of Pre-Defined Airspace Configurations [AOM19.4] | PCP | - |

## Enhanced Arrival Sequencing

Arrival manager (AMAN) tools improve sequencing and metering of arrival aircraft by integrating with the ATC systems and providing controllers with advisories to create an optimal arrival sequence, reducing holding and low-level vectoring.

Through this major ATM change, arrival sequencing is expected to move from local AMAN tools taking into account local constraints to a full integration of AMAN with the en-route environment, including multiple airports and taking into account network considerations by also assessing the impact on other traffic flow.

The Implementation Plan addresses enhanced arrival sequencing through five implementation objectives.

| | | | |
|---|---|---|---|
| Pre-SESAR | - AMAN Tools and Procedures [ATC07.1] | - | - |
| | - Initial Extension of AMAN to En-route [ATC15.1] | - | - |
| SESAR 1 | - | - | - |
| | - Extension of AMAN to En-route [ATC15.2] | PCP | AM-1.3 |
| | - Enhanced AMAN-DMAN Integration [ATC19] (NEW)<br>- ) | - | - |

*(c) Substantial change*

## Performance Based Navigation (PBN)

ICAO's PBN concept has expanded area navigation (RNAV) techniques, originally centred upon lateral navigation accuracy only, to a more extensive statement of required navigation performance (RNP) related to accuracy, integrity and continuity along with how this performance is to be achieved in terms of aircraft and crew requirements. RNP relies primarily on the use of satellite technologies.

The PBN major ATM change will leverage on the advanced navigational capabilities of aircraft allowing the implementation of more flexible and environmentally friendly procedures. This will enable better access to airspace and airports and will lead to a reduction of the greenhouse gaseous emissions with a direct contribution to the decarbonisation of aviation.

Regulation (EU) 2018/1048 of 18 July 2018 governs PBN implementation in European airspace. It aims towards the exclusive use of PBN in European airspace by the year 2030. The Regulation governs PBN across a wide spectrum of applications in Terminal and En-Route environment i.e. SID, STAR, Instrument Approach Procedures to RWY, ATS routes, and Rotorcraft operations

The Implementation Plan addresses this topic through six implementation objectives.

| | | | |
|---|---|---|---|
| Pre- SESAR | - Continuous Descent Operations [ENV01] | - | - |
| | - Continuous Climb Operations [ENV03] | - | - |
| | - RNAV 1 in TMA Operations [NAV03.1] (c) | - | - |
| | - RNP Approach Procedures to instrument RWY [NAV10] (c) | PCP | - |
| SESAR 1 | - RNP 1 in TMA Operations [NAV03.2] (c) | PCP | - |
| | - ATS IFR Routes for Rotorcraft Operations [NAV12] (c) | - | - |

*(c) Substantial change*

## Free Route

Free route airspace (FRA) is a specified airspace within which users can freely plan a route between a defined entry point and a defined exit point, with the possibility of routeing via intermediate (published or unpublished) waypoints, without reference to the air traffic services (ATS) route network, subject of course to availability. Within FRA airspace, flights remain subject to ATS.

FRA is a way of overcoming the efficiency, capacity and environmental problems facing aviation, representing a key landmark in achieving free routing across the entire European airspace on the road

to SESAR business trajectories and 4D profiles. The implementation FRA operations will have to be accompanied by the deployment or upgrade of several controller support tools (e.g. MTCD, conflict resolution assistant, APW, etc.) which are critical for the successful implementation of free route. These are detailed in the major ATM change 'ATM systems'.

Direct routeing milestone was successfully achieved in 2017. The associated implementation objective (AOM21.1) has therefore been declared as Achieved and removed from the Plan although it is kept in the table below for traceability purposes.
The Implementation Plan includes for implementation objectives which cover this major ATM Change, and one Outline Description..

| | | | |
|---|---|---|---|
| Pre- SESAR | - | | |
| | - Electronic Dialogue as Automated Assistance to Controller during Coordination and Transfer [ATC17]<br>- | - | AM-1.3 |
| SESAR 1 | - Direct Routing [AOM21.1] - Achieved | PCP | - |
| | - Free Route Airspace [AOM21.2]<br>- | PCP | AM-1.6<br>AM-1.10<br>AM-5.1 |
| | - Multi-Sector Planning [ATC18]<br>- | - | AM-4.3<br>AM-5.1 |
| SESAR2020 W1 | - FRA below FL310 to ensure connectivity with TMAs [OD2] | - | AM-1.7 |

## Collaborative Airport

Through this major ATM change, the airport will fully interface the landside with the ATM Network. In this framework, airport operations planning, monitoring, management and post-operations analysis tools and processes are built into the airport operations plan (AOP) and airport collaborative decision making (A-CDM) for normal, adverse and/or exceptional operating conditions. Five implementation objectives and one SESAR Solution are in the Implementation Plan.

| | | | |
|---|---|---|---|
| Pre-SESAR | - Airport CDM [AOP05] | - | - |
| | - Airport Collaborative Environmental Management [ENV02] | - | - |
| SESAR 1 | - Initial Airport Operations Plan [AOP11] | PCP | - |
| | - Interactive Rolling NOP [FCM05] | PCP | - |
| | - Provision of departure planning information to NMOC [AOP17] (NEW) | - | - |
| | - AOP and AOP-NOP Seamless Integration [Sol #21] | - | - |

*(c) Substantial change*

## Surface Management

At busy airports the management of arrival and departures coupled with efficient and safe movement on the airport surface is a crucial part of managing an on-time airport. Improving airport surface operations is one of the key SESAR initiatives. Surface management provides critical situational awareness, visibility, alerts, and decision support to the airport and its stakeholders. Eight implementation objectives address this topic.

| | | | |
|---|---|---|---|
| Pre- SESAR | - A-SMGCS Surveillance (former Level 1) [AOP04.1] | - | - |
| | - A-SMGCS Runway Monitoring and Conflict Alerting (RMCA) [AOP04.2] | - | - |
| | - Improve Runway Safety by Preventing Runway Excursions [SAF11] | - | - |
| SESAR 1 | - Improve Runway and Airfield Safety with Conflicting ATC Clearances (CATC) Detection and Conformance Monitoring Alerts for Controllers (CMAC) [AOP12] | PCP | - |
| | - Automated Assistance to Controller For Surface Movement Planning and Routing [AOP13] | PCP | - |
| | - Runway Status Lights-RWSL [AOP18] (NEW) | - | - |
| | - Enhanced Traffic Situational Awareness and Airport Safety Nets for the Vehicle Drivers [AOP15] (NEW) | - | - |
| | - Guidance Assistance through Airfield Ground Lighting [AOP16] (NEW) | - | - |

*(c) Substantial change*

## Enhanced operations in the vicinity of the runway

The operations in the vicinity of the runway, namely those referring to the final approach phase, can be optimised by a series of improvements related to separation management. While maintaining the safety levels, these improvements will offer benefits in terms of capacity and flight efficiency, contributing as well to savings in terms of costs and mitigation of the environmental impact, providing benefits to airlines, ANSPs and airports.

Two implementation objectives address this major ATM change.

| | | | |
|---|---|---|---|
| Pre- SESAR | - Time-Based Separation [AOP10] | PCP | - |
| SESAR 1 | - Precision Approach using GBAS CAT II/III Based on GPS L1 [NAV11] (NEW) | - | - |

## Pre-SWIM and SWIM

System wide information management (SWIM) represents a complete paradigm change in how information is managed along its full lifecycle and across the ATM system. Its aim is to provide information users with relevant and commonly understandable information. This means making the

right information available at the right time to the right stakeholder. SWIM brings the industry based information technology approach of service orientated architecture (SOA) to the European ATM system, whereby all stakeholders' access, share and process information through services and SWIM-enabled applications. Through this major ATM change, information exchange will move from a peer-to-peer (legacy) infrastructure to an agile, high quality and secure information sharing environment, flight object related, enabling seamless operations and full digitalisation.

The Implementation Plan covers SWIM topic through eight implementation objectives.

| | | | |
|---|---|---|---|
| Pre- SESAR | - Common Flight Message Transfer Protocol [ITY-FMTP] | - | AM-1.3 |
| | - Ensure Quality of Aeronautical Data and Aeronautical Information [ITY-ADQ] | - | - |
| | - Electronic Terrain and Obstacle Data (eTOD) [INF07] | - | - |
| SESAR 1 | - NewPENS [COM12] | PCP | - |
| | - Extended Flight Plan [FCM08] | PCP | AM-1.4 |
| | - Information Exchanges Using SWIM Yellow TI Profile [INF08.1] | PCP | AM-1.5 |
| | - Information Exchanges Using SWIM Blue TI Profile [INF08.2] - (Initial) | PCP | AM-9.1 |
| | - Digital Integrated Briefing [INF09] (NEW - Initial) | - | - |

*(c) Substantial change*

## Data Link

Data link (DL) is an essential enabler for the implementation of trajectory-based operations (TBO) which will see the sharing of the information between airborne and ground systems through the business-mission trajectory lifecycle. Thanks to the DL-based TBO, flight and flow centric operations will be possible in a network context allowing the implementation of new concepts of operation.

One Implementation Objective and one Outline Description cover this major ATM change:

| | | | |
|---|---|---|---|
| Pre-SESAR | - Initial ATC Air-Ground Data Link Services [ITY-AGDL] | - | AM-1.1 |
| SESAR 1 | Extended Projected Profile availability on the ground [OD1] | PCP | AM-1.2 |

*(c) Substantial change*

## CNS Rationalisation

Development of the CNS rationalisation, an aspect of the infrastructure key feature, is one of the main priorities for the current ATM Master Plan update. It is anticipated that the current independent activities supporting CNS rationalisation will be consolidated in an overarching strategic approach. Pending the availability of the abovementioned strategy, the current strategic view is focused on developments already performed in the pre-SESAR phase, and consolidated by the PCP regulation**.**

Eight Implementation Objectives and two Outline Descriptions address this topic.

| | | | |
|---|---|---|---|
| Pre-SESAR | - Aircraft Identification [ITY-ACID] | - | - |
| | - Surveillance Performance and Interoperability [ITY-SPI] | - | - |

| | | | |
|---|---|---|---|
| | - 8.33 kHz Air-Ground Voice Channel Spacing below FL195 [ITY-AGVCS2] | - | - |
| | - Migrate from AFTN to AMHS [COM10] | - | - |
| SESAR 1 | - Voice over Internet Protocol (VoIP) in En-Route [COM11.1] (NEW) | PCP | AM-1.3 |
| | - Voice over Internet Protocol (VoIP) at Airport/Terminal [COM11.2] (NEW) | - | - |
| | - NewPENS [COM12] | PCP | - |
| | - ADS-B Surveillance of Aircraft In Flight and on the Surface [Sol #110] | - | - |
| | - Air Traffic Services (ATS) Datalink Using Iris Precursor [OD3] | - | AM-1.16 |
| | - Composite surveillance ADS-B/WAM [OD4] | - | AM-1.17 |

## ATM systems

Ground-based safety nets are an integral part of the ATM system. Using primarily ATS surveillance data, they provide warning times to prevent imminent or actual hazardous situations from developing into major incidents or even accidents. They include Minimum Safe Altitude Warning, Short Term Conflict Detection, Area Proximity Warning (this one linked to PCP as it is required in the Regulation for the implementation of FRA) and Approach Path Monitoring tools. MSAW is already fully implemented across the ECAC region and is only reported here for completeness.

Also, this includes conflict detection, resolution support and conformance monitoring tools.

Four Implementation Objectives address these topics.

| | | | |
|---|---|---|---|
| Pre- SESAR | - Ground-Based Safety Nets [ATC02.8] | PCP | - |
| SESAR 1 | - Enhanced STCA for TMAs [ATC02.9] (c) | - | - |
| | - Automated Support for Conflict Detection, Resolution Support Information and Conformance Monitoring [ATC12.1] | PCP | AM-1.15<br>AM-5.1 |
| | - Enhanced STCA with Down-Linked Parameters [ATC20] (NEW) | - | - |

## Virtualisation

With the support of virtual centre technologies, it will be possible to reorganise physical assets that will lead to facilitated data-sharing, new synergies and more efficient management of the ATM resources network. It will also facilitate effective interoperability between functional systems.

The implementation of remote tower services is already taking place in many parts of Europe. Other elements like the virtual centre, are expected to deliver the flexibility necessary to improve the performance of the system as a whole, either in the form of a single Air Traffic Service Unit (ATSU) or a grouping of collaborative ATSUs using data services provided by an ATM Data Service Provider (ADSP).

One Implementation Objective and one Outline Description address these topics.

| | | | |
|---|---|---|---|
| SESAR 1 | - Remote Tower services | - | - |
| SESAR 2020W1 | - Work station , service interface definition and virtual centre concept [OD5] | - | AM-4.5 |

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# TABLE OF CONTENTS

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# 1. INTRODUCTION

## The Level 3 of the European ATM Master Plan

This Implementation Plan establishes the "Implementation view" or Level 3 of the European ATM Master Plan (MP) and is connected to the 2 other levels, namely Level 2, Planning and Architecture view and Level 1 Executive view (see figure 1 below).

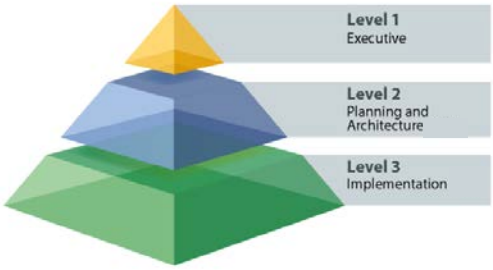


**Figure 1 - The three levels of the European ATM Master Plan**

The ATM Master Plan Level 3, Implementation Plan[1], brings together commonly agreed actions taken by ECAC stakeholders, and provides the framework for the implementation of SESAR. These actions are consolidated in the form of 'Implementation Objectives'.

The ECAC-wide agreement is reached through various steps involving all relevant stakeholders. It starts with the production of the Implementation Plan under the aegis of SESAR Project (PJ) 20 (Work Package 2.5); consultations are then carried out with the relevant technical EUROCONTROL Working Arrangements (e.g. Teams); once the technical content is considered sound both the EUROCONTROL Agency Advisory Body (AAB) and PJ20 are requested to comment; and finally an endorsement is sought with the EUROCONTROL Provisional Council to prepare the EUROCONTROL's position at the SJU Admin Board where the document is approved.

The Implementation Objectives present operational, technical and institutional improvements, which contribute to the performance requirements for the key performance areas (KPAs) cost-efficiency, operational efficiency, capacity, environment, safety and security, as defined in the ATM Master Plan Level 1. They also reflect the outcome from the Planning and Architecture level (Level 2) when considering the integration of operational changes which have reached the necessary operational and technical maturity, and are supported by common agreement for their inclusion in the plan and, where applicable, their deployment. Finally, they account for the existing (EU) Regulations in ATM.

The MP Level 3 Implementation Plan is updated every year and takes into account the status of deployment derived from the MP Level 3 Implementation Report.

## Master Plan Level 3 2019 - Implementation Plan

The main focus for the 2019 Implementation Plan has been to include new Implementation Objectives stemming from SESAR Solutions already identified in 2018 as promising elements for future coordination, and give more visibility to the validated SESAR 1 Solutions associated with existing Implementation Objectives.

Alignment with the Deployment Programme (DP) of the SESAR Deployment Manager (SDM) and with the ICAO Global Air Navigation Plan (GANP) are maximised. The Level 3 addresses the full scope of the Master Plan's mature and deployable elements as Implementation Objectives, some of which relate to the PCP (Pilot Common Project). For the PCP-related elements, i.e. those directly linked to the implementation of ATM sub-

[1] Previously known as the European Single Sky ImPlementation Plan (ESSIP Plan).

functionalities, the MP Level 3 is fully in line with the PCP Regulation. It also provides the traceability to the corresponding actions identified in the European Plan for Aviation Safety 2019-2023, recently published by EASA.

As in the previous editions, the 2019 Implementation Plan is structured in three different views:

- **Strategic view -** that provides a strategic outlook for each Major ATM Change within each SESAR Key Feature.
- **Deployment view -** that provides a summary of the main elements (what, who, when, where, references) vis-à-vis the operational change per Implementation Objective.
- **Engineering view -** that provides a complete description for each Implementation Objective including, detailed descriptions of stakeholder lines of action (SLoAs) and relevant supporting material. This view is available online, on the European ATM Master Plan Portal (https://www.eatmportal.eu/working/signin).

Since 2017, the Implementation Plan contains a **'Risk management'** chapter that has been updated for this edition in accordance with risk management practices. This chapter was initially developed with the intention of supporting the framework of the overall Master Plan risk management process, as described in Chapter 7 of the Master Plan Executive View (Level 1) – Edition 2015. For its development, both a top-down and a bottom-up approach were followed. Firstly, the risks identified at Level 1 were analysed in terms of their impact and relevance to Level 3; the risks deemed relevant were included in the Level 3 risk chapter. Secondly, Level-3 specific risks were identified together with an assessment of impact and mitigation actions, ensuring their relevance at Programme level by linking them to the Level 1 risks; these risks are presented in the document.

## Implementation Objectives Evolution

The 2019 Plan includes 8 **new** Implementation Objectives. These:

- Are based on the work done by PJ20-WP2.8 (identifying mature SESAR Solutions for future coordination activities);
- Have a "Local" scope, i.e. without a predefined Applicability Area and Full Operational Capability (FOC) date. They are subject to local business decisions by any stakeholder concerned;
- With the exception of NAV11 (GBAS Cat. II/III) and INF09 (digital integrated briefing) – being 'Initial' Objectives, the others are presented as 'Active' in the Plan (i.e. will be monitored through the LSSIP starting from the 2019 cycle).

| Designator | Title | Scope | Status | Rationale |
|---|---|---|---|---|
| **AOP15** | Enhanced traffic situational awareness and airport safety nets for the vehicle drivers | **Local** | **Active** | To improve implementation planning and monitoring of "SESAR Solution #04 – Enhanced traffic situational awareness and airport SNET for the vehicle drivers". FOC date and Applicability is subject to local needs. |
| **AOP16** | Guidance assistance through airfield ground lighting | **Local** | **Active** | To improve implementation planning and monitoring of "SESAR Solution #47–Guidance Assistance through Airfield Ground Lighting". FOC date and Applicability is subject to local needs. |
| **AOP17** | Provision/integration of departure planning information to NMOC | **Local** | **Active** | To improve implementation planning and monitoring of "SESAR Solution #61– CWP Airport - Low Cost and Simple Departure Data Entry Panel". FOC date and Applicability is subject to local needs. |
| **AOP18** | Runway Status Lights (RWSL) | **Local** | **Active** | To improve implementation planning and monitoring of "SESAR Solution #01 – Runway Status Lights". FOC date and Applicability is subject to local needs. |
| **ATC19** | Enhanced AMAN-DMAN integration | **Local** | **Active** | To improve implementation planning and monitoring of "SESAR Solution #54 – Flow based Integration of Arrival and Departure Management". FOC date and Applicability is subject to local needs. |
| **ATC20** | Enhanced STCA with down-linked parameters via Mode S EHS | **Local** | **Active** | To improve implementation planning and monitoring of "SESAR Solution #69 – Enhanced STCA with down-linked parameters".<br>FOC date and Applicability is subject to local needs. |
| **INF09** | Digital Integrated Briefing | **-** | **Initial** | To improve implementation planning of "SESAR Solution #34 – Digital Integrated Briefing". Due to the maturity of the Solution and corresponding Specifications and standards, introduced as "Initial". FOC date and Applicability is subject to local needs. |
| **NAV11** | Implement precision approach procedures using GBAS CAT II/III based on GPS L1 | **-** | **Initial** | To improve implementation planning of "SESAR Solution #55 – Precision approaches using GBAS CAT II/III based on GPS L1". Due to the maturity of the Solution and corresponding Specifications and standards, introduced as "Initial". FOC date and Applicability is subject to local needs. |

Substantial changes to 6 existing Objectives were introduced, to:

- Improve implementation monitoring of SESAR Solution #60 (Enhanced STCA for TMA) by adapting ATC2.9;
- Differentiate implementation planning and reporting for VoIP in En-route and Airport/Terminal Operating Environment, by splitting COM11 into COM11.1 and COM11.2;
- Align NAV03.1, NAV03.2, NAV10 and NAV12 to the requirements of the newly published PBN Implementing Regulation (Commission Implementing Regulation 2018/1048).

The objective FCM04.1 (STAM Phase 1) was declared as achieved at the end of 2018, thus it is not part of the active objectives in the Plan 2019.

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# 2. STRATEGIC VIEW

One of the main drivers of the Implementation Plan is to provide a full view of the overall lifecycle of the SESAR Solutions. The Implementation Plan 2019 edition focus is to incorporate as much as possible the results of the SESAR 1 Programme, thus allowing for a more accurate monitoring of the deployment of the SESAR Solutions linked to Implementation Objectives.

The long-term vision of the SESAR project is enabled through effective sharing of information between air and ground actors across the Network (from a gate-to-gate perspective), and supported by optimisation of the enabling technical infrastructure/s, making increased use of standardised and interoperable systems with advanced automation, ensuring a more cost-efficient and performance-based service provision.

This vision is expressed through the SESAR Target Concept and is supported through the implementation of operational changes in accordance with the strategic orientations defined by the four Key Features (described on the right).

For a more focused strategic perspective, the Strategic View is structured by "Major ATM Changes". This concept, first introduced in the Level 3 Report 2015, breaks down the four Key Features into more concrete elements and provides a logical grouping of the implementation objectives. This allows for a better understanding of the status and future evolution of the different lines of change of the Master Plan as a whole, and of Level 3 in particular.

The Major ATM Changes include several operational changes, grouped into blocks. The mapping on the following pages show how all the elements fit together into the overall picture of the Master Plan, and into each of the four Key Features.

Furthermore, each strategic view presents the improvements achieved in the pre-SESAR phase, addresses the operational changes brought by the PCP Regulation, and provides an indication of the emerging SESAR 1 Solutions.

### The four SESAR Key Features:

**Optimised ATM network services**

An optimised ATM network must be robust and resilient to a range of disruptions, including meteorological and unplanned events relying on a dynamic and collaborative mechanism. This will allow for a common, updated, consistent and accurate plan that provides reference information to all planning and executing ATM actors.

**Advanced air traffic services**

The future European ATM system will be characterised by advanced service provision, underpinned by the automated tools that reduce controllers' need for tactical intervention due to automation of routine tasks. The feature moves towards automation and the effective and efficient integration of all aerial vehicles including general aviation (GA) and rotorcraft (RC) alongside the introduction of remotely-piloted aircraft systems (RPAS) into the ATM environment.

**High-performing airport operations**

The future European ATM system relies on the full integration of airports as nodes into the network. This implies enhanced airport operations, ensuring a seamless process through Airport-Collaborative Decision Making (A-CDM), in normal and adverse conditions, and further integration of airport operations within the Network operations also through AOP/NOP integration leading to predictability, planning stability and the ability to operate to plan as much as possible. The regional and local airports will also need to be integrated into the network.

**Enabling aviation infrastructure**

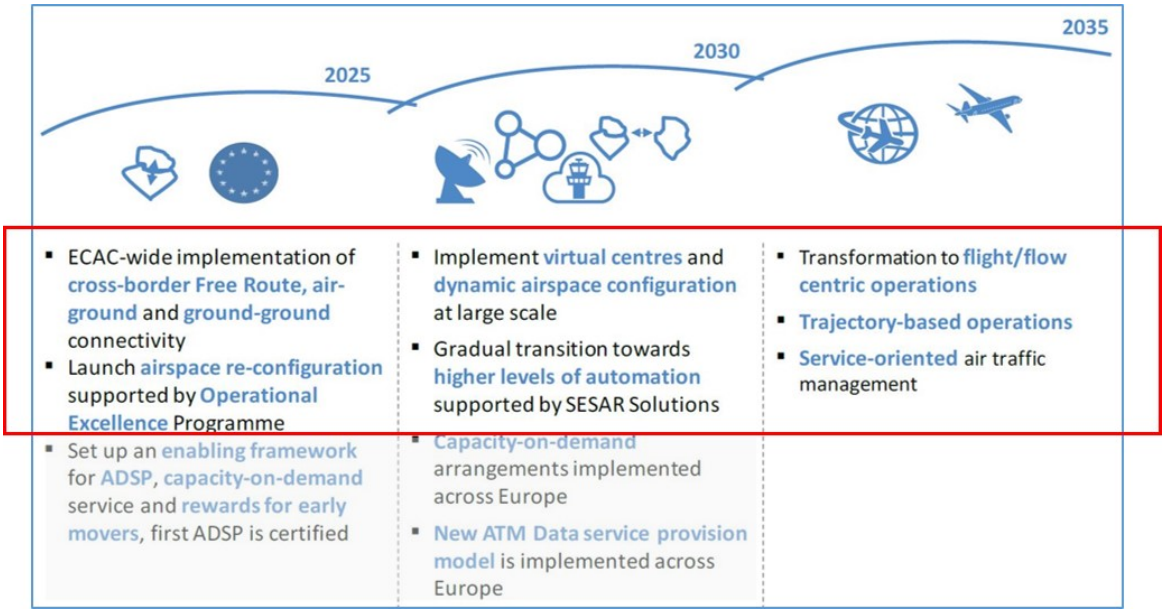
The first three Key Features will be underpinned by an integrated and rationalised aviation infrastructure. It will rely on enhanced integration and interfacing between aircraft and ground systems, including ATC and other stakeholder systems. The introduction of U-space services to support access to airspace for Unmanned Aircraft Systems (UAS) is a major development of this feature. The drone community will make the necessary effort to integrate into the airspace occupied by manned aviation. The ATM will need UAS/RPAS/drones to be equipped with capabilities to make them able to interoperate with the manned aviation, compliant with local Air/Ground procedures and compatible with ground safety nets.

# Airspace Architecture Study Transition Plan in MPL3 Plan

## Scope of Transition Strategy for AAS

Full implementation of AAS elements should be achieved via a progressive transition strategy in three 5 year-periods, while building on known good practices and quick wins, as well as existing initiatives such as SESAR.

AAS focuses on the subset of seven (7) milestones representing the technical and operational requirements for the full implementation of AAS. They require the stakeholders to adopt new standards and procedures; investments in new technologies and new services, including availability of cross-FIR ATM data services to enable the virtual de-fragmentation, as well as adaptations to the current ATM service delivery model where necessary.




**Conditions for success**

The following conditions need to exist to catalyse an evolution of the service provision landscape in support of this transition:

1. Capacity-on-demand service - ensures the continuity of ATC provision despite disruptions by enabling a temporary delegation of ATC provision to an alternate provider with spare capacity.
   *Topics with potential regulatory changes to facilitate implementation: Oversight, responsibility/liability, Interoperability, ATCO Licensing, Pricing / charging.*
2. ATM data service provision - requires common ATM data service provision supporting several ATS providers simultaneously. Allows for ANSPs more specialised in one or more services, while possibly covering geographical areas that go beyond individual FIR boundaries.
   *Topics with potential regulatory changes to facilitate implementation: Certification, oversight and enforcement, Common Requirements for certification, Alliance building, Competition rules, Interoperability and data access, Pricing/charging, Liability.*
3. Targeted incentives for early movers - offered for the stakeholders that implement recommended operational improvements or that shift towards innovative delivery models to initiate the transition.
   *Topics with potential regulatory changes to facilitate implementation: modulation of charges, Best Equipped Best Served "BEBS".*

These conditions actually are the three (3) milestones that are not addressed by the Plan. They are the framework for the regulatory requirements and service delivery models which the European Commission will address in parallel.

## AAS Perspective in the Plan

There are a number of already existing MPL3 Implementation Objectives supporting planning and monitoring of the implementation of AAS elements.

MPL3 Plan implementation objectives cover short to medium term, thus largely corresponding to first AAS transition phase by the year 2025.

The elements found in the second (2030) and third (2035) phase of the transition, that do not qualify for the implementation objective or outline description, are expected to be delivered by SESAR 2020 Wave 2 starting January 2020. They are shown in the tables for completeness of the information.

The table for each transition phase identifies the following:

a) the milestones and the elements supporting each AAS milestone,
b) MPL3 Implementation Objective or Outline Description covering the supporting element of the milestone.
c) SESAR Solution contributing to the supporting element of the milestone (SESAR1, Wave 1 and Wave 2)

## Transition Phase 1 by 2025

| AAS Milestone | Element supporting the milestone | SESAR Solution | MPL3 Plan 2019 |
|---|---|---|---|
| **1. ECAC-wide cross-border FRA, A/G and G/G connectivity** | | | |
| 1.1. | Air-ground data exchange - CPDLC | Nil | ITY-AGDL |
| 1.2. | Air-ground data exchange – EPP/ADS-C | #115 SESAR 1 | OD-1 EPP |
| 1.3. | G/G connectivity | #05 SESAR1 | ATC17 |
| | | | ATC15.2 |
| | | | COM11.1 |
| | | | ITY-FMTP |
| 1.4. | eFPL based on ICAO FF-ICE supporting SBT transition to RBT | PJ.18-02c SESAR 2020 Wave 1 | FCM08 |
| 1.5. | G/G Connectivity-SWIM Yellow | #46 SESAR 1 | INF08.1 |
| 1.6. | FRA cross-border above FL310 | #66 SESAR 1<br>#33 SESAR 1<br>PJ.06-01 SESAR 2020 Wave 1 | AOM21.2 to be amended for cross border |
| 1.7. | FRA cross-border below FL310 | #66 SESAR 1<br>#33 SESAR 1<br>PJ.06-01 SESAR 2020 Wave 1 | OD-2 FRA ensuring connectivity with TMA |
| 1.8. | Advanced FUA and ASM Tools, Real time airspace data, Full Rolling ASM/AFTCM | #31 SESAR 1 | AOM19.1 |
| | | | AOM19.2 |
| | | | AOM19.3 |
| 1.9. | Implement Target Times (SAM, API) | #18 SESAR 1 | FCM07 |
| 1.10. | Automated support for dynamic sectorisation | #66 SESAR 1 | AOM21.2 |
| 1.11. | Occupancy counts and Traffic monitoring volumes exchanges (STAM) | #17 SESAR 1 | FCM04.2 |
| 1.12. | Network related data exchanges with operational stakeholders (AOP/NOP interfaces, Aeronautical data, flight plan data, network data) | #20 SESAR 1 | FCM05 |
| 1.13. | Data exchange to support traffic complexity | #19 SESAR 1 | FCM06 |
| 1.14. | Collaborative Flight Planning (CPR, FSA, AFP) | Nil | FCM01 |

| AAS Milestone | Element supporting the milestone | SESAR Solution | MPL3 Plan 2019 |
|---|---|---|---|
| | | | FCM03 |
| 1.15. | Enhanced tactical conflict detection & resolution (CD&R) services and conformance monitoring tools for en-route | #27 SESAR 1 | ATC12.1 |
| 1.16. | Air traffic services (ATS) datalink using iris precursor | #109 SESAR 1 | OD-3 Iris precursor |
| 1.17. | Cooperative surveillance ADS-B / WAM | #114 SESAR 1 | OD-4 ADS-B/WAM |
| 2. | **Airspace re-configuration & operational excellence programme** | | |
| 2.1. | EU-wide airspace re-configuration programme to define and implement an optimal cross-FIR and flow-centric redesign of airspace sectors. | Nil | N/A refer to NOP & ERNIP |
| 2.2. | EU-wide operational excellence programme to achieve operational harmonisation aligning on ATC capacity and ways of working to best practices. | Nil | N/A refer to NOP & ERNIP |

## Transition Phase 2 from 2025-2030

| AAS Milestone | Element supporting the milestone | SESAR Solution | MPL3 Plan 2019 |
|---|---|---|---|
| 4. | **Implement virtual centre and dynamic airspace management on a large scale** | | |
| 4.1. | Dynamic airspace configurations (DAC) - Prerequisites | #44 SESAR 2020 Wave 2 | Nil |
| 4.2. | DAC- flexible sectorisation boundaries dynamically modified based on demand | #44 SESAR 2020 Wave 2 | Nil |
| 4.3. | Collaborative control and multi sector planner (MSP) in en-route | #70 SESAR 2020 Wave 2 | ATC18 |
| 4.4. | Delegation of airspace amongst ATSUs based on traffic / organisation needs (either static , dynamic or on contingency) | #93 SESAR 2020 Wave 2 | Nil |
| 4.5. | Work station, service interface definition & virtual centre concept | PJ.16-03 SESAR 2020 Wave 1 | OD-5 VC CWP |
| 5. | **Gradual move to higher levels of automation supported by the implementation of SESAR Solutions** | | |
| 5.1. | Higher levels of automation in ATC to support full TBO | Nil | ATC12.1<br>ATC18<br>AOM21.2-ASP02 |
| 5.2. | Enhanced network traffic prediction and shared complexity representation | #45 SESAR 2020 Wave 2 | Nil |
| 5.3. | Next generation AMAN for 4D environment | #1 SESAR 2020 Wave 2 | Nil |
| 5.4. | Digital integrated network management and ATC planning (INAP) | #48 SESAR 2020 Wave 2 | Nil |

| AAS Milestone | Element supporting the milestone | SESAR Solution | MPL3 Plan 2019 |
|---|---|---|---|
| 5.5. | Improved ground trajectory predictions enabling future automation tools | #53 SESAR 2020 Wave 2 | Nil |
| 5.6. | RBT revision supported by datalink and increased automation | #57 SESAR 2020 Wave 2 | Nil |
| 5.7. | HMI interaction modes for ATC centre | #96 SESAR 2020 Wave 2 | Nil |
| 5.8. | Improved vertical profiles through enhanced vertical clearances | #56 SESAR 2020 Wave 2 | Nil |
| 5.9. | Higher levels of automation supporting sectorless ATCO work | Nil | Nil |

## Transition Phase 3 from 2030-2035

| AAS Milestone | Element supporting the milestone | SESAR Solution | MPL3 Plan 2019 |
|---|---|---|---|
| **8.** | **Transformation to flight centric operations where applicable** | | |
| 8.1. | Flight-centric ATC and improved distribution of separation responsibility in ATC | #73 SESAR 2020 Wave 2 | Nil |
| **9.** | **Trajectory-based operations** | | |
| 9.1. | Flight object interoperability and SWIM Blue profile | PJ.18-02b SESAR 2020 Wave 1 | INF08.2 |
| 9.2. | Dynamic E-TMA for advanced CDO/CCO and improved arrival and departure operations | #08 SESAR 2020 Wave 2 | Nil |
| 9.3. | Enhanced integration of AU trajectory definition and network management processes | #38 SESAR 2020 Wave 2 | Nil |
| 9.4. | Trajectory prediction service | #88 SESAR 2020 Wave 2 | Nil |
| 9.5. | Mission trajectories management with integrated dynamic mobile areas type 1 and type 2 | #40 SESAR 2020 Wave 2 | Nil |
| 9.6. | RBT revision supported by datalink and increased automation | #57 SESAR 2020 Wave 2 | Nil |
| **10.** | **Service-oriented ATM** | | |
| 10.1. | De-couple ATS provision, ATM data services, integration services and geographically fixed services. | Nil | Nil |

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## Major ATM changes within the ATM Master Plan

*Note that the graphs below and the Strategic Views presented in the following chapters are based on the mapping of Operational Changes and SESAR Key Features as presented in MP Level 1 Edition 2015 (Figure 9 of the document). The changes to this mapping introduced during the update campaign of the MP Level 1 for 2019 will be taken into account in due time when these changes are stable.*

### Optimised ATM Network Services

| Major ATM Change | Pre-SESAR | PCP | SESAR 1 | SESAR 2020 Wave 1 |
|---|---|---|---|---|
| ATFCM | **ATFM slot exchange**<br>**Basic network operations planning**<br>• FCM03-Collaborative flight planning [AM-1.14]<br>**STAM**<br>• FCM04.1-STAM Phase 1 | **Automated support for traffic complexity assessment**<br>• FCM06-Traffic complexity assessment [AM-1.13]<br>**CTOT to TTA for ATFCM purposes**<br>• FCM07-CTOT to TTA for ATFCM purposes [AM-1.9]<br>**Enhanced STAM**<br>• FCM04.2-STAM Phase 2 [AM-1.11] | **UDPP**<br>• FCM09-Enhanced ATFM Slot Swapping<br>• SOL#57 UDPP-Departure | |
| NOP | **Basic network operations planning**<br>• FCM03-Collaborative flight planning [AM-1.14]<br>• FCM05-Interactive Rolling NOP | **Collaborative NOP**<br>• FCM05-Interactive Rolling NOP [AM-1.12] | | |
| Free Route & Advanced FUA | **Civil/military airspace and aeronautical data coordination**<br>• AOM13.1-Harmonise OAT and GAT handling<br>• AOM19.1-ASM support tools [AM-1.8] | **ASM and A-FUA**<br>• AOM19.1-ASM support tools [AM-1.8]<br>• AOM19.2-ASM Management of real time airspace data [AM-1.8]<br>• AOM19.3-Full rolling ASM/ATFCM process [AM-1.8]<br>• AOM19.4-Management of Pre-defined Airspace Configurations<br>**Free route (*)**<br>• AOM21.1-Direct Routing [Achieved]<br>• AOM21.2-Free Route Airspace [AM-1.6], [AM-1.10], [AM-5.1] | | • OD-02 FRA cross-border below FL310 [AM-1.7] |

(*) This operational change is described in the section addressing Advanced Air Traffic Services

### Advanced Air Traffic Services

| Major ATM Changes | Pre-SESAR | PCP | SESAR 1 | SESAR 2020 Wave 1 |
|---|---|---|---|---|
| Enhanced arrival sequencing | **Basic AMAN**<br>• ATC07.1-AMAN<br>• ATC15.1-Initial extension of AMAN to En-Route | **AMAN extended to en-route airspace**<br>• ATC15.2-Extension of AMAN to En-route [AM-1.3] | **AMAN/DMAN integration including multiple airports**<br>• ATC19-Enhanced AMAN-DMAN integration<br>• SOL#08-AMAN into multiple airports<br>***Airborne Separation Assistance System (ASAS) spacing***<br>**Controlled Time of Arrival (CTA)**<br>• SOL#06-CTA in medium density/complexity | |
| PBN | **Introduction of PRNAV**<br>• ENV01-Continuous Descent Operations<br>• ENV03-Continous Climb Operations<br>• NAV03.1-RNAV-1 in TMAs<br>• NAV10-RNP Approach to instrument RWY | **Enhanced TMA using RNP-based operations**<br>• NAV03.2-RNP1 in TMAs | **Advanced RNP**<br>• SOL#10-Route network using advanced RNP<br>**NAV12 - ATS IFR Routes for Rotorcraft Operations**<br>**Trajectory-based tools**<br>• SOL#107-Point Merge in TMA<br>• SOL#108-AMAN and Point Merge | |
| Free Route | • ATC17-Electronic Dialog supporting COTR [AM-1.3] | **Free route**<br>• AOM21.1-Direct Routing [Achieved] (*)<br>• AOM21.2-Free Route Airspace [AM-1.6], [AM-1.10], [AM-5.1] | **Sector team operation**<br>• ATC18-Multi Sector Planning [AM-4.3], [AM-5.1]<br>• SOL#118- Basic Extended ATC Planner<br>**Trajectory-based tools** | • OD-02 FRA cross-border below FL310 [AM-1.7] |
| ATM Systems | • ATC02.8-Ground based safety nets | • ATC12.1-MONA, TCT and MTCD [AM-1.15], [AM-5.1] | **Enhanced Safety Nets**<br>• ATC02.9-Enhanced STCA for TMAs<br>• ATC20-STCA with Mode S DAP | |

(*) AOM21.1 was achieved during 2017 and therefore removed from the Implementation Plan. It is kept in this graph for traceability purposes.

## High Performing Airport Operations

| Major ATM Changes | Pre-SESAR | PCP | SESAR 1 |
|---|---|---|---|
| Collaborative Airport | **Initial airport CDM**<br>• AOP05-Airport CDM<br>**Additional Objectives:**<br>• ENV02-Collaborative Environmental Management | **Airport operations plan**<br>• AOP11-Initial Airport Operations Plan<br>• FCM05-Interactive Rolling NOP | **Collaborative airport**<br>• SOL#21-AOP-NOP seamless integration<br>• AOP17-Provision of DPI to NMOC<br>• SOL#116-De-icing management tool |
| Surface management | **A-SMGCS L1 and L2**<br>• AOP04.1-A-SMGCS Surveillance<br>• AOP04.2-A-SMGCS Runway Monitoring and Conflict Alerting (RMCA)<br>**Additional Objectives:**<br>• SAF11-Prevent Runway Excursions | **Automated assistance to controller for surface movement planning and routing**<br>• AOP13-Automated Assistance to Controller for Surface Movement Planning and Routing<br>**Airport safety nets**<br>• AOP12-Improve RWY safety with ATC clearance monitoring<br>**DMAN synchronised with pre-departure sequencing**<br>• AOP13-Automated Assistance to Controller for Surface Movement Planning and Routing<br>**DMAN integrating surface management constraints** | **Integrated surface management**<br>• SOL#48-Virtual blocks in LVP<br>**Integrated surface management datalink**<br>• SOL#23-CPDLC D-TAXI<br>**Ground Situational Awareness**<br>• AOP16-Guidance via AGL<br>• SOL#70-Enhanced ATCO Awareness in AWO<br>**Enhanced Airport Safety Nets**<br>• AOP18-RWY status lights<br>**Airport Safety Nets Vehicles**<br>• AOP15-SNET for vehicles drivers |
| Enhanced / Optimised operations in the vicinity of the runway | **Crosswind reduced separations for arrivals**<br>**Operations in LVC** | **TBS for final approach**<br>• AOP10-Time based separation | **LVPs using GBAS**<br>• NAV11-GBAS Cat II/III approach<br>***Approach & Departure Separations***<br>SOL#117 Reduce LVC minima by enhanced flight vision systems |
| Remote Tower | | | **Remote Tower**<br>• AOP14-Remote Tower Services |

## Enabling Aviation Infrastructure

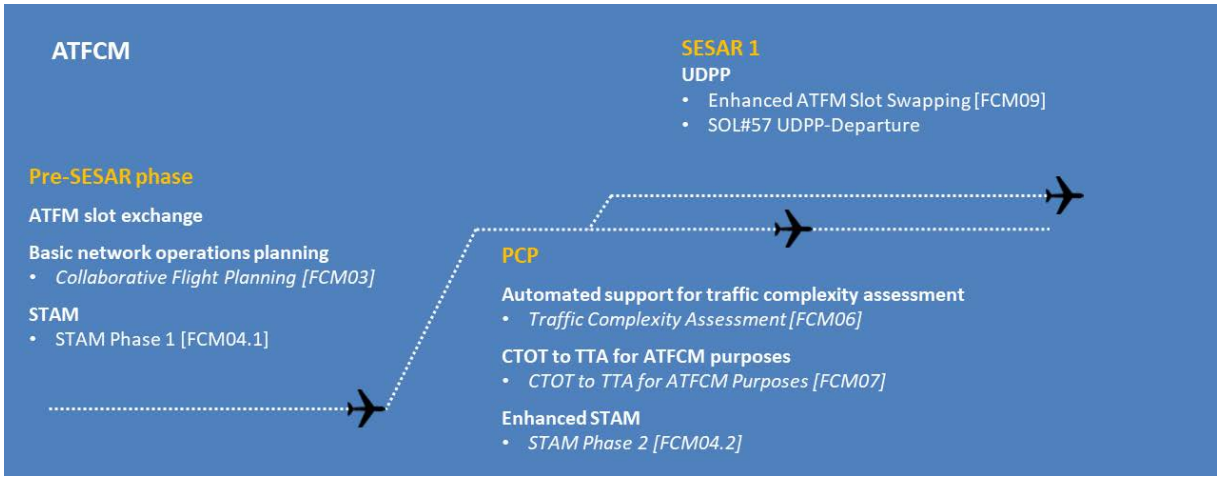
| Major ATM Changes | Pre-SESAR | PCP | SESAR 1 | SESAR 2020 Wave 1 |
|---|---|---|---|---|
| Pre-SWIM & SWIM | **IP network**<br>• ITY-FMTP-FMTP over IPv6 [AM-1.3]<br>**B2B services**<br>**Information reference and exchange models**<br>• INF07-eTOD<br>• ITY-ADQ-Aeronautical Data Quality | **Common Infrastructure Components: SWIM registry, PKI**<br>• INF08.1-SWIM Yellow TI Profile [AM-1.5]<br>**SWIM technical infrastructure and profiles**<br>• INF08.1-iSWIM Yellow TI Profile [AM-1.5]<br>**Aeronautical, Meteorological, Cooperative network information exchange**<br>• INF08.1-iSWIM Yellow TI Profile [AM-1.5]<br>**Flight information exchange**<br>• INF08.1-iSWIM Yellow TI Profile [AM-1.5]<br>• INF08.2-iSWIM Blue TI Profile [AM-9.1]<br>• FCM08-Extended Flight Plan [AM-1.4]<br>**Communications infrastructure**<br>• COM12-NewPENS | **Digital Integrated Briefing**<br>• INF09-Digital Integrated Briefing | |
| Data Link | **A/G datalink**<br>• ITY-AGDL-A/G Data-link [AM-1.1] | **Initial trajectory information sharing (I4D)** | **Information sharing and business trajectory**<br>• SOL#67-AOC data increasing trajectory prediction accuracy<br>• OD-01 A/G data exchange EPP/ADS C [AM-1.2]<br>**Mission trajectory** | |
| CNS Rationalisation | **ADS-B, WAM**<br>• ITY-ACID-Aircraft Identification<br>• ITY-SPI-Surveillance performance and interoperability<br>**GNSS, GBAS, SBAS**<br>***Communications infrastructure***<br>• COM10-Basic and enhanced AMHS<br>• ITY-AGVCS2-8,33KHz below FL195 | **Communications infrastructure**<br>• COM11.1-Voice over IP in En-Route (*) [AM-1.3]<br>• COM11.2-Voice over IP in Airport/Terminal<br>• COM12-NewPENS | **CNS rationalisation**<br>• SOL#100-ACAS Ground Monitoring and Presentation<br>• SOL#101-Extended hybrid surveillance<br>• SOL#102-AeroMACS<br>• OD-03 ATS datalink using Iris Precursor [AM-1.16]<br>• SOL#110-ADS-B surveillance of aircraft in flight and on the surface<br>• OD-04 Composite Surveillance ADS-B / WAM [AM-1.17] | |
| Virtualisation | | | • AOP14-Remote Tower Services (**) | • OD-05 VC concept, CWP and interface [AM-4.5] |

(*) Not mandated by the PCP Regulation but enabling some SESAR 1 operational changes
(**) Remote TWR operational change is described in the key feature High Performing Airports

## Air Traffic Flow and Capacity Management (ATFCM)

Air traffic flow and capacity management (ATFCM) endeavours to optimise traffic flows according to air traffic control capacity, while enabling airlines to operate safe and efficient flights. The implementation of the ATFCM major ATM change will see a deeper integration of all the operational stakeholders with regard to information sharing. The NM will play a central role, as information integrator in the creation of a more agile still more predictable Network.

The aim of this major ATM change is to pave the way from local-centric operations, planning and decision making to the SESAR target concept of flight and flow-centric operations where airspace users fly their preferred trajectories in a context where all actors share and access information, enabling a full collaborative decision-making process.




Note: objectives/outline descriptions in *italics* are supporting the implementation of the Airspace Architecture Study

The **pre-SESAR** phase focused on the set-up of the network followed by the deeper integration of stakeholder through exchanges of information for better consistency and predictability. The latter elements of this phase are expected to be implemented by end 2019.

The **PCP** Regulation adds the next set of building blocks for this major ATM change by bringing flow management into a cooperative traffic management environment, and optimising the delivery of traffic into sectors and airports and the use for ATFCM measures.

Furthermore, the **SESAR 1** programme has validated two additional SESAR Solutions which support the last element of this major ATM change - User-driven prioritisation process (UDPP). UDPP gives all concerned airspace users, including business aviation operators, the opportunity to exchange the departure order of two flights in accordance with their commercial or operational priorities. Of the two solutions, one has already been translated into an implementation objective addressing Enhanced ATFM slot swapping, and the other one addressing UDPP-Departure will be considered for the medium term..

**Medium Term View**

By addressing UDPP-Departure ATFCM would evolve to cover the full UDPP Operational Change, which facilitates ATFCM planning and departure sequencing through advanced airport operations (advanced collaborative decision-making and demand capacity balancing).

**Relation with the Airspace Architecture Study (AAS)**

Several implemenation objectives within the major ATM change are also supporting the Milestone 1 “ECAC-wide cross-border FRA, A/G and G/G connectivity” of the AAS, in particular the milestone’s elements 1.9 on “Implement Target Times (SAM, API)”, 1.11 on “Occupancy counts and Traffic monitoring volumes exchanges (STAM)”, 1.13 on “Data exchange to support traffic complexity”and 1.14 on “Collaborative Flight Planning (CPR, FSA, AFP)”.

**Roadmap**

The following table provides a consolidated view across the major ATM change of the implementation objectives within the change, in terms of scope, impacted stakeholders and expected implementation timeframes.

| MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ← | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| FCM03 | Collaborative flight planning | Nil | AM1.14 | | | | | | | | | | | | 60% | | | | | | | | | | | | |
| FCM04.2 | STAM phase 2 | #17 | AM-1.11 | | | | | | | | | | | | 10% | | | | | | | | | | | | |
| FCM06 | Traffic Complexity Assessment | #19 | AM-1.13 | | | | | | | | | | | | 12% | | | | | | | | | | | | |
| FCM07 | CTOT to TTA for ATFCM | #18 | AM-1.9 | | | | | | | | | | | | | | | | | | | | | | | | |
| FCM09 | Enhanced ATFM Slot swap | #56 | Nil | | | | | | | | | | | | | | | | | | | | | | | | |

Full roadmap and the legend explaining how to read roadmap table is available in Annex 5 of this document.

## Stakeholder Perspective

The major ATM change will make use of increased digitalisation for all operational stakeholders along the following lines:

**Network Manager (NM) -** Integration of automatically transmitted real-time flight information for a better traffic situation awareness and higher sector load calculation accuracy. STAM measures to smooth sector workloads by reducing traffic peaks. Enhanced flight planning and flight data exchanges to support trajectory based operations. This includes the introduction of planning processes in which the AUs can access flight constraint assessments and obtain approval prior to filing, 4D trajectory exchange. A more proactive approach to maximise the use of available capacity, will be introduced. This approach will combine the Network capacity modelling processes of the NOP with techniques enabling the optimisation of all necessary Network resources. Enhanced monitoring techniques, including the detection of local overloads, along with a continuous monitoring of impact at network level and improved slot swapping offered to airspace users with a.o. multiple-swaps.

**Air Navigation Service Providers (ANSPs) -** ANSPs play a primary role in the information sharing processes with the NM, both as information sources and users. An improved traffic situation picture will allow a better accuracy for traffic complexity assessments and for smoothing traffic peaks with minimum restrictions for the airspace users.

**Airport Operators -** Airport operators implementing the gate-to-gate concept are increasingly integrated into the network. This is achieved through the provision of airport related data (e.g. demand data) and their participation in the collaborative ATFCM processes in particular, for the allocation of target times.

**Airspace Users (AUs) -** Airspace users benefit from the increased accuracy of traffic prediction, which improves the use of available capacity reducing the delays. The role of the users spans from the provision of demand data to the NM to the use of the slot swapping facility provided by the NM.

## Performance Benefits

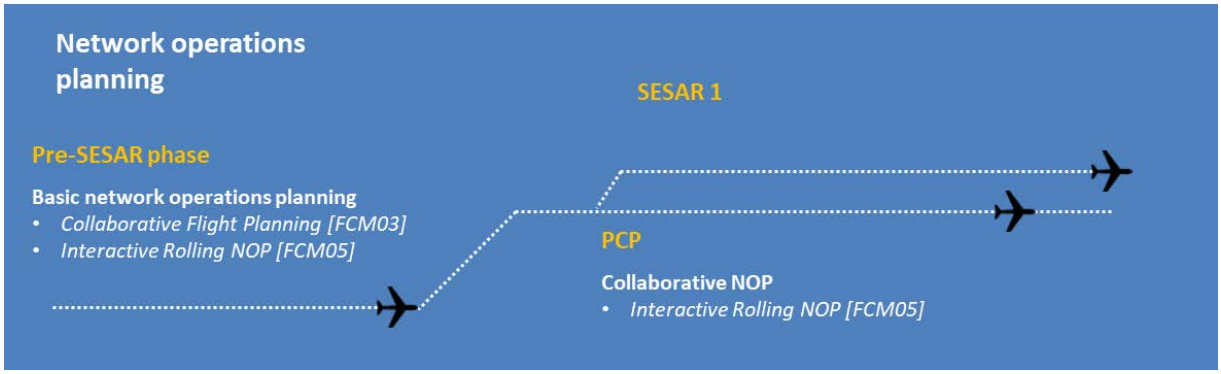
Optimised use of the available capacity by using real-time information about the network situation to identify and avoid 'hotspots' and reduce traffic complexity.

Reduced flight time and holdings, owing to improved network predictability. Cost savings and reduced fuel burn due to airspace users being able to fly their preferred trajectories, according to their priorities and operational objectives.

Improved ATCO workload predictability and prevention of overload.

## Network Operations Planning

The Network Operations Plan (NOP) is an overview of consolidated network flow and capacity, enabling operational partners to anticipate or respond to events and to increase their mutual understanding of the situation from the strategic phase to the real-time operation phase, followed by post operational analysis. The operations planning process consolidates forecasts and plans from all partners involved in ATM operations (ANSPs, airports, AOs, MIL) and from the NM's units in charge of flow, capacity, and airspace management. Starting with the strategic planning of capacity, the process progresses to an operational level with the development of derived seasonal, weekly and daily plans (the so-called 'NOP Coordination'). The seasonal segment of the NOP is extracted and electronically hosted on the network operations portal of the NM. A seasonal segment of the NOP is developed each year to address the 'Transition Plan for Major Projects in Europe'.




Note: objectives/outline descriptions in *italics* are supporting the implementation of the Airspace Architecture Study

The aim of this major ATM change is to pave the way from local-centric operations planning and decision making to the SESAR Target Concept of flight and flow-centric operations, where all actors share and access information, enabling a full collaborative planning and decision-making process with the NM in the core of the European ATM Network.

The **pre-SESAR** phase focused on the foundation of the network followed by the deeper integration of stakeholders through exchanges of information and set-up of the NOP.

The **PCP** Regulation adds the ensuing building blocks by improving the NOP with enhanced functionalities and the integration with Airport Operations Plans (AOP). NM continues to develop the 'Rolling/Dynamic Network Plan' aimed at displaying network situational information updated in real time. It addresses hotspots, network events, ATFCM measures and ATFM Information Messages made available via B2B services and via the n-CONNECT platform. NOP will evolve towards a "one stop shop" with "look ahead" capabilities, for NM to further develop 'Common Network Awareness' and 'Collaborative Network Planning'.

**Medium Term View**

The cooperative processes required at both local and network level will be further enhanced. The NM will offer direct, open and consolidated support through an efficient partnership approach, from planning into operations. A direct link will be ensured between network capacity planning, airspace improvements, updated airport planning, integrated data and tool availability for all planning phases, enhanced ATFCM, as well as for the planning and coordination of significant events.

**Relation with the Airspace Architecture Study (AAS)**

Several implemenation objectives within the major ATM change are also supporting the Milestone 1 "ECAC-wide cross-border FRA, A/G and G/G connectivity" of the AAS, in particular the milestone's element 1.12 on "Network related data exchanges with operational stakeholders (AOP/NOP interfaces, Aeronautical data, flight plan data, network data)" as well as milestone's element 1.14 on "Collaborative Flight Planning (CPR, FSA, AFP).

**Roadmap**

The following table provides a consolidated view across the major ATM change of the implementation objectives within the change, in terms of scope, impacted stakeholders and expected implementation timeframes.

| MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ← | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| FCM03 | Collaborative flight planning | Nil | AM1.14 | | | | | | | | | | | | 60% | | | | | | | | | | | | |
| FCM05 | Interactive rolling NOP | #20, #21 | AM-1.12 | | | | | | | | | | | | 8% | | | | | | | | | | | | |

Full roadmap and the legend explaining how to read roadmap table is available in Annex 5 of this document.

## Stakeholder Perspective

The major ATM change will see a significant integration of all the operational stakeholders with regard the information sharing, with the NM playing a central role as information integrator.

**Network Manager (NM) -** The NOP will become the main transversal tool supporting collaborative planning. It will evolve towards "one stop shop" with "look ahead" capabilities, to allow NM to communicate and exchange information with all relevant stakeholders and further develop "Common Network Awareness" and "Collaborative Network planning". A more proactive, NOP-supported approach will be introduced to maximise the use of available capacity.

**Air Navigation Service Providers (ANSPs) -** The Network will not operate without the full involvement and commitment of ANSPs as the implementers of local activities related to capacity and flight efficiency enhancement measures.

**Airport Operators -** Increasingly, Airports will be integrated into the Network, improving the gate-to-gate perspective. This will be done through the provision of airport related data (e.g. demand data) to the NOP, followed by the full integration of the Airport Operations Plan data into the NOP.

**Airspace Users -** To fully realise the benefits of improved integration of airspace design, airspace management, flexible use of airspace and air traffic flow and capacity management, through the NOP, a more dynamic and flexible approach to flight planning from the airspace users will be required.

## Performance Benefits

Small benefits through improved use of the airport and airspace capacity resulting from a better knowledge of the airspace availability and of the traffic demand.

Enhanced through use of cost efficient tools to access network information.

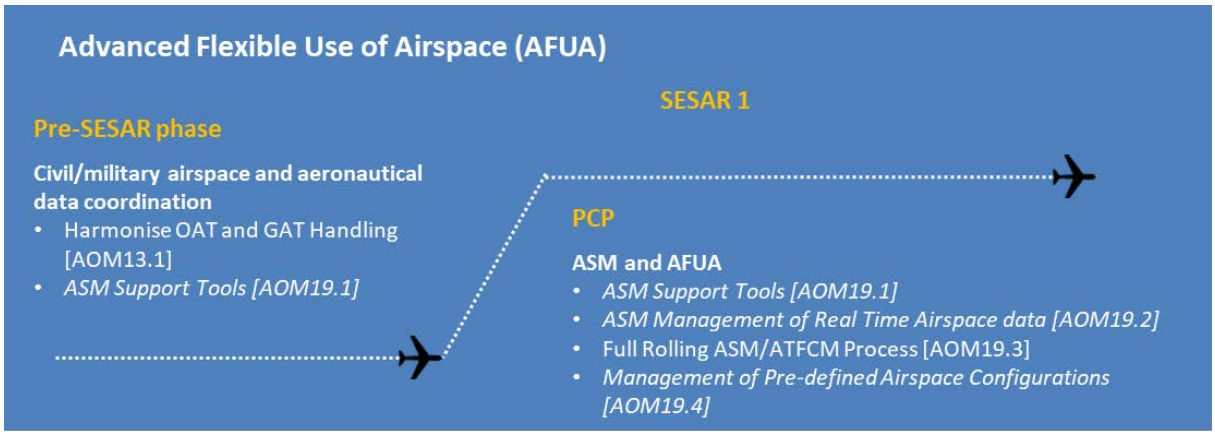
Reduced flight time and flight holding due to improved network predictability. Cost savings and reduced fuel burn enabling airspace users to fly their preferred trajectories according to their priorities and operational requirements.

Improved ATCO workload predictability and prevention of overloads.

## Advanced Flexible Use of Airspace (AFUA)

The basic principle of flexible use of airspace (FUA) is that airspace is no longer designated as military or civil but is considered as a single continuum, used flexibly on a day-to-day basis. All users have access, and based on their specific needs, their requirements are managed to ensure the most efficient use of airspace. Wherever possible, permanent airspace segregation should be avoided.

Through a closer civil-military partnership and exchange of real-time airspace management (ASM) information, advanced FUA (AFUA) will enhance the efficiency of airspace use providing the ability to manage airspace reservations more flexibly in response to airspace user requirements. In an increasingly complex environment, AFUA will enable the implementation of other SES and SESAR concepts, in particular free route airspace.




Note: objectives/outline descriptions in *italics* are supporting the implementation of the Airspace Architecture Study

One of the pillars of the **SES** Regulations was the implementation of FUA as required by Regulation (EC) No 2150/2005, which is now fully implemented in Europe. The FUA concept was developed at the three levels of ASM that correspond to civil/military co-ordination tasks: Strategic Level 1 – definition of the national airspace policy and establishment of pre-determined airspace structures; Pre-tactical Level 2 – day-to-day allocation of airspace according to user requirements; Tactical Level 3 – real-time use of airspace.

A further initiative includes the implementation of harmonised handling of operational air traffic (OAT) and general air traffic (GAT) across Europe, as defined in the "EUROCONTROL Specifications for harmonized Rules for OAT under IFR rules inside controlled Airspace (EUROAT)". Its full implementation is expected soon.

In support of FUA implementation, the use of ASM to support the management of airspace reservations is increasingly widespread.

These tools are evolving in order to handle the **PCP** requirements in terms of ASM and advanced FUA. ASM requires real-time sharing of airspace status between different ASM tools and with the NM through the Network Operations Plan (NOP).

This enables a full rolling ASM/ATFCM process ensuring a continuous, seamless and reiterative airspace planning and allocation based on airspace requests, for any time period including, support for the deployment of airspace configurations.

**Medium Term View**

Transition towards trajectory-based operations will be enabled by the adoption of modular airspace reservations (ARES) using the variable profile area (VPA) design principles, validated in SESAR 1. VPA facilitates a better response to military requirements and constraints and enhances civil-military coordination including real time airspace status update for defining different airspace scenarios with acceptable network impact.

In parallel, SESAR R&D activities will further elaborate on dynamic airspace configurations (DAC) and dynamic mobile areas (DMA) concepts. Compared to today's airspace scenarios, which by their nature are static, DAC/DMA enable flexible solutions that can be dynamically adapted to traffic demand to respond to different regional/local performance objectives, which may vary in time and place.

**Relation with the Airspace Architecture Study (AAS)**

Several implemenation objectives within the major ATM change are also supporting the Milestone 1 "ECAC-wide cross-border FRA, A/G and G/G connectivity" of the AAS, in particular the milestone's element 1.8 on "Advanced FUA and ASM Tools, Real time airspace data, Full Rolling ASM/AFTCM".

**Roadmap**

The following table provides a consolidated view across the major ATM change of the implementation objectives within the change, in terms of scope, impacted stakeholders and expected implementation timeframes.

| MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ← | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| AOM13.1 | Harmonise OAT and GAT handling | Nil | Nil | | | | | | | | | | | | 39% | | | | | | | | | | | | |
| AOM19.1 | ASM Tools to Support AFUA | #31 | AM-1.8 | | | | | | | | | | | | 28% | | | | | | | | | | | | |
| AOM19.2 | ASM Management of Real-Time Airspace Data | #31 | AM-1.8 | | | | | | | | | | | | 6% | | | | | | | | | | | | |
| AOM19.3 | Full Rolling ASM/ATFCM and ASM Information Sharing | #31 | AM-1.8 | | | | | | | | | | | | 8% | | | | | | | | | | | | |
| AOM19.4 | Management of Pre-defined Airspace Configurations | #31 | Nil | | | | | | | | | | | | 6% | | | | | | | | | | | | |

Full roadmap and the legend explaining how to read roadmap table is available in Annex 5 of this document.

## Stakeholder Perspective

Due to the very nature of the major ATM change, addressing the national airspace, the implementation will require the coordinated actions of military and civil stakeholders, with the facilitation by the Network Manager.

**Network Manager (NM) -** The NM will provide the appropriate tools (e.g. via the NOP Portal or eAMI message for those using B2B service) allowing the dissemination of airspace information. It will support real-time airspace status updates allowing all stakeholders to take early advantage of possible opportunities.

**Air Navigation Service Providers (ANSPs) -** The ANSPs will play their role in the civil-military partnership with their contribution to a full rolling ASM/ATFCM process. This process aims to optimise airspace availability and utilisation through a continuous real-time CDM process.

**Airspace Users (AUs) -** To realise the full benefits of improved integration of airspace design, ASM/FUA and ATFCM, a more dynamic and flexible approach to flight planning from the airspace users is required enabling the use of capacity as soon as airspace becomes available.

**Military Authorities -** AFUA is based on extended civil-military cooperation that is proactive and performance oriented to achieve mission effectiveness and flight efficiency. The military stakeholders will therefore have to contribute to the successful implementation of AFUA, from strategic to tactical airspace management.

## Performance Benefits

Increased through better utilisation of airspace resources within and across airspace boundaries leading to reduction of flight delays. Reduction in airspace segregation.

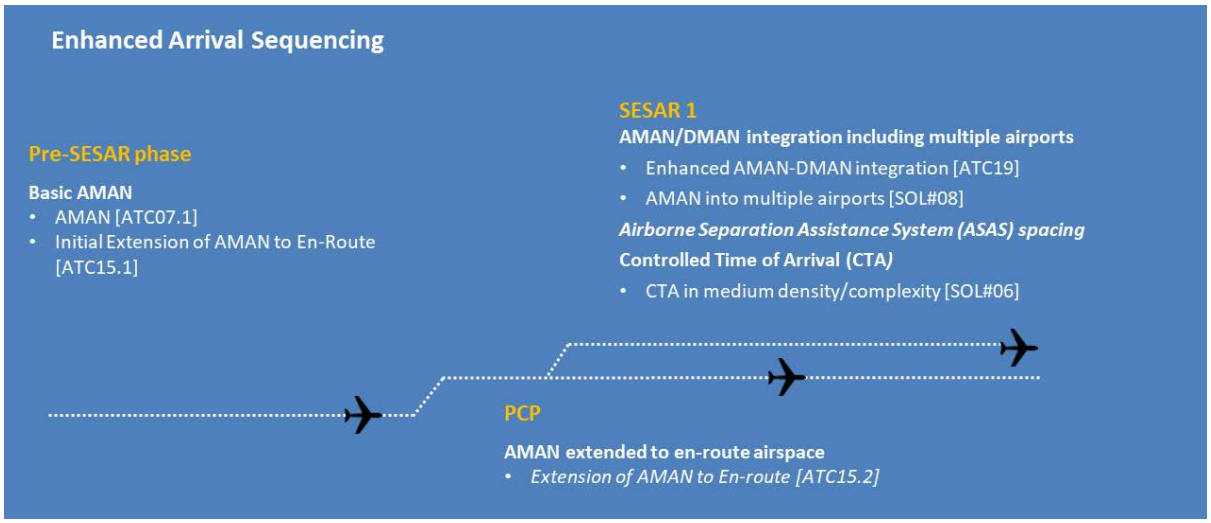
Increased through the availability of progressively optimum routes/trajectories aiding lower fuel burn. More efficient ways to separate operational and general air traffic. Definition and use of temporary airspace reservation, more closely in line with military operational requirements.

Better knowledge of traffic environment, common situational awareness, and specific enhancements through reduction in controller workload.

## Enhanced Arrival Sequencing

Arrival management (AMAN) tools enhance sequencing and metering of arrivals by integrating with the ATC systems and providing controllers with advisories to create an optimal arrival sequence, reducing holding and low-level vectoring.

Through this major ATM change, arrival sequencing is expected to progress from local AMAN tools utilising local constraints to a full integration of the AMAN with the en-route environment including multiple airports and taking into account network considerations by evaluating the impact on overall traffic flow.




Note: objectives/outline descriptions in *italics* are supporting the implementation of the Airspace Architecture Study

During the **pre-SESAR** phase, ANSPs and airport operators were expected to implement basic AMAN tools to improve sequencing and metering of arrival aircraft in TMAs and airports. AMAN is already implemented in 20 airports in Europe (18 of them PCP) and is expected to be fully deployed by end 2019.

Further to local implementation, the arrival management (AMAN) information is expected to be shared with upstream en-route sectors, using the arrival management information exchange message (AMA) or other generic arrival message/s. This will provide an enhanced arrival sequence allowing for a smoother accommodation of AMAN constraints.

Furthermore, an AMAN horizon of up to 180-200 nautical miles from the arrival airport, as required by the **PCP** Regulation, is expected to be implemented by the end of 2023. A high level of coordination is required to ensure synchronised implementation across the different ANSPs managing the en-route sectors impacted by the traffic flows to/from the 25 PCP airports.

Predictability and resilience at an airport is increased by improved co-ordination between ACC/APP and TWR controllers, allowing the setting up of fixed arrival departure sequencing patterns for defined periods of time.

**Relation with the Airspace Architecture Study (AAS)**

One implemenation objective within the major ATM change is also supporting the Milestone 1 “ECAC-wide cross-border FRA, A/G and G/G connectivity” of the AAS, in particular the milestone’s element 1.3 on “G/G connectivity”.

**Roadmap**

The following table provides a consolidated view across the major ATM change of the implementation objectives within the change, in terms of scope, impacted stakeholders and expected implementation timeframes.

| MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ← | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| ATC07.1 | Arrival management tools | Nil | Nil | | | | | | | | | | | | 64% | | | | | | | | | | | | |
| ATC15.1 | Initial extension of AMAN to En-route | Nil | Nil | | | | | | | | | | | | 48% | | | | | | | | | | | | |
| ATC15.2 | AMAN Extended to En-route Airspace | #05 | AM-1.3 | | | | | | | | | | | | 9% | | | | | | | | | | | | |
| ATC19 | Enhanced AMAN/DMAN integration | #54 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |

Full roadmap and the legend explaining how to read roadmap table is available in Annex 5 of this document.

**Medium Term View**

The next step in this major ATM change will be the integration of AMAN and DMAN including multiple airports.

## Stakeholder Perspective

While the implementation of basic AMAN tools is a local undertaking, the extension to en-route requires the involvement of multiple stakeholders (e.g. ANSPs of neighbouring countries) introducing a network dimension.

**Air Navigation Service Providers (ANSPs)** - ANSPs are the primary stakeholders implementing this change, either through the deployment of AMAN within their area of responsibility and further extension to en-route for up to 200 nautical miles, or through the extension of AMAN tools installed in neighbouring countries or even further away from their area of responsibility. Subsequently, the extended AMAN functionality will be integrated with the Departure Manager constraints and will consider new concepts of operations (e.g. related to the use of target times), taking into account network considerations through additional data exchanges with the NM.

**Network Manager (NM)** - The NM will support the network dimension of the extended AMAN as well as its evolution to a more network centric tool. The NM systems will support the extended AMAN functionality through data exchange (e.g. Flight Data messages), and additional procedures and tools (e.g. Network Impact Assessment Tool), implementing new concepts of operations.

## Performance Benefits

Reduction in holding and in low-level vectoring, by applying delay management during an earlier stage of the flight, with a positive impact on fuel burn.

Increased flight efficiency due to increased use of the Flight Management System (FMS) and improved environmental sustainability. Less noise and lower fuel consumption due to reduction in holding and low-level vectoring.

Increased safety owing to a more structured airspace, with a positive impact on controller and pilot situational awareness.

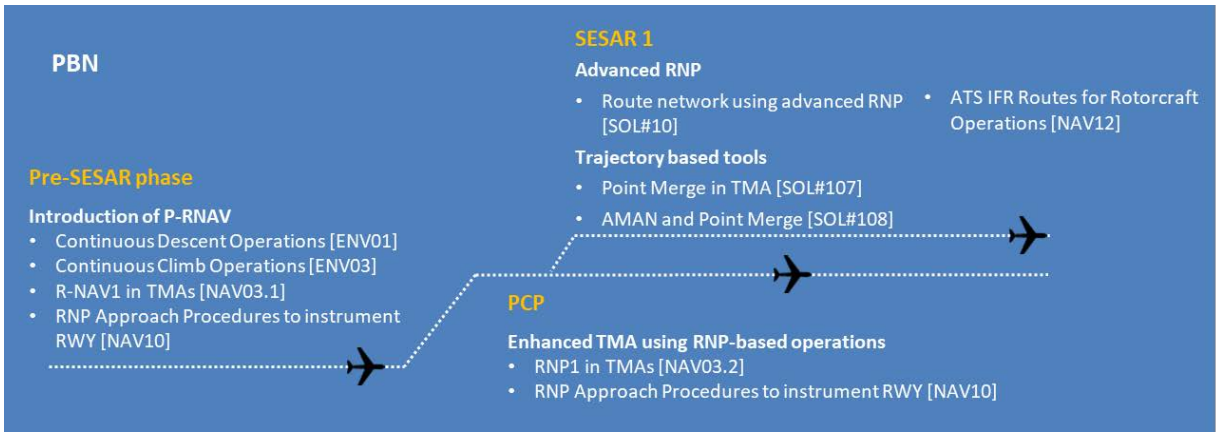
Reduced TMA controller workload due to reduction in frequency usage, permitting increase in capacity.

## Performance Based Navigation (PBN)

ICAO's PBN concept has extended area navigation (RNAV) techniques, originally centred upon lateral navigation accuracy only, to a more extensive statement of required navigation performance (RNP) relating to accuracy, integrity and continuity and how this performance will to be achieved in terms of aircraft and crew requirements. RNP relies primarily on the use of satellite technologies.

The major ATM change for PBN elies on advanced navigational capabilities of aircraft facilitating the implementation of more flexible and environmentally friendly procedures. This enables better access to airspace and airports and will lead to a reduction in greenhouse gas emissions, providing a direct contribution towards the decarbonisation of aviation.

Regulation (EU) 2018/1048 of 18 July 2018 governs PBN implementation in European airspace. It aims towards the exclusive use of PBN in European airspace by the year 2030. The Regulation governs PBN across a wide spectrum of applications in Terminal and En-Route environment i.e. SID, STAR, Instrument Approach Procedures to RWY, ATS routes, and Rotorcraft operations.




During the **pre-SESAR** phase, precision (P)-RNAV approaches combined, where possible, with continuous descent/climb operation techniques, have been deployed in a number of airports/TMAs mostly executing local initiatives. In the absence of a European-wide mandate, implementation has progressed slowly due to the difficulty of handling mixed-mode operations, especially in complex and busy TMAs.

The PBN concept suggests that RNAV specifications are effectively legacy specifications and is firmly set on RNP. The **PCP** Regulation mandates a number of high complexity TMAs to move to an RNP1 environment however, PCP pertains to a limited geographical scope.

**SESAR 1** Solution #10 'Optimised Route Network using Advanced RNP' provides a PBN solution to link Free Route airspace (FRA) above FL310, to the final approach via a set of defined and de-conflicted routes, from fixed entry points at the base of the FRA to the final approach segment.

Further integration of rotorcraft into the ATM system is achieved via the enabling of an optimised use of the airspace and improving connectivity between the airports and heliports.

**Roadmap**

The following table provides a consolidated view across the major ATM change of the implementation objectives within the change, in terms of scope, impacted stakeholders and expected implementation timeframes.

| MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ← | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| ENV01 | Continuous Descent Operations | Nil | Nil | | | | | | | | | | | | 36% | | | | | | | | | | | | |
| ENV03 | Continuous Climb Operations | Nil | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |
| NAV03.1 | RNAV1 in TMA Operations | #62 | Nil | | | | | | | | | | | | 57% | | | | | | | | | | | | |
| NAV03.2 | RNP1 in TMA Operations | #09, #51 | Nil | | | | | | | | | | | | 6% | | | | | | | | | | | | |
| NAV10 | RNP App. Procedures to instrument RWY | #103 | Nil | | | | | | | | | | | | 36% | | | | | | | | | | | | |
| NAV12 | ATS IFR Routes for Rotorcraft Operations | #113 | Nil | | | | | | | | | | | | | | | | | | | | | | | | |

Full roadmap and the legend explaining how to read roadmap table is available in Annex 5 of this document.

## Stakeholder Perspective

The implementation of PBN requires a strong partnership between many actors, primarily ANSPs, airspace users and regulatory authorities as follows:

**Airspace Users (AUs) -** The airspace users will retain a substantial role in the implementation of the change through the appropriate equipage of the airframes (e.g. RNAV 1 followed by RNP 1 capabilities) and the training and the certification of aircrews.

**Air Navigation Service Providers (ANSPs) -** ANSPs will support this change by implementing new PBN procedures and airspace design, capitalising on improved navigation capabilities of aircraft, adapting the ground navigation infrastructure in order to provide appropriate support to the airspace users as well as deploying or updating of controller support tools, in order to take into account new patterns of traffic distribution.

**Regulatory Authorities -** State authorities will play a key role in the implementation of PBN, by ensuring its safe introduction through supervisory responsibilities, actively participating in the development of an airspace concept that responds to the airspace users' requirements and public interest.

**Military Authorities -** The military stakeholders will be involved in the implementation of PBN within their role as service providers as well as airspace users (flying IFR/GAT). The relevant capabilities of military aircraft with equivalent performance to that of civil airspace user aircraft will allow seamless integration of traffic flows and enable benefits from optimised airspace organisation and procedures.

## Performance Benefits

Reduction in fuel burn through optimised routes and procedures.

Emission of greenhouse gases and noise nuisance reduced by use of optimal flight procedures and routings.

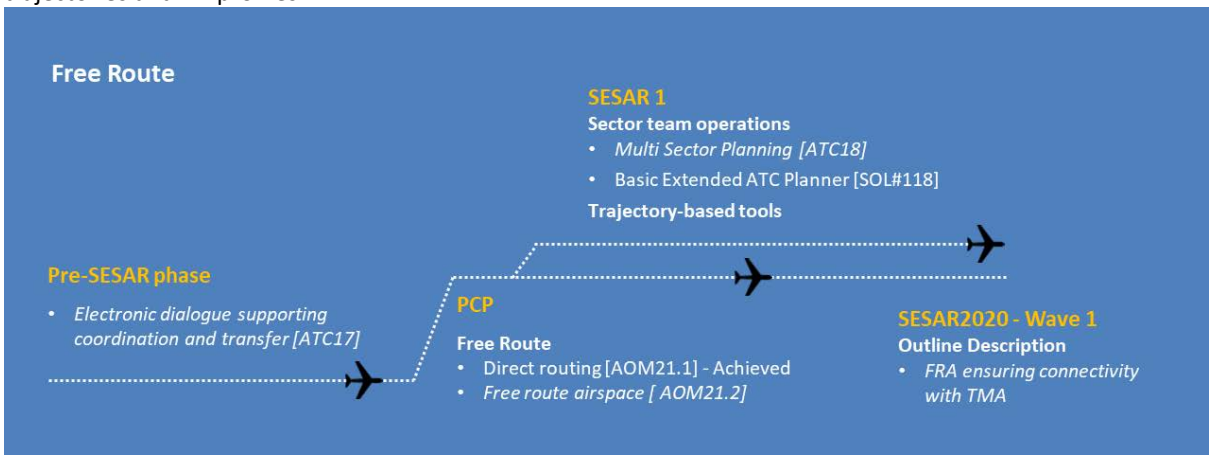
Improved through increased situational awareness, indirectly for both ATC and pilot through reduction of workload during RNAV/RNP/APV operations.

Marginal improvement, in particular due to the implementation of APV procedures. This will allow improved access to airport in all weather conditions as well as lower minima, than what can be achieved with non-precision approaches.

## Free Route

Free route airspace (FRA) is specified airspace within which users can freely plan a route between a defined entry point and a defined exit point, with the possibility of routeing via intermediate (published or unpublished) waypoints, without reference to the air traffic services (ATS) route network, subject to availability. Within FRA airspace, flights remain subject to air traffic control.

FRA is a response to the efficiency, capacity and environmental problems facing aviation. It represents a key milestone in achieving free routing across the entire European airspace on the road to SESAR business trajectories and 4D profiles.




Note: objectives/outline descriptions in *italics* are supporting the implementation of the Airspace Architecture Study

During the **pre-SESAR phase**, the free route foundations have been laid by the deployment of several ground system support tools, facilitating the tasks of the controller in a free route environment as well as by initial, local deployments of direct routes or free route airspaces.

The wider scenario for the implementation of free route in Europe is set up within the **PCP** Regulation, mandating the implementation of FRA above FL310 in the entire European region (as an interim step, the implementation of direct routes is also envisaged by the Regulation. This was virtually achieved in 2017). The implementation of the concept of operations is accompanied by the deployment or upgrade of several controller support tools (e.g. medium-term conflict detection, conflict resolution assistant, area proximity warning, etc.) which are critical for the successful implementation of FRA. **Medium Term View**

Further implementation of free route will continue with an emphasis on more cross-border initiatives. This, together with more advanced controller tools and new ways of working that improve ATC Planning role in ACC by bridging the gap between ATFCM and ATC, will bring additional flexibility and resilience in the network, and lead to the inherent harmonisation of airspace design, rules and operating practices in the European network, paving the way for trajectory based flights and flow-centric operations.

**Relation with the Airspace Architecture Study (AAS)**

Several implemenation objectives within the major ATM change are also supporting the Milestone 1 “ECAC-wide cross-border FRA, A/G and G/G connectivity” of the AAS, in particular the milestone’s elements 1.3 on “G/G connectivity”, 1.6 on “FRA cross-border above FL310”, 1.10 on “Automated support for dynamic sectorisation”, 4.3 on “Collaborative control and multi sector planner (MSP) in en-route” and 5.1 on “Higher levels of automation in ATC to support full TBO”. The element 1.7 on “FRA cross-border below FL310” is being addressed by the Outline Description associated to the extension of FRA ensuring connectivity with TMA.

**Roadmap**

The following table provides a consolidated view across the major ATM change of the implementation objectives within the change, in terms of scope, impacted stakeholders and expected implementation timeframes.

| MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ← | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| OD-2 | FRA ensuring connectivity with TMA | #66<br>#33<br>PJ.06-01 | AM-1.7 | | | | | | | | | | | | | | | | | | | | | | | | |
| AOM21.2 | Free Route Airspace | #33, #66 | AM-1.6<br>AM-1.10<br>AM-5.1 | | | | | | | | | | | | 55% | | | | | | | | | | | | |
| ATC17 | E. Dialogue, Automat.Assist to ATCO during COTR | Nil | AM-1.3 | | | | | | | | | | | | 26% | | | | | | | | | | | | |
| ATC18 | Multi Sector Planning En-route P2T | #63<br>#70W2 | AM-4.3<br>AM-5.1 | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |

Full roadmap and the legend explaining how to read roadmap table is available in Annex 5 of this document.

**Stakeholder Perspective**

The implementation of free Route will require a concerted approach from airspace users, air navigation service providers and the Network Manager, with particular consideration to the assessment of impact on capacity.

**Airspace Users (AUs) -** The move from route-based airspace to free route airspace offers significant opportunities to airspace users. With the FRA concept compatible with current navigation capabilities, airspace users will need to adapt their light planning systems to fully exploit the potential of free route airspace.

**Air Navigation Service Providers (ANSPs) -** Operating a free route environment offers improved predictability due to more stable trajectories and the use of conflict detection tools. This concept can lead to a better spread of conflicts compared to the clustering of conflicts generated by the fixed route network.

**Network Manager (NM) -** The Network Manager has a crucial role to play in the deployment of free route. It provides support to ANSPs with respect to airspace design, concepts of operation, advice on aeronautical publication and the pre-validation of each new free route environment to ensure that airspace users are able to plan flights in line with the concept. The NM also provides applicable solutions to further enhance operational performance and resolve any potential problems, which may arise due to implementation of free route. This includes provision of proactive coordination, and technical and operational support for local or sub-regional free route airspace initiatives, ensuring that the requisite network improvements are in place to support the initiatives.

## Performance Benefits

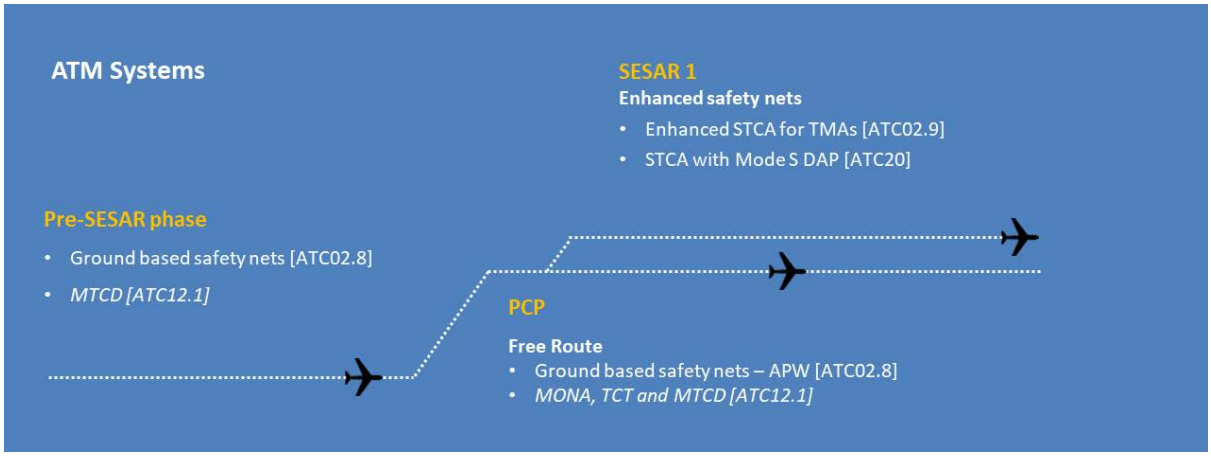
- Savings in route distances and fuel efficiency through increased use of preferred flight profiles.
- Reduction in emissions through use of optimal routes.
- Although the main benefits are expected in the area of environment, the FRA implementation has an ambition to at least maintain the current level of safety.
- Increased capacity through better airspace utilisation and reduced controller workload.

## ATM systems

In the current ATM systems, the automation support for controllers is limited..

Some automation support is available to the controller for assessing the detailed intentions of a flight and for assessing the impact of an ATC instruction before issuing it to the pilot. These limitations of the ATM systems on automation support imply that significant human effort is still required to manage traffic. Additional automation is therefore considered as a key capacity enabler, because by reducing the controller's time spent in building up a mental picture of the flights intent, more time would be available to handle additional traffic within a sector.

The major ATM change on ATM systems focusses on ground-based safety nets as well as on the conflict detection, resolution support and conformance monitoring tools providing support to both the Planning and to the Executive Controllers. Ground-based safety nets are an integral part of the ATM system. Using primarily ATS surveillance data, they provide warning times to prevent imminent or actual hazardous situations from developing into major incidents or even accidents.




Note: objectives/outline descriptions in *italics* are supporting the implementation of the Airspace Architecture Study

Ground-based safety nets (Short Term Conflict Alert (STCA), Area Proximity Warning (APW) and Approach Path Monitoring (APM)) as well as Medium Term Conflict Detection (MTCD) tools have started being implemented widely during the **pre-SESAR phase**. Minimum Safe Altitude Warning (MSAW) is fully implemented all across ECAC since a few years.

Of these, APW and the conflict detection tools, resolution support functions and conformance monitoring are considered to facilitate the implementation of Free Route (see previous section) as required by the PCP.

For the supporting safety tools, **SESAR 1** has also addressed the optimisation of safety nets for specific TMA operations, as well as the performance of the short-term conflict alert (STCA) both in TMAs and En-Route, through the use enhanced algorithms and/or the use of Mode S EHS Downlinked Aircraft Parameters.

**Medium Term View**

Progressive increase of automation support as an enabler of trajectory-based operations (TBO) will reduce manual intervention, allowing controllers to handle more aircraft at any time. This will include providing support to the controllers to deal with sector specifics, enabling them to control traffic within a substantially increased number of sectors.

**Relation with the Airspace Architecture Study (AAS)**

This major ATM change supports Milestone 1 "ECAC-wide cross-border FRA, A/G and G/G connectivity" of the AAS, in particular element 1.15 on "Enhanced tactical conflict detection & resolution (CD&R) services and conformance monitoring tools for en-route" and element 5.1 on "Higher levels of automation in ATC to support full TBO".

**Roadmap**

The following table provides a consolidated view across the major ATM change of the implementation objectives within the change, in terms of scope, impacted stakeholders and expected implementation timeframes.

| MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ← | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| ATC02.8 | Ground based safety nets | Nil | Nil | | | | | | | | | | | | 54% | | | | | | | | | | | | |
| ATC02.9 | Enhanced STCA for TMAs | #60 | Nil | | | | | | | | | | | | 72% | | | | | | | | | | | | |
| ATC12.1 | MONA, TCT and MTCD | #27, #104 | AM-1.15<br>AM-5.1 | | | | | | | | | | | | 44% | | | | | | | | | | | | |
| ATC20 | Enhanced STCA with DAPs via Mode S EHS | #69 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |

Full roadmap and the legend explaining how to read roadmap table is available in Annex 5 of this document.

**Stakeholder Perspective**

Continuous increase of automation support to ATCOs to sustain capacity in particular in complex airspace will concern mainly the air navigation service providers and only very marginally the airspace users (see the carriage of Mode S EHS transporter, supporting the enhancement of STCA with Downlinked Aircraft Parameters).**Air Navigation Service Providers (ANSPs) -** Use of tools to increase controller productivity and safety including an improved human machine interface (HMI) and revolutionary use of tactical trajectory for conflict detection and resolution (CD&R) and conformance monitoring (MONA) will facilitate and support the evolution towards the implementation of Trajectory Based Operations (TBO). The general evolution of ATCO controller support tools will improve the information provision to the controller regarding the factors influencing a flight trajectory. This will be followed by the provision of support to decision making in nominal conditions helping the controller in finding conflict resolution solutions.

## Performance Benefits

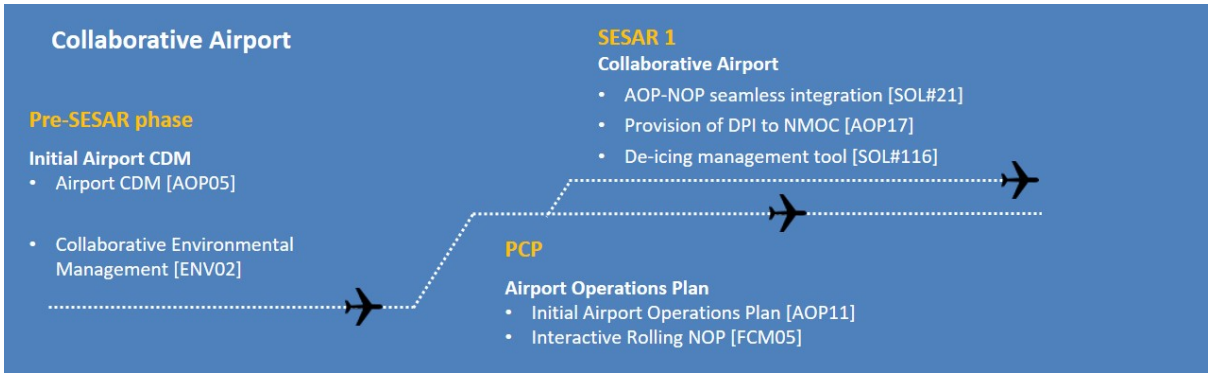
Early and systematic conflict detection and conformance monitoring enabled by ground based automated tools will reduce the need for tactical interventions, conformance monitoring reduces the risk of the impact of controllers and pilots errors. Possibility to maintain high level of safety with an increase in capacity due to a reduction of controller workload per aircraft.

Identification of unauthorised penetration into airspace volumes. Infringements of minimum safe altitude. Deviations from glide path. Identification of conflicts with improved warning times, decrease of nuisance alerts and increase of genuine alerts.

Reduction of tactical controller workload, and better sector team productivity, compared to the conventional systems without automated support will open potential for capacity up to 15% in comparison to a baseline case without a detection tool (MTCD and/or TCT).

## Collaborative Airport

Through this major ATM change, the airport will fully interface the landside with the ATM Network. Airport operations planning, monitoring, management and post-operations analysis tools and processes are built into the airport operations plan (AOP) and the airport collaborative decision making (A-CDM), for all operating conditions. Target times of arrival will be derived from the AOP, and used by NM to balance arrival demand and capacity, to facilitate arrival management processes from the en-route phase.




The **pre-SESAR** phase establishes the foundation for this major ATM change focusing on concepts like:

- Local collaboration: Making the airport an interactive environment at local level, where information is shared and decisions are taken in a collaborative manner in terms of operations (A-CDM) but also in terms of safety (Local runway safety teams) and environmental aspects (Collaborative environmental management).
- Initial link to the network: Connecting the airport to the Network through the exchange of information with the Network Manager, and collaboratively manage flight updates (A-CDM).

Current plans show that deployment of this phase will be achieved until the year 2020.

The **PCP** Regulation builds on these concepts by transforming the A-CDM into an integrated airport operations plan, which dynamically connects the airport operator, ANSP and airline operations centre and, further integrating the airport with the network by connecting the AOP with NOP. The AOP will provide the NOP with airport constraints, target times for arrival, airport configurations, etc. in order to facilitate collaborative ATFCM processes.

SESAR 1 integrates airports into the ATM Network planning function, taking into consideration the operations influencing the airside processes. The 'AOP-NOP Seamless Integration' consists in the implementation of a collaborative airport environment fully integrating those landside processes within the terminal infrastructure that have a performance impact on flight predictability and efficiency with the ATM Network.

Small/regional airports not implementing A-CDM or AOP are integrated in the ATM network by sharing of departure planning information with NM. The Network integration of departure estimates from medium and small sized airports via the exchange of Departure Planning Information (DPI), is needed to enhance the network benefit and improve the flow management process. It also supports further integration of airports into the Network by addressing the reception from the NM of estimated landing times and is in line with the concept of 'Advanced ATC Tower'.

**Roadmap**

The following table provides a consolidated view across the major ATM change of the implementation objectives within the change, in terms of scope, impacted stakeholders and expected implementation timeframes.

| MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ← | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| AOP05 | Airport CDM | #106 | Nil | | | | | | | | | | | | 55% | | | | | | | | | | | | |
| AOP11 | Initial Airport Operations Plan | #21 | Nil | | | | | | | | | | | | 11% | | | | | | | | | | | | |
| AOP17 | Provision/integration of DEP planning info to NMOC | #61 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |
| ENV02 | Airport Collaborative Env. Management | Nil | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |

Full roadmap and the legend explaining how to read roadmap table is available in Annex 5 of this document.

## Stakeholder Perspective

This major ATM change is based on information sharing and collaborative decision-making, where cooperation and synchronisation between all involved stakeholders is paramount.

**Airport Operators -** The airport operator will lead the implementation of this major ATM change by driving the local implementation of A-CDM, including connection to the network, by providing the NM with flight update messages (FUM) and departure planning information (DPI). In the second phase, they will set up and operate the AOP that lies at the core of the collaborative airport concept. It will also provide, e.g. airport configurations, operational capacity of airport resources, etc. And last but not least by accomplishing the full integration of the landside, including ground handling, with the ATM Network as part of a 'Total Airport' management approach.

**Air Navigation Service Providers (ANSPs) -** The ANSP is a key partner of the airport operator for the implementation of this major ATM change, through participation in the A-CDM processes, provision and maintenance of the elements of the AOP within its responsibility, for example available airspace capacity, constraint factors (e.g. adjacent airports, military training areas,), and the reception of FUM message from NM and distribution of DP message to NM.

**Airspace Users (AUs) -** Airspace users are another key partner in the A-CDM process and are one of its main beneficiaries. An important step forward will be the connection of airline operations centres' to the AOP, making airspace users both providers and users of its information.

**Network Manager -** NM will be responsible for achieving full integration of the NOP and the different European AOPs into a 'collaborative' NOP. It will enable the availability of shared operational planning and real-time data for all concerned stakeholders, making it the key enabler for CDM, both at network and airport level.

## Performance Benefits

Better predictability of airport operations and significant resilience benefits through better management of forecast or unexpected capacity shortfalls. More flexibility, enabling airlines to consider their business requirements for a better decision-making.

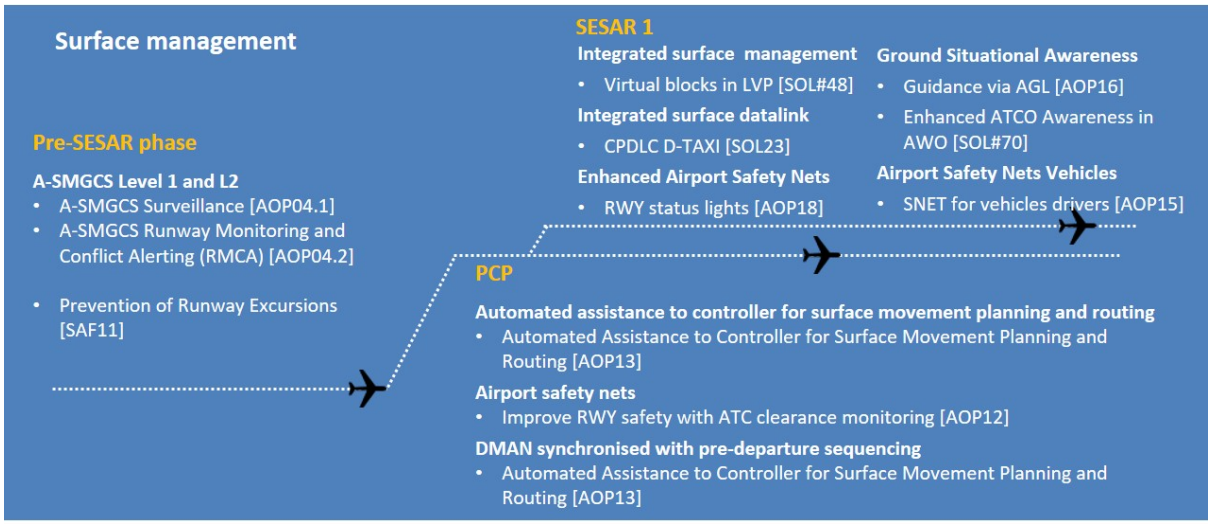
Improved through optimal use of facilities and services, better use of airport and ATFM slots. Reduction of structural delay - buffer time that the companies add to the planned flight time in order to statistically accommodate foreseeable delays.

Reduced noise and emissions thanks to better-timed operations enabling the reduction of engine ground running time.

Increased airport revenue through additional flights and passengers.

## Surface Management

At busy airports, the management of arrivals and departures coupled with efficient and safe movement on the airport surface is a crucial part of managing an "on-time" airport. Improving airport surface operations is one of the key SESAR initiatives. Surface management provides critical situational awareness, visibility, alerts, and decision support to the airport and its stakeholders.




The **pre-SESAR** phase has set-up the foundation for this major ATM change through the widespread implementation of advanced surface movement guidance and control systems (A-SMGCS), in particular the 'Surveillance' service (former Level 1) which is a pre-requisite for the 'Runway Monitoring and Conflict Alerting (RMCA)' service (former Level 2); the latter being the first element of the 'Airport Safety Support' service.

Additionally two ECAC-wide Action Plans, addressing runway incursions and excursions, are close to implementation.

The **PCP** Regulation mandates the implementation of automated assistance to controller for surface movement planning and routing, supplemented by departure management tools integrating surface management constraints and synchronised with pre-departure sequencing. To achieve this, the information on the use of taxi routes becomes crucial and it needs to be centralised, managed and distributed.

In terms of safety, the PCP Regulation mandates the full implementation of the Airport Safety Support service, including conflicting ATC clearances (CATC) and conformance monitoring alerts for controllers (CMAC).

The **SESAR 1** programme validated Solutions contributing to an integrated surface management, namely Runway status lights, Enhanced traffic situational awareness and airport safety nets for vehicle drivers, guidance assistance through airfield ground lighting, the use of airfield ground lighting for ATC purposes, the provision of enhanced displays, and virtual block control in low visibility conditions. All these elements are new additions into the Plan.

### Medium Term View

The next stage for this major ATM change, implied by the outcome of SESAR 1, is the use of datalink between tower and crews, the integration of safety nets on-board vehicles and aircraft and the potential use of datalink for delivery of airport clearances.

### Roadmap

The following table provides a consolidated view across the major ATM change of the implementation objectives within the change, in terms of scope, impacted stakeholders and expected implementation timeframes.

| MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ← | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| AOP04.1 | A-SMGCS Surveillance (former Level 1) | #70 | Nil | | | | | | | | | | | | 70% | | | | | | | | | | | | |
| AOP04.2 | A-SMGCS RMCA (former Level 2) | Nil | Nil | | | | | | | | | | | | 52% | | | | | | | | | | | | |
| AOP12 | Improve RWY safety with CATC detection and CMAC | #02 | Nil | | | | | | | | | | | | 16% | | | | | | | | | | | | |
| AOP13 | Auto. Assist. ATCO for Surface plan. and routing | #22 #53 | Nil | | | | | | | | | | | | 0% | | | | | | | | | | | | |
| AOP15 | Traffic sit. awareness and SNET for the vehicle drivers | #04 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |
| AOP16 | Guidance assistance through AGL | #47 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |
| AOP18 | Runway Status Lights (RWSL) | #01 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |
| SAF11 | Improve RWY safety by preventing RWY excursions | Nil | Nil | | | | | | | | | | | | 66% | | | | | | | | | | | | |

Full roadmap and the legend explaining how to read roadmap table is available in Annex 5 of this document.

## Stakeholder Perspective

Stakeholder contribution to this major ATM change will include:

**Air Navigation Service Providers (ANSPs) -** In partnership with the airport operator, the ANSP will mainly be responsible for the implementation of digital systems such as electronic flight strips (EFS), of A-SMGCS 'Surveillance' and 'Airport Safety Support', which includes: runway monitoring and conflict alerting (RMCA), conflicting ATC clearances (CATC) and conformance monitoring alerts for ATCO (CMAC) as well as of automated assistance to controller for surface movement planning and routing.

**Airport Operators -** The airport operator will be responsible for the integration of vehicles and drivers into the surface management system. All ground vehicles operating on the manoeuvring area need to be equipped to provide their position and identity to the surveillance system.

**Airspace Users (AUs) -** This major ATM change does not require additional equipment for airspace users, but AUs will need to update the operating procedures and the training manuals for pilots.

**Regulatory Authorities -** Regulatory authorities will ensure, through appropriate mandates, that aircraft and vehicles are suitably equipped to enable their location and identification on the airport surface, where required. Also, they will promulgate the rules for operations using AGL in taxi guidance and runway status lights.

## Performance Benefits

Improved situational awareness of all actors and support to controller in detecting potentially hazardous conflicts on or near the runway or infringement of the runway.

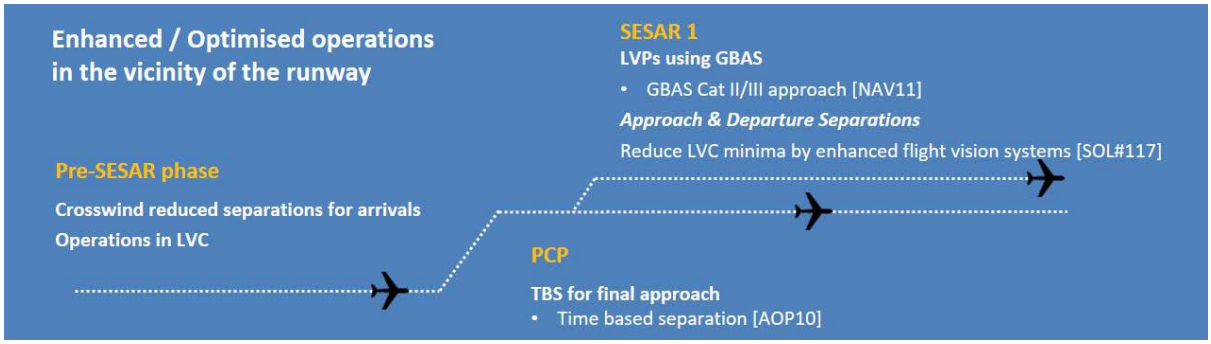
Increased availability of taxiway resources and reduced total taxi time by ground movements. Improved traffic flow on the manoeuvring area by providing more accurate taxi times to A-CDM platform for runway sequencing.

Reduced fuel consumption due to reduced taxi time.

Reduced noise and emissions thanks to better-timed operations enabling the reduction of engine ground running time.

## Enhanced Operations in the Vicinity of the Runway

Flight operations in the vicinity of the runway, namely those at the final approach phase, can be optimised by a series of improvements related to separation management. Whilst maintaining safety levels, these improvements offer capacity and flight efficiency benefits and contribute to reducing cost and environmental impact, thereby providing benefits to airlines, ANSPs and airports.




During the **pre-SESAR** phase initial steps were taken to progress this major ATM change with the local implementation of reduced separations between aircraft for arrivals , taking into consideration wake turbulence categories ('RECAT') or under specific wind conditions , and operations in low visibility conditions (LVC) that make use of enhanced ATC procedures and/or navigation systems.

The RECAT-EU introducing 6 wake turbulence categories and separation standards on approach and departure has been implemented at Paris CDG, Le Bourget, Heathrow, and Leipzig Halle airport. It is available for implementation based on local requirements where there is a positive benefits case. The operational use of the RECAT-EU scheme requires limited changes to the ATM system and no need for new technologies.

The **PCP** phase focuses on time-based Separation (TBS) at final approach. For TBS, separation between two successive aircraft in an arrival sequence is based on a time interval instead of distance. The equivalent distance information is calculated by the TBS support tool (taking account of prevailing wind and integration of relevant separation constraints and parameters), and displayed to the controller along with the time interval separations.

The PCP Regulation mandates the implementation of TBS in 16 major European airports. However currently, there are ongoing feasibility studies and local CBAs evaluations to determine the suitability of this functionality for their specific local environments.

The **SESAR 1** programme has validated a Solution for precision approaches (PA), using ground-based augmentation of satellite navigation systems (GBAS) for CAT II/III operations. Since use of GBAS Cat II/III eliminates ILS critical zones, offers PA where ILS cannot due to geography, has signal stability unlike ILS, it has the potential to unlock capacity benefits, as well as enable a future rationalisation of airport infrastructure/s.

**Medium Term View**

The runway throughput enhancements will be extended with the TBS tool, encompassing: weather-dependent separation (WDS), RECAT pairwise separation (PWS) – also for departures, reduced minimum surveillance separation (MSS), and enhanced arrival procedures. Flight crews will reduce LVC landing minima using enhanced Flight vision systems (EFVS) to gain operational credit as permitted per EASA EU Regulation 965/2012, allowing LVC operations below CAT I minima at runways without ILS CAT II/III.

**Roadmap**

The following table provides a consolidated view across the major ATM change of the implementation objectives within the change, in terms of scope, impacted stakeholders and expected implementation timeframes.

| MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ← | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| AOP10 | Time Based Separation | #64 | Nil | | | | | | | | | | | | 6% | | | | | | | | | | | | |
| NAV11 | PA using GBAS CAT II/III based on GPS L1 | #55 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |

Full roadmap and the legend explaining how to read roadmap table is available in Annex 5 of this document.

## Stakeholder Perspective

Stakeholders will contribute to this major ATM change as follows:

**Air Navigation Service Providers (ANSPs)**

ANSPs will be at the core of this major ATM change for the pre-SESAR and PCP phases since the majority of the elements related to operational changes fall under their responsibility. In particular, for the implementation of TBS, the ANSPs will have to ensure the integration of several elements:

- compatibility between AMAN and TBS systems;
- integration of the TBS tool, with safety nets, into the controller working position;
- integration of local MET info with actual glide-slope wind conditions into the TBS tool.

The TBS tool will also provide automatic monitoring and alerting of non-conformant behaviours, separation infringement and incorrect aircraft being turned on to a separation indicator. Controllers will therefore need adequate training for TBS procedures to ensure its safe introduction.

If a decision is made to implement GBAS CAT II/III procedures, whether locally or from a European perspective, the ANSPs will collaborate with the airport operators for the installation of the necessary ground equipment and development of procedures.

**Airport Operators**

Airport operators maintain a key role in this major ATM change for supporting and liaising with the ANSP in the local implementation of TBS. They will be the main stakeholder for the decision to implement GBAS CAT II/III operations, or for potential rationalisation of airport infrastructure.

**Airspace Users (AUs)**

Airspace users will need to update their procedures and training on new separation modes (TBS / RECAT). For GBAS CAT II/III, it will be necessary to ensure aircraft are suitably equipped and airworthiness certification and operational approval has been secured.

**Regulatory Authorities**

Regulatory authorities will ensure the safe introduction of local TBS procedures and systems but will also have an important role to play in the decision-making process for a potential widespread implementation of GBAS CAT II/III operations.

## Performance Benefits

More consistent separation delivery on final approach.

Improved aircraft landing rates leading to increased airport throughput and resilience across wind conditions. Reduction in holding times and entries to touchdown times leading to reduced delays.

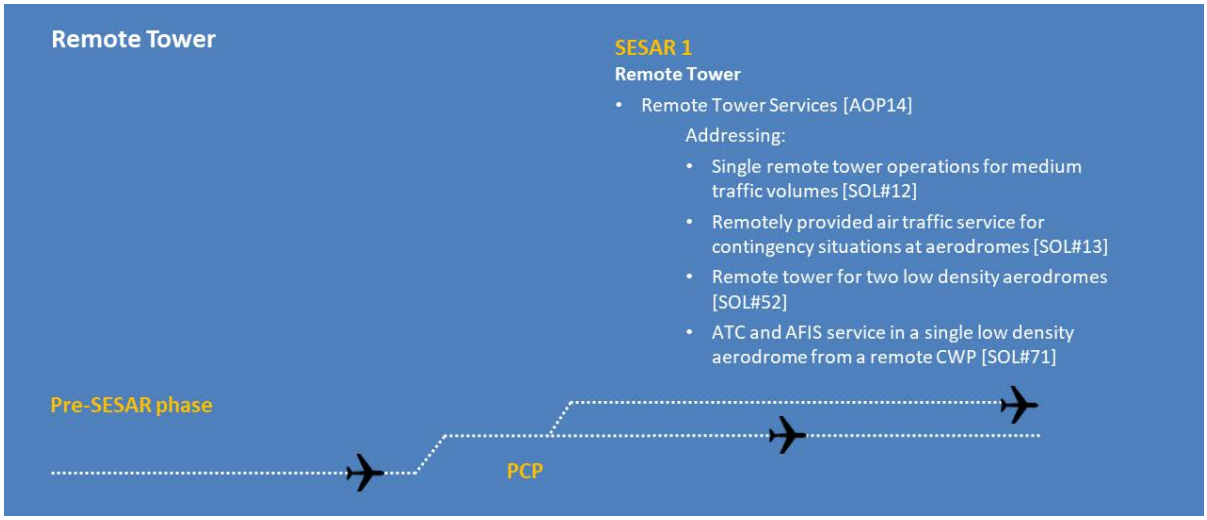
With the introduction of operations using GBAS CatII/III, cost efficiency is expected to improve.

Reduced fuel consumption due to reduced holding times.

Reduced emissions due to reduced holding times and stack entry to touchdown times.

## Remote Tower

The typical operating environments for remote tower services are airports below third level node, with a single runway, non-complex runway layout and low capacity utilisation. But remote tower services are not limited to those environments. The concept can also be feasible to apply to medium density aerodromes where simultaneous movements at all aerodromes can be expected, as well as at larger aerodromes with multiple simultaneous movements or at any aerodrome, to cater for emergency situations.




Remote tower technology draws on a range of advanced technologies, including high-definition, infrared and pan-tilt-zoom cameras to provide visual surveillance augmented by available radar and flight data to deliver additional information in real time. With this sophisticated technology, an out-of-the-window view from the tower is captured and reproduced at a remote facility with the level of detail and accuracy required for controllers to provide safe and expeditious air traffic control services to visual flight rules (VFR) and instrument flight rules (IFR) traffic. The visual image reproduction is overlaid with information from additional sources, such as secondary radar and automatic dependent surveillance-broadcast (ADS-B), which not only enhances the visual image for use in normal conditions, but provides an enhanced capability for low-visibility conditions. Services are further enhanced through the integrated use of advanced features such as object tracking, motion-based alerting, infrared vision, digital image magnification and hotspot monitoring. In addition, the controllers have remote access to all the necessary controls, including communications, lighting, airport and flight data, as well as meteorological information.

This major ATM change is fully based on the **SESAR 1** results and is built around an implementation objective AOP14 linked with 4 validated SESAR 1 Solutions. These solutions follow an incremental path with regard the complexity of the aerodromes where the Remote Tower could be deployed.

The first among them is the provision of remote tower air traffic services to a single airport with as few as five flights arriving and departing daily (SOL#71). The next logical step is to use the single remote tower set-up for regional airports with medium-sized traffic volumes (SOL#12). Having proved that controllers can safely provide air traffic services to an airport remotely, a third SESAR Solution provides simultaneous remote tower air traffic services to two low traffic density airports from a single location (SOL#52). However, there is no doubt that the technology has potential for use at busier airports, in particular as a contingency solution for any outages of the services provided for at the tower (SOL#13), providing operational resilience and safety assurance, should the primary tower be compromised.

Compared with the out-of-the-window view, the major ATM change provides the opportunity to increase controllers' situational awareness and provide for additional alerts for collision avoidance through the integration of information from additional sources.

**Medium Term View**

The next step would be the provision of remote aerodrome air traffic service by a "multiple" and/or "centre" setting, combining air traffic services from various aerodromes in a centralized control room independent on airport location in order to make use of the valuable resource ATS provider more efficiently. More cost-effective aerodrome ATS would allow rural, less frequented airports to work cost-effective and to keep them in operations or even to increase the service levels for more day hours operations or even to upgrade non-controlled to controlled airports. All this would contribute to a better passenger comfort in terms of shorter travel times and better point to point connections.

**Roadmap**

The following table provides a consolidated view across the major ATM change of the implementation objectives within the change, in terms of scope, impacted stakeholders and expected implementation timeframes.

| MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
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| | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ← | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| AOP14 | Remote Tower Services | #12 #71 #52 #13 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |

Full roadmap and the legend explaining how to read roadmap table is available in Annex 5 of this document.

## Stakeholder Perspective

Stakeholders will contribute to this major ATM change as follows:

**Air Navigation Service Providers (ANSPs)**

ANSPs will be at the front-end of this major ATM change representing a paradigm shift in the way ATC have been delivered at airports over the last century. As such, safety concerns will have to be clearly and unambiguously addressed in relation to a broad range of ATS and CNS systems and their quality of service. Based on local requirements and complexity, many additional features could be added, supplementing the “simple” reproduction at a remote facility of an out-of-the-window view from the tower, implying appropriate additional controller training.

**Airport Operators**

Airport operators will play a key role in the deployment and maintenance of appropriate technical infrastructure used for the provision of remote tower services. They will also be the main beneficiaries as the deployment of remote tower services will allow the provision of better and more flexible services.

**Regulatory Authorities**

Regulatory authorities will have a critical role to play through the provision of appropriate implementation guidance as well as the supervision of safe introduction or remote tower services.

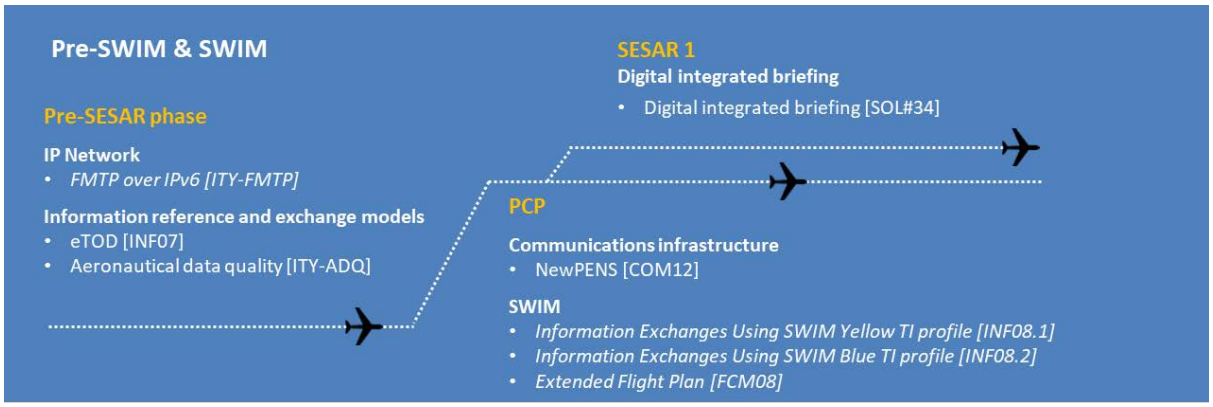
## Performance Benefits

Cost reduction for ATS by optimisation of ATCOs. Remote ATS facilities will be cheaper to maintain, able to operate for longer periods and enable lower staffing costs. It will also significantly reduce the requirement to maintain tower buildings and infrastructure..

Improve the uniformity of service provision at low to medium density and remote aerodromes and increase the availability of the service (for example allowing ATS to be provided at an aerodrome which previously was unable to financially support a service). Cost benefits of RCT due to customer retention and reduced economic loss during contingency events.

## Pre-SWIM and SWIM

System wide information management (SWIM) represents a paradigm shift in information management throughout its entire lifecycle. The aim of SWIM is to provide users with relevant and commonly comprehensible information. This means making the right ATM information available at the right time to the right user. SWIM brings the industry-based information technology approach of service-orientated architecture (SOA), to the European ATM system where all stakeholders are able to access, share and process ATM information through SWIM-enabled applications and services, fully aligned with the ICAO Manual on SWIM Concept. Through this major ATM change, information exchange will move from a peer-to-peer (legacy) infrastructure to an agile, high quality, scalable, resilient and secure information sharing environment, flight object related, enabling seamless operations and paving the way to full digitalisation.




Note: objectives/outline descriptions in *italics* are supporting the implementation of the Airspace Architecture Study

The **pre-SESAR** phase is expected to set up a firm foundation for SWIM implementation. This includes migration to an internet protocol-based network (IPv6) for the peer-to-peer communications of flight information and the deployment of a rigorous baseline of aeronautical data with appropriate level of quality, integrity and format. Whilst noting the delay associated with the implementation of aeronautical data quality as well as with the implementation of electronic terrain and obstacle data, it is anticipated that the baseline will be in place by 2020.

The pre-SESAR baseline will be used for the extensive implementation of initial SWIM (Yellow profile used for exchange of ATM data (e.g. aeronautical, meteorological (MET), airport, etc.), and, later on, of the Blue profile used for exchange of flight information in relation to the flight object), required by the **PCP** Regulation and supported by the Pan-European Network Service (PENS and its successor NewPENS) to provide a common IP-based network service across the entire European region. Furthermore, the **SESAR 1** programme has validated one additional solution addressing a Digital Integrated Briefing.

**Medium Term View**

The next step will be to build on the SWIM infrastructure and continue the ATM digitalisation process with the overall aim to deploy a state of the art information-sharing infrastructure, integrating aircraft and ground systems in a globally interoperable and harmonised manner, enabling the sharing of the same AIS, weather and 4-D flight information.

**Relation with the Airspace Architecture Study (AAS)**

This major ATM change supports Milestone 1 “ECAC-wide cross-border FRA, A/G and G/G connectivity” of the AAS, in particular element 1.3 on “G/G connectivity”, 1.4 on “ICAO Extended Flight Plan (eFPL) supporting SBT transition to RBT” and 1.5 on “G/G Connectivity-SWIM Yellow” as well aselement 9.1 on “Flight object interoperability and SWIM Blue profile”.

**Roadmap**

The following table provides a consolidated view across the major ATM change of the implementation objectives within the change, in terms of scope, impacted stakeholders and expected implementation timeframes.

| MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ↑ | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| COM12 | NewPENS | Nil | Nil | | | | | | | | | | | | 0% | | | | | | | | | | | | |
| FCM08 | Extended Flight Plan | #37 PJ18-02c | AM-1.4 | | | | | | | | | | | | 0% | | | | | | | | | | | | |
| INF07 | Electronic Terrain and Obstacle Data (e-TOD) | Nil | Nil | | | | | | | | | | | | 10% | | | | | | | | | | | | |
| INF08.1 | Information Exchanges using the SWIM Yellow TI Profile | #35, #46 | AM-1.5 | | | | | | | | | | | | 0% | | | | | | | | | | | | |
| INF08.2 | Info. Exchanges using the SWIM Blue TI Profile | #28, #46 PJ.18-02b | AM-9.1 | | | | | | | | | | | | | | | | | | | | | | | | |
| INF09 | Digital Integrated Briefing | #34 | Nil | | | | | | | | | | | | | Based on local decision | | | | | | | | | | | |
| ITY-ADQ | Ensure quality of AIM data and inormation | Nil | Nil | | | | | | | | | | | | 6% | | | | | | | | | | | | |
| ITY-FMTP | Common flight message transfer protocol (FMTP) | Nil | AM-1.3 | | | | | | | | | | | | 76% | | | | | | | | | | | | |

Full roadmap and the legend explaining how to read roadmap table is available in Annex 5 of this document.

## Stakeholder Perspective

The implementation of the major ATM change will require the contribution of all stakeholders as follows:

**Air Navigation Service Providers (ANSPs)**

Adaptation of the data communication infrastructure to IPv6 has begun and it will continue with the implementation of appropriate infrastructure components and data exchanges.

**Network Manager (NM)**

NM will support the deployment of NewPENS through the migration of the own systems, supplemented with the implementation of the appropriate infrastructure components and data exchanges. NM B2B improvements, compatible with SWIM Yellow Profile, will make the 'Publish/Subscribe Flight Data' message a complete alternative to ETFMS flight Data, enhancing the collaborative decision-making at a network level.

**Airport Operators**

Airport operators will facilitate a data originator role, with responsibility for the collection, management and provision of (electronic) terrain and obstacle data (eTOD) and assurance of the quality of aeronautical data and information under their responsibility.

**Airspace Users (AUs)**

The AUs will provide the Network with the appropriate information and also receive the information from NM.

**Regulatory Authorities**

While not directly involved in the technical implementation, the regulatory authorities will play a crucial role in deployment by setting up and overseeing the appropriate policies and regulatory and governance frameworks.

**Military Authorities**

Depending on their tasks, military authorities will participate in specific roles: regulatory authorities, data originators, airport operators, air navigation providers and airspace users. These roles, taking into account the specifics of the military and their primary role will be similar to the role of all the stakeholders identified above.

**Industry**

The implementation of the major ATM change will need suitable systems and constituents that will be developed and made available by the ATM manufacturing industry.

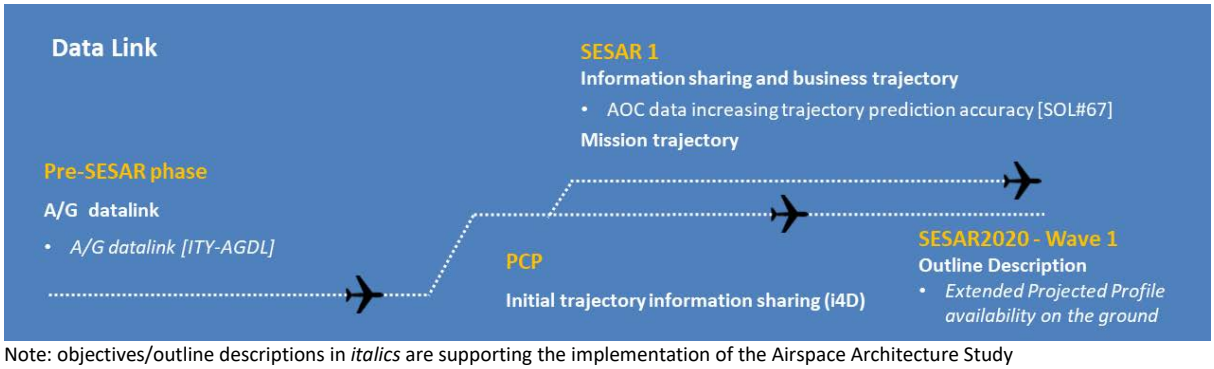
## Performance Benefits

The implementation of SWIM is an enabler for unlocking multiple potential applications. Therefore, benefits will be dependent upon applications that will operate over the SWIM infrastructure and cannot be generically quantified or qualified. However, some benefits triggered by the improvement of quality of aeronautical data and of aeronautical information, in terms of safety and security can already be highlighted.

| | |
|---|---|
| | Improved consistency, reliability and integrity of aeronautical data and information as well as the availability of quality-assured electronic terrain and obstacle data from authoritative sources. |
| | Enhanced security due to the implementation of security requirements as required by the ADQ Regulation. |

## Data Link

Data link (DL) is an essential enabler for the implementation of trajectory-based operations (TBO) which will see the sharing of the same information between airborne and ground systems through the business/mission trajectory lifecycle. Owing to data link-based TBO, flight and flow centric operations will be possible in a network context enabling the implementation of new concepts of operation.




Note: objectives/outline descriptions in *italics* are supporting the implementation of the Airspace Architecture Study

In the **pre-SESAR phase**, the first step in DL was to connect pilots and controllers (controller–pilot datalink communications - CPDLC) to support routine non-time critical communications; to increase safety and efficiency in the short term and to lead to new ways of working in the future, paving the way for more advanced DL applications. CPDLC is a method by which air traffic controllers can communicate with pilots over a DL system, replacing routine voice communication with data messages. Unfortunately, unexpected technical issues during implementation have led to delays in the deployment of DL. This has triggered an action by the European Commission in mandating the SESAR Deployment Manager to act as Data Link Services (DLS) Implementation Project Manager and to set up a DLS Recovery Plan, building on SDM technical expertise and its unique position as coordinator of the SESAR Deployment Framework Partnership. SDM and all partners succeeded in achieving substantial progress in the deployment of the DLS witnessed by a substantial increase in the DLS performance.

This activity will continue through the initial **PCP** timeframe, supplemented in due course with other initiatives, leading to initial trajectory information sharing to be succeeded by full information sharing in support of the performance of business/mission trajectory.

Additionally, the **SESAR 1** programme has validated an additional technological solution supporting the major ATM change:

- AOC data increasing trajectory prediction accuracy.

**Medium Term View**

Following on from the implementation of the DL first steps leading to CPDLC being the main means for air-ground communications, the focus will move toward further integration between airborne and ground systems with a view to accomplish full 4D information sharing. This will allow the airborne systems to exchange trajectory information via air-ground datalink to support a fully updated trajectory, as agreed with all actors. The airborne systems will also enhance the trajectory information maintained in flight data processing systems with aircraft or environmental-specific content downlinked from the aircraft. Implementation will have to be done with full coordination with ATM modernisation programs outside Europe and in particular, with NextGen in order to achieve a degree of harmonisation necessary to ensure that aircraft can operate in all regions without requiring additional equipment.

**Relation with the Airspace Architecture Study (AAS)**

This major ATM change supports Milestone 1 “ECAC-wide cross-border FRA, A/G and G/G connectivity” of the AAS, in particular element 1.1 on “Air-ground data exchange - CPDLC” and 1.2 on “Air-ground data exchange – EPP/ADS-C”.

**Roadmap**

The following table provides a consolidated view across the major ATM change of the implementation objectives within the change, in terms of scope, impacted stakeholders and expected implementation timeframes.

| MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ← | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| ITY-AGDL | Initial ATC air-ground data link services | Nil | AM-1.1 | | | | | | | | | | | | 37% | | | | | | | | | | | | |
| OD-1 | EPP/ADS C | #115 | AM-1.2 | | | | | | | | | | | | | | | | | | | | | | | | |

Full roadmap and the legend explaining how to read roadmap table is available in Annex 5 of this document.

## Stakeholder Perspective

The full implementation of the major ATM change will enable a paradigm change in the provision of air navigation services, requiring contribution, dedication and synchronisation of all stakeholders in Europe and beyond. Its deployment will allow the synchronisation of the airborne-based and ground-based predictions of the aircraft trajectory, leading to the establishment of the Reference Business / Mission Trajectory.

### Air Navigation Service Providers (ANSPs)

The ANSPs (this may include communication service providers, not providing other types of air navigation services) together with the airspace users, will play the main role in the implementation of DL. The implementation of CPDLC will continue with further integration of the ground systems with the airborne systems, and the deployment of automatic dependent surveillance-Contract (ADS-C) allowing more flight centric operations and new methods of service provision.

### Airspace Users (AUs)

The Airspace Users will play a critical role by collaborating with ANSPs in the transition to DL. AUs will be required to deploy airborne components and associated procedures supporting DL throughout its evolution, from CPDLC to 4D trajectory sharing via ADS-C for flight management system (FMS) trajectory prediction downlink.

### Network Manager (NM)

NM will support implementation through multiple initiatives, from flight plan filtering to the migration of systems and procedures, in support of operations based on full sharing of trajectory between all relevant stakeholders.

### Military Authorities

The main role of the military authorities will be as airspace users. They will benefit from the move to Mission Trajectory based operations, but in order to do so, they will be required to participate in trajectory information sharing and update their systems accordingly. However, it is acknowledged that the specific situation of military fleets and the nature of their operations (even when flying IFR/GAT) may raise specific issues in particular related to the equipage of large fleets, long procurement cycles, certification mismatch, and last but not least, cybersecurity.

### Regulatory Authorities

Ultimately, the implementation of the major ATM change may lead to a paradigm shift in the provision of services. The change process will be governed by the regulatory authorities, who will create an appropriate framework and oversee the new operating environment.

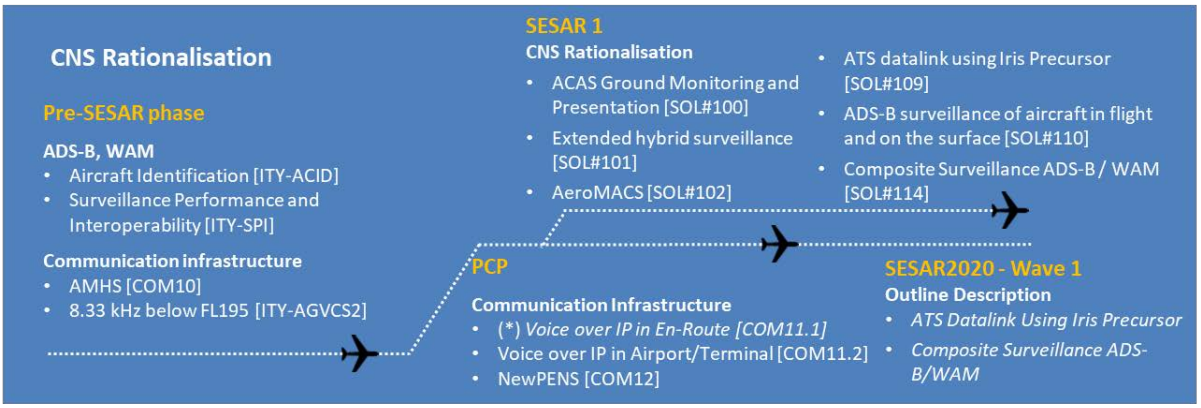
## Performance Benefits

The performance benefits will be evident with the introduction of CPDLC but will increase substantially with the progress towards trajectory-based operations. The following enumeration is limited to the benefits realised by CPDLC.

- Enhanced through the delivery of standard and unambiguous message and reduction of miscommunications.
- Additional capacity obtained through increased controller productivity, because of a reduction in voice communications.

## CNS Rationalisation

Development of the CNS rationalisation, an aspect of the infrastructure key feature, is one of the main priorities for the current ATM Master Plan update. It is anticipated that the current independent activities supporting CNS rationalisation will be consolidated in an overarching strategic approach. Pending the availability of the above-mentioned strategy, the current strategic view is focused on developments already performed in the pre-SESAR phase, and consolidated by the PCP regulation.




(*) Not mandated by the PCP Regulation but enabling some related operational changes.

Note: objectives/outline descriptions in *italics* are supporting the implementation of the Airspace Architecture Study

In the **pre-SESAR** phase, the main driver for change was the SES interoperability Regulation and its implementing rules. In this phase, the implementation initiatives addressed specific shortcomings faced by the European Air Traffic Management Network (e.g. shortage of VHF frequency assignments, shortage of SSR transponder codes, surveillance spectrum protection, etc.) and support for the deployment of new technologies (e.g. ADS-B, AMHS, etc.). These initiatives, implemented mostly in the timeframe 2018-2020 will set a firm foundation for new concepts of operations in the field of communication and surveillance, unlocking the full potential for CNS rationalisation.

In the **PCP** timeframe, the baseline include new features, particularly in the field of communication infrastructure (e.g. widespread deployment of Voice over IP and New PENS).

The **SESAR 1** programme has validated additional technological solutions supporting the major ATM change, that for the time being are not supported by commonly agreed implementation activities:

- ACAS Ground Monitoring and Presentation
- Extended hybrid surveillance
- AeroMACS
- ATS datalink using Iris Precursor
- ADS-B surveillance of aircraft in flight and on the surface
- Composite Surveillance ADS-B / WAM

**Medium Term View**

The next step for this major ATM change will be to consolidate the current and proposed evolutions into a robust Strategy, viewing C, N and S from a holistic perspective and in line with the vision for future ATM systems, enabling a lean and efficient use of the CNS infrastructure.

**Relation with the Airspace Architecture Study (AAS)**

This major ATM change supports Milestone 1 “ECAC-wide cross-border FRA, A/G and G/G connectivity” of the AAS, in particular element 1.3 on “G/G connectivity”, 1.16 on “Air traffic services (ATS) datalink using iris precursor” and 1.17 on “Cooperative surveillance ADS-B / WAM”.

**Roadmap**

The following table provides a consolidated view across the major ATM change of the implementation objectives within the change, in terms of scope, impacted stakeholders and expected implementation timeframes.

| MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ↑ | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| COM10 | Migration from AFTN to AMHS | Nil | Nil | | | | | | | | | | | | 55% | | | | | | | | | | | | |
| COM11.1 | VoIP in En-Route | Nil | AM-1.3 | | | | | | | | | | | | | | | | | | | | | | | | |
| COM11.2 | VoIP in Airport/Terminal | Nil | Nil | | | | | | | | | | | | | | | | | | | | | | | | |
| ITY-ACID | Aircraft identification | Nil | Nil | | | | | | | | | | | | 20% | | | | | | | | | | | | |
| ITY-AGVCS2 | 8.33 kHz A/G Voice Channel Spacing below FL195 | Nil | Nil | | | | | | | | | | | | 20% | | | | | | | | | | | | |
| ITY-SPI | Surveillance performance and interoperability | Nil | Nil | | | | | | | | | | | | 39% | | | | | | | | | | | | |
| OD-3 | Iris precursor | #109 | AM-1.16 | | | | | | | | | | | | | | | | | | | | | | | | |
| OD-4 | ADS-B/WAM | #114 | AM-1.17 | | | | | | | | | | | | | | | | | | | | | | | | |

Full roadmap and the legend explaining how to read roadmap table is available in Annex 5 of this document.

## Stakeholder Perspective

The implementation of this major ATM change will require contributions from all operational stakeholders, with a particular emphasis on the synchronisation between airborne and ground deployment.

**Air Navigation Service Providers (ANSPs)**

The ANSPs will need to deploy the new CNS ground infrastructure, which may impose changes to their ATM systems/procedures extending beyond the CNS systems alone.

**Network Manager (NM)**

The NM will facilitate the changes by adapting its systems (e.g. G/G communications with its stakeholders) as well as its services and applications to take into account and to support the deployment of the new infrastructure (e.g. flight plan flagging/filtering).

**Airspace Users (AUs)**

The Airspace Users will play a critical role in the implementation for CNS infrastructure rationalisation, which will be dependent on the new CNS capabilities of aircraft.

**Airport Operators**

Airport operators will contribute to the implementation of the major ATM change through rationalisation of their CNS infrastructure. This refers only to the communication infrastructure used in relation to their stakeholders, but depending on the local conditions and organisations, it may also address the surveillance and the navigation infrastructure as well.

**Military Authorities**

The military authorities will have specific roles to play, depending on their tasks: regulatory authorities, airport operators, air navigation providers and airspace users.

**Regulatory Authorities**

While not directly involved in the technical implementation, the regulatory authorities will play a crucial role in setting up and overseeing appropriate policies and regulatory frameworks.

**Industry**

The implementation of the major ATM change will require suitable systems and constituents which will be made available by the ATM manufacturing industry.

## Performance Benefits

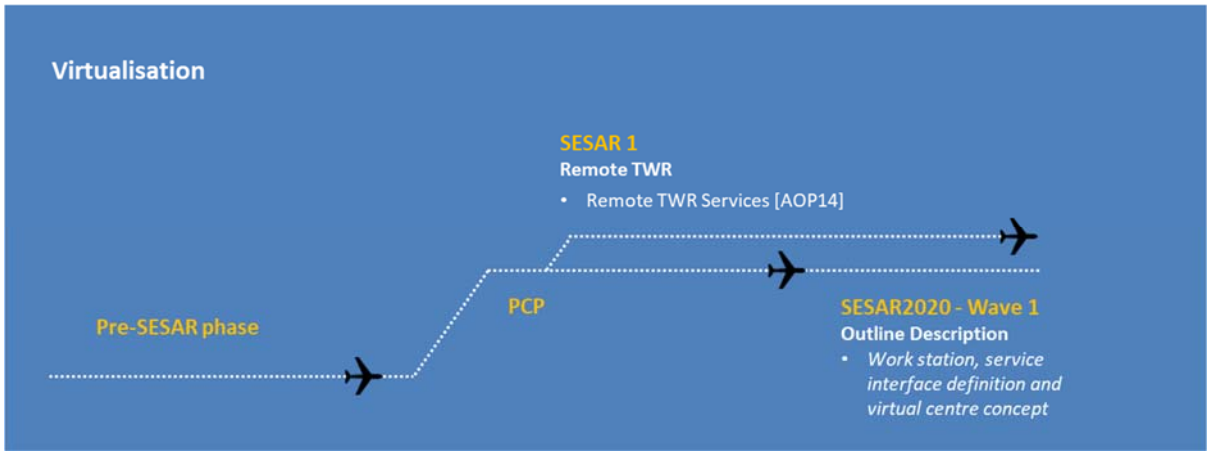
- Enhanced safety through reduction of harmful interference currently caused by the use of systems in a less rationalised way.
- More cost efficient systems replacing legacy systems based on outdated technologies or allowing the decommissioning of legacy systems/constituents.
- Additional capacity through the deployment of new cost-efficient CNS solutions in areas where they are not currently deployed (e.g. ADS-B in non-radar areas).

## Virtualisation

With the support of virtual centre technologies, it will be possible to reorganise physical assets that will lead to facilitated data-sharing, new synergies and more efficient management of the ATM resources network. It will also facilitate effective interoperability between functional systems.

They are expected to deliver the flexibility necessary to improve the performance of the system as a whole, like the virtual centre, a single Air Traffic Service Unit (ATSU) or a grouping of collaborative ATSUs using data services provided by ATM Data Service Provider (ADSP).

To note that, while part of the virtualisation of service provision, the Remote Tower services are already covered in detail through a dedicated major ATM change associated to the "High Performing Airport Operations" Key Feature.




Note 1: the detailed content of Remote TWR (AOP14) is described in the dedicated major ATM change description.
Note 2: objectives/outline descriptions in *italics* are supporting the implementation of the Airspace Architecture Study

**Medium Term View - Relation with the Airspace Architecture Study (AAS)**

Out of the R&D work of **SESAR 2020 W1**, the Outline Description OD5 on the deployment of work stations allowing the concept of virtual centre will support the AAS milestone AM-4.5 "Work station, service interface definition & virtual centre concept".

**Roadmap**

For the time being the AAS element does not have an associated implementation objective. The roadmap related to Remote Tower Services is available in the corresponding description of the major ATM change.

**Stakeholder Perspective**

The quest for virtualisation will certainly impact all ATM stakeholders. In particular the Air Navigation Service Providers but also the Network Manager, the Airport Operators and the Regulators. However as no implementation objective has been developed yet, it is premature to provide details on the perspective of each stakeholder type.

## Performance Benefits

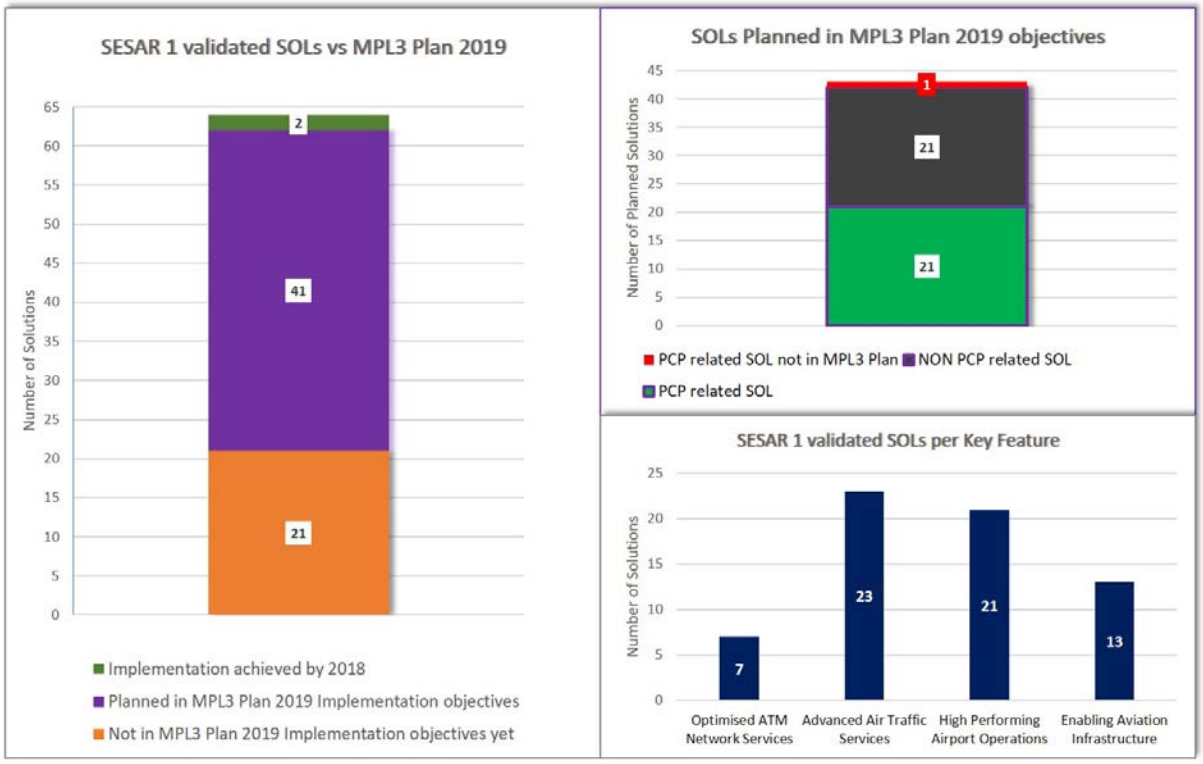
| | |
|---|---|
| | More cost efficient systems replacing legacy systems based on outdated technologies or allowing the decommissioning of legacy systems/constituents. New synergies and more efficient management of the ATM resources network |
| | Increased capacity through better airspace utilisation and reduced controller workload. |

# 3. SESAR 1 SOLUTIONS IN THE IMPLEMENTATION PLAN

The Level 3 Implementation Plan aims to gradually incorporate the results of the SESAR Programme, in particular, the validated and performing SESAR Solutions stemming out of SESAR 1.

The Implementation Plan naturally incorporates those SESAR Solutions that are subject to regulated implementation through the EU legal framework. Other Solutions should find their way into the Level 3 Plan through the development of deployment scenarios that, in turn, need to fulfil a number of conditions so the Solution is subject to a coordinated / harmonised deployment. The need for an agreed process and set of criteria to define which Solutions are incorporated in the Implementation Plan is identified in the Risk Management chapter and should be addressed.

Here is the overview of SESAR 1 Solutions status in the context of Level 3 Implementation Plan 2019.

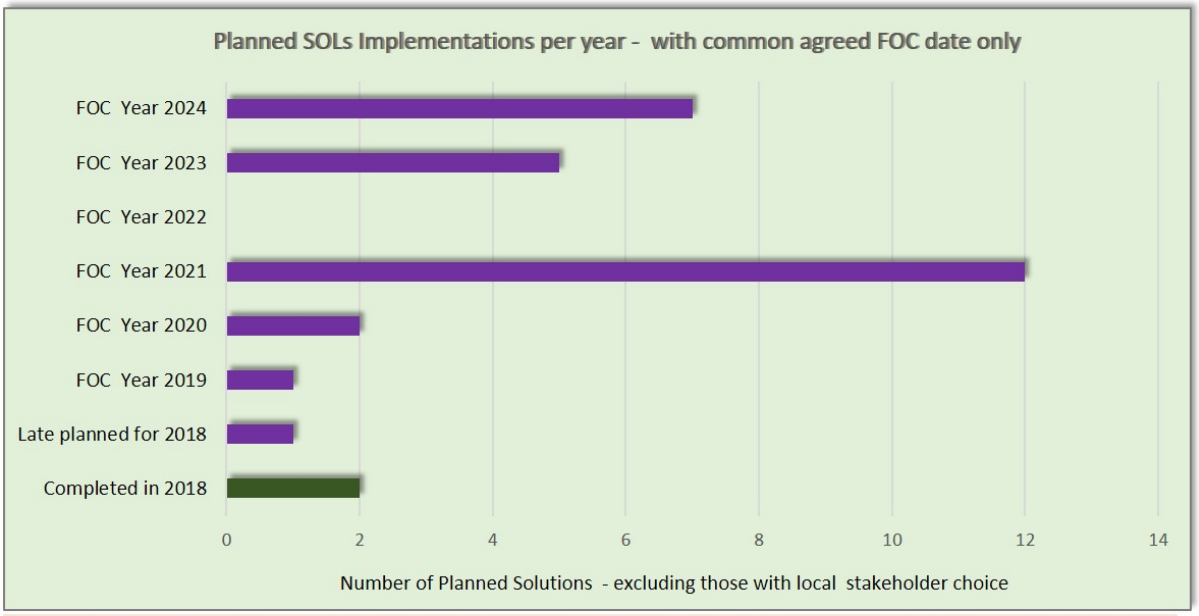



At this moment, a different Implementation Objectives in the Implementation Plan 2019 address 2/3 of validated SESAR 1 Solutions.

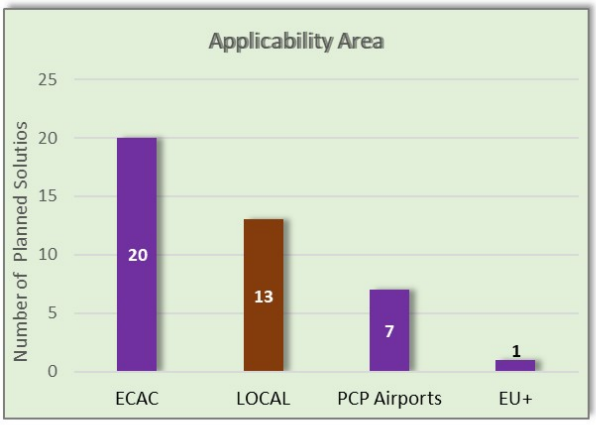
The most of validated SESAR 1 Solutions are within SESAR Key Features of Advanced ATS and High Performing Airport Operations. Less than 1/3 of these Solutions are subject to regulated implementation by PCP Regulation.

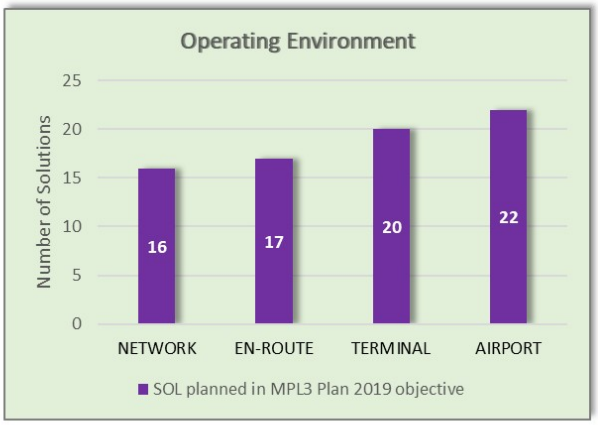
## Focus on the Solutions Planned in MPL3 Plan 2019

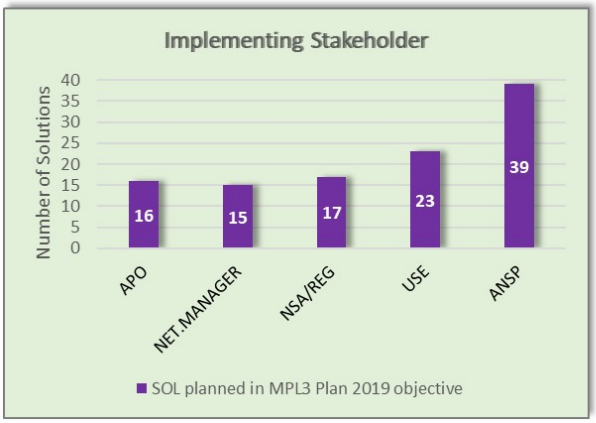
The following graphs show only the SESAR 1 Solutions addressed by the Implementation Objectives of MPL3 Plan 2019. The graphs highlight a several major implementation characteristics of the Solutions found in the Plan 2019.

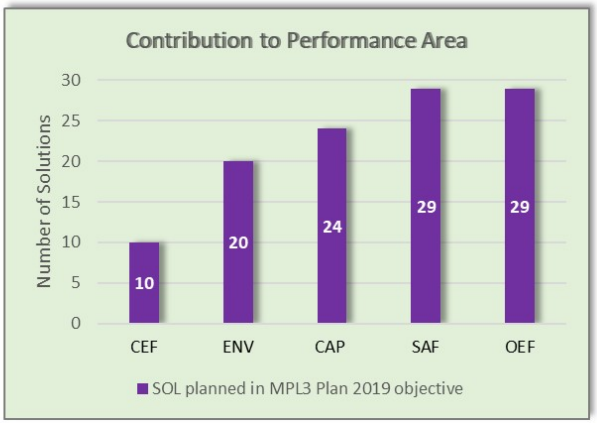



*Additional 13 SESAR1 planned Solutions have "Local "scope, i.e. FOC date and applicability area are subject to a stakeholder decision*




The Implementation Objectives plan implementation of the functionality recognised in the Solution.

More details for each SESAR 1 Solution are found in the Annex 4 of this document.

## Optimised ATM Network Services

### PCP Related Solutions

| | SESAR Solution | MP Level 3 Implementation Objective |
|---|---|---|
| Sol #17 | Advanced short-term ATFCM measures (STAMs) | FCM04.2 |
| Sol #18 | Calculated take-off time (CTOT) and target time of arrival (TTA) | FCM07 |
| Sol #19 | Automated support for traffic complexity detection and resolution | FCM06 |
| Sol #20 | Initial collaborative network operations plan (NOP) | FCM05 |
| Sol #31 | Variable profile military reserved areas and enhanced civil-military collaboration | AOM19.1, AOM19.2, AOM19.3, AOM19.4 |

### Non-PCP Related Solutions

| | SESAR Solution | MP Level 3 Implementation Objective |
|---|---|---|
| Sol #56 | Enhanced air traffic flow management (ATFM) slot swapping | FCM09 |
| Sol #57 | User-driven prioritisation process (UDPP) – departure | - |

## Advanced Air Traffic Services

### PCP Related Solutions

| | SESAR Solution | MP Level 3 Implementation Objective |
|---|---|---|
| Sol #05 | Extended arrival management (AMAN) horizon | ATC15.2 |
| Sol #09 & #51 | RNP 1 operations | NAV03.2 |
| Sol #32 & #65 | Direct Routing | AOM21.1* |
| Sol #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 | AOM21.2 |
| Sol #66 | Automated support for dynamic sectorisation | AOM21.2-ASP03 |
| Sol #103 | Approach Procedures with vertical guidance | NAV10 |

**After 2017, this objective/solution has been considered 'Achieved' and therefore has been removed from the Implementation Plan 2018*

### Non-PCP Related Solutions

| | SESAR Solution | MP Level 3 Implementation Objective |
|---|---|---|
| Sol #06 | Controlled time of arrival (CTA) in medium-density/medium-complexity environments | - |
| Sol #08 | Arrival management into multiple airports | - |
| Sol #10 | Optimised route network using advanced RNP | - |
| Sol #11 | Continuous descent operations (CDO) using point merge | - |
| Sol #27 | Enhanced tactical conflict detection & resolution (CD&R) services and conformance monitoring tools for en-route | ATC12.1 |
| Sol #60 | Enhanced STCA for TMA specific operations | ATC02.9 |
| Sol #62 | Precision area navigation (P-RNAV) in a complex terminal airspace | NAV03.1 |
| Sol #63 | Multi-Sector Planning | ATC18 |
| Sol #69 | Enhanced STCA with down-linked parameters | ATC20 |
| Sol #104 | Sector Team Operations - En-route Air Traffic Organiser | ATC12.1 |
| Sol #105 | Enhanced airborne collision avoidance system (ACAS) operations using the autoflight system | - |
| Sol #107 | Point merge in complex terminal airspace | - |
| Sol #108 | Arrival Management (AMAN) and Point Merge | - |
| Sol #113 | Optimised Low Level IFR routes for rotorcraft | NAV12 |
| Sol #118 | Basic Extended ATC Planner | - |

## High-Performing Airport Operations

### PCP Related Solutions

| | SESAR Solution | MP Level 3 Implementation Objective |
|---|---|---|
| Sol #02 | Airport safety nets for controllers: conformance monitoring alerts and detection of conflicting ATC clearances | AOP12 |
| Sol #21 | Airport operations plan (AOP) and its seamless integration with the network operations plan (NOP) | AOP11, FCM05 |
| Sol #22 | Automated assistance to controllers for surface movement planning and routing | AOP13 |
| Sol #53 | Pre-departure sequencing supported by route planning | AOP13-ASP02 |
| Sol #64 | Time-based separation | AOP10 |

### Non-PCP Related Solutions

| | SESAR Solution | MP Level 3 Implementation Objective |
|---|---|---|
| Sol #01 | Runway status lights | AOP18 |
| Sol #04 | Enhanced traffic situational awareness and airport safety nets for vehicle drivers | AOP15 |
| Sol #12, 13, 52 & #71 | Remote tower | AOP14 |
| Sol #23 | D-TAXI service for controller-pilot datalink communications (CPDLC) application | - |
| Sol #47 | Guidance assistance through airfield ground lighting | AOP16 |
| Sol #48 | Virtual block control in low visibility procedures (LVPs) | - |
| Sol #54 | Flow based integration of arrival and departure management | ATC19 |
| Sol #55 | Precision approaches using GBAS Category II/III | NAV11 |
| Sol #61 | A low-cost and simple departure data entry panel for the airport controller working position | AOP17 |
| Sol #70 | Enhanced ground controller situational awareness in all weather conditions | (**AOP04.1) |
| Sol #106 | DMAN Baseline for integrated AMAN DMAN | AOP05 |
| Sol #116 | De-icing management tool | (***) |
| Sol #117 | Reduce LVC landing minima using enhanced flight vision systems (EFVS) | - |

*(**) Linked to the Level 3 via AOP04.1, however this objective is technology-agnostic (not necessarily via ADS-B)*

*(***) DIMT is implemented via AOP05 as part of A-CDM, but not necessarily as an internet-based tool*

## Enabling Aviation Infrastructure

### PCP Related Solutions

| | SESAR Solution | MP Level 3 Implementation Objective |
|---|---|---|
| Sol #35 | Meteorological information exchange | INF08.1 |
| Sol #37 | Extended flight plan | FCM08 |
| Sol #46 | Initial system-wide information management (SWIM) technology solution | INF08.1, INF08.2 |
| Sol #115 | Extended Projected Profile (EPP) availability on ground | Awaiting clarification on PCP AF6 functionality |

### Non-PCP Related Solutions

| | SESAR Solution | MP Level 3 Implementation Objective |
|---|---|---|
| Sol #28 | Initial ground-ground interoperability | INF08.2 |
| Sol #34 | Digital integrated briefing | INF09 |
| Sol #67 | AOC data increasing trajectory prediction accuracy | - |
| Sol #100 | ACAS Ground Monitoring and Presentation System | - |
| Sol #101 | Extended hybrid surveillance | - |
| Sol #102 | Aeronautical mobile airport communication system (AeroMACS) | - |
| Sol #109 | Air traffic services (ATS) datalink using Iris Precursor | - |
| Sol #110 | ADS-B surveillance of aircraft in flight and on the surface | - |
| Sol #114 | Composite Surveillance ADS-B / WAM | - |

# 4. DEPLOYMENT VIEW

The Deployment View is organised per SESAR Key Feature and, for each one provides an overview of the associated implementation objectives and their planned deployment in the form of a Gantt chart. Each implementation objective is then described in a more detailed deployment view answering:

- **What**: providing a brief description of the improvement to be implemented;
- **Why**: detailing the performance benefits brought by the objective;
- **Who**: listing the ATM stakeholders involved in its implementation;
- **When**: presenting agreed timelines;
- **Where**: setting the geographical scope for implementation;
- **How**: breaking down the actions to be taken by each stakeholder.

In addition, for each objective a preview is given of the reported implementation progress, and some additional information like links to SESAR Level 1 and 2 elements, ICAO Aviation Systems Block Upgrades (ASBUs), Families of the DP and applicable legislation and standards.

The progress status for each objective comes from the Master Plan Level 3 2018 Implementation Report and described in the following terms:

| | |
|---|---|
| **On time** | implementation progress is on time and no delays are expected; |
| **Risk of delay** | the estimated achievement date is in line with the FOC date, but there are risks which could jeopardise timely implementation of the objective; |
| **Planned delay** | the estimated achievement date is beyond the FOC date. Stakeholders already envisage delays the implementation. FOC date is still in the future, some corrective measures can still be taken to achieve the objective in line with its FOC date; |
| **Late** | the estimated achievement date is beyond the FOC date and the FOC date is already past; |
| Not available | objectives in their first year of monitoring; the data collected does not allow yet determining a reliable estimated achievement date or a progress status. |
| **Completion rate – end 2018:** | refers to the percentage of States/airports that have reported the objective as 'completed' (cf. LSSIP[2] 2018). |
| **Estimated achievement** | the date of estimated achievement is calculated as the year when the objective's implementation is at least 80% completed in the applicability area. |

Additionally, those objectives that have not been monitored in 2018 and therefore no progress status can be determined are identified as:

- **New:** new objective introduced in this edition of the Implementation Plan;
- **New 'Active':** objective that was 'Initial' in the edition 2018 (and therefore not monitored) and has been changed to 'Active' in this edition of the Implementation Plan;
- **Initial:** objective introduced in the Implementation Plan for which some elements still require validation and therefore area not yet monitored.

Detailed explanation of the terminology used throughout this chapter is provided in Annex 1 - Definitions and Terminology.

[2] Local Single Sky ImPlementation (LSSIP) – ECAC-wide EUROCONTROL reporting process on Single European Sky ATM changes

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## Implementation Objectives – Deployment Views Index

**Table 1 - Implementation Objectives – Deployment Views Index**

## Optimised ATM network services

| | | <15 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | ≥25 | AAS TP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AOM13.1 | Harmonise Operational Air Traffic (OAT) and General Air Traffic (GAT) handling | | | | | | | | | | | | | - |
| AOM19.1 | ASM Support Tools to Support AFUA | | | | | | | | | | | | | AM-1.8 |
| AOM19.2 | ASM Management of Real-Time Airspace Data | | | | | | | | | | | | | AM-1.8 |
| AOM19.3 | Full Rolling ASM/ATFCM Process and ASM Information Sharing | | | | | | | | | | | | | AM-1.8 |
| AOM19.4 | Management of Pre-defined Airspace Configurations | | | | | | | | | | | | | - |
| AOM21.1 | Direct Routing (*) | | | | | Achieved | | | | | | | | - |
| AOM21.2 | Free Route Airspace (**) | | | | | | | | | | | | | AM-1.6<br>AM-1.10<br>AM-5.1 |
| | | | | | | | | | | | | | | - |
| FCM03 | Collaborative Flight Planning | | | | | | | | | | | | | AM-1.14 |
| FCM04.1 | STAM Phase 1 (*) | | | | | | | | | | | | | - |
| FCM04.2 | STAM Phase 2 | | | | | | | | | | | | | AM-1.11 |
| FCM05 | Interactive Rolling NOP | | | | | | | | | | | | | AM-1.12 |
| FCM06 | Traffic Complexity Assessment | | | | | | | | | | | | | AM-1.13 |
| FCM07 | Calculated Take-Off Time (CTOT) to Target Times for ATFCM Purposes | | | | | | | | | | | | | AM-1.9 |
| FCM09 | Enhanced ATFM Slot Swapping | | | | | | | | | | | | | - |

*(*) AOM21.1 was achieved during 2017 and FCM04.1 was achieved during 2018, and therefore removed from the Implementation Plan. They are kept in this graph for traceability purposes but no deployment view is presented in the next chapters*

*(**) This objective is described in the section addressing Advanced Air Traffic Services*

The objective codes in the MP Level 3 appearing in this section refer to:

- AOM – Airspace Organisation and Management
- FCM – Flow and Capacity Management

A full definition of all acronyms can be found in Annex 1-Definitions and Terminology.

# AOM13.1 - Harmonise OAT and GAT Handling

This objective aims at ensuring that the principles, rules and procedures for handling operational air traffic (OAT) and general air traffic (GAT) are commonly applied to the maximum possible extent within ECAC airspace. Harmonised rules are set in the 'EUROCONTROL Specifications for harmonized Rules for OAT under Instrument Flight Rules (IFR) inside controlled Airspace (EUROAT)'.

OAT means all flights, which do not comply with the provisions stated for GAT and for which rules and procedures have been specified by appropriate national authorities.

GAT means all movements of aircraft carried out in conformity with ICAO procedures.

| | | |
|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** Nil |
| **SESAR Key Feature:** | Optimised ATM Network Services | |
| **OI Steps & *Enablers*:** | AOM-0301, *AAMS-10a, AIMS-19b* | |
| **Dependencies:** | No dependencies | |
| **Network Strategy Plan:** | SO6/2 | |
| **Operating Environment:** | En-Route, Network | |
| **EATMN Systems:** | ASM, AIS | |

## Applicable regulations & standards

- Regulation (EC) No 2150/2005 on common rules for the flexible use of airspace
- Regulation (EU) 2015/340 on technical requirements and administrative procedures relating to air traffic controllers' licences and certificates pursuant to Regulation (EC) No 216/2008

## When

FOC: **31/12/2018**

## Who

Stakeholders:
- Regulators
- ANSPs
- Military

## Where

Applicability Area
All ECAC+ States except Albania, Latvia, Luxembourg, Malta, Moldova and Morocco.

## Status

**Late**

Completion rate - end 2018: **39%**

Estimated achievement: **12/2020**

## Benefits

### Operational Efficiency
Increased efficiency of civil-military operations through the use of harmonised procedures at pan-European level.

### Safety
Less risk of error through the use of common rules and procedures for OAT handling and for OAT/GAT interface.

### Security
Increased through robust pan-European OAT provisions and structures to effectively support national and multinational military operations.

## Regulatory Lines of Action:

| | | |
|---|---|---|
| **REG01** | **Revise national legislation as required**<br>- Perform conformance analysis between existing rules and the EUROAT specification and determine, changes of regulatory material, where necessary.<br>- Develop and enact national regulations and rules pertinent to this specification. | 31/12/2018 |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Apply common principles, rules and procedures for OAT handling and OAT/GAT interface** | 31/12/2018 |
| **ASP02** | **Train staff as necessary**<br>- Train ATCOs in the provision of ATS to OAT-IFR flights including the new procedures introduced by the implementation of this objective. | 31/12/2018 |

## Military Lines of Action:

| | | |
|---|---|---|
| **MIL01** | **Apply common principles, rules and procedures for OAT handling and OAT/GAT interface** | 31/12/2018 |
| **MIL02** | **Provide feedback on result of conformance analysis between national rules to EUROAT**<br>- Provide EUROCONTROL with a national point of contact (POC) and a distribution list for the dissemination of EUROAT specification. | 31/12/2012 |
| **MIL04** | **Migrate military aeronautical information to EAD** | 31/12/2015 |

## Changes to the Objective since previous edition:

- Status changed from ‘On time’ to ‘Late’.
- Scope changed from ECAC to ECAC+
- MUAC and Israel added to Applicability Area.

# AOM19.1 – ASM Tools to Support AFUA

Deploy airspace management (ASM) support tools and their interoperability with the Network Management's systems to support advanced FUA (AFUA) by managing airspace reservations resulting from civil-military co-ordination, more flexibly according to airspace users' needs. These tools enable improved ASM processes at strategic, pre-tactical and tactical levels, they support dynamic and flexible sector configurations and are capable of sharing real-time airspace status and possibly provide data for impact assessment of airspace configurations. This objective is an enabler for AOM19.2 and AOM19.3.

| | | |
|---|---|---|
| **SESAR Solutions:** | #31 | **AAS Milestone:** 1.8 |
| **SESAR Key Feature:** | Optimised ATM Network Services | |
| **Essential Operational Change / PCP:** | S-AF3.1 Airspace Management and Advanced FUA | |
| **DP Families:** | 3.1.1 ASM Tool to support AFUA | |
| **OI Steps & *Enablers*:** | AOM-0202, AOM-0202-A | |
| **Dependencies:** | No dependencies | |
| **ICAO ASBUs:** | B1-FRTO, B1-NOPS | |
| **Network Strategy Plan:** | SO3/2, SO3/3 | |
| **Operating Environment:** | Terminal, En-Route, Network | |
| **EATMN Systems:** | ASM | |

## When

FOC: **31/12/2018**

## Who

Stakeholders:
- ANSPs
- Network Manager

## Where

Applicability Area
All ECAC+ States except Armenia, Georgia, North Macedonia, Malta, Luxembourg, Moldova.

## Status

**Late**

Completion rate - end 2018: **28%**

Estimated achievement: **12/2019**

## Applicable regulations & standards

- Regulation (EC) 2150/2005 - Implementation and Application FUA
- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Benefits

Capacity
Increased through better utilisation of airspace resources within and across airspace boundaries leading to reduction of flight delays.

Operational Efficiency
Increased through the availability of more optimum routes/trajectories allowing lower fuel burn.

Safety
Improved through a shared real-time airspace status display and enhanced, common situational awareness of all players.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Deploy automated ASM support systems**<br>- Deploy ASM support systems (LARA or locally developed ones) to support the local or sub-regional airspace planning and allocation (without interface with NM - covered by ASP02). | 31/12/2018 |
| **ASP02** | **Implement interoperability of local ASM support system with NM system**<br>- Adapt local ASM support systems to make them interoperable with NM system.<br>- Conclude the Operational Access Acceptance Activities required to validate the ASM tool interfacing NM system via B2B service.<br>- Update the existing agreement with NM in order to cover B2B services. | 31/12/2018 |
| **ASP03** | **Improve planning and allocation of airspace booking**<br>- Improve planning and allocation of reserved/segregated airspace at pre-tactical ASM level 2 by:<br>- Planning reserved/segregated airspace utilization in accordance with actual need;<br>- Releasing reserved/segregated non used airspace as soon as activity stops;<br>- Utilising reserved/segregated airspace that has not been planned in airspace use plan (AUP).<br>- This should be enabled by the measurement of FUA Indicators. | 31/12/2018 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Integrate local ASM support systems with NM systems**<br>- Integrate the local automated ASM support systems with NM systems.<br>- Update existing agreement NM-ANSP in order to cover B2B services. | 31/12/2018 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+
- Israel and Morocco added to Applicability Area.
- Status changed from “On time” to “Late”

# AOM19.2 – ASM Management of Real-Time Airspace Data

Implement enhanced airspace management (ASM) by automated, real-time, continuous exchange services of ASM data during the tactical phase. ASM information (airspace reservation (ARES) status) is shared between ASM systems, civil and military ATS units/systems and communicated to NM. These data are collected, saved and processed in order to be exchanged between ASM stakeholders and be made available to ATM actors; while some airspace users are not directly involved in ASM process, they will be notified by the NM.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #31 | **AAS Milestone:** | 1.8 |
| **SESAR Key Feature:** | Optimised ATM Network Services | | |
| **Essential Operational Change / PCP:** | S-AF3.1 Airspace Management and Advanced FUA | | |
| **DP Families:** | 3.1.2 ASM management of real time airspace data | | |
| **OI Steps & *Enablers*:** | AOM-0202-A, AOM-0206-A | | |
| **Dependencies:** | AOM19.1, AOM19.3 | | |
| **ICAO ASBUs:** | B1-FRTO, B1-NOPS | | |
| **Network Strategy Plan:** | SO3/2, SO3/3 | | |
| **Operating Environment:** | Terminal, En-Route, Network | | |
| **EATMN Systems:** | ASM, FDPS/SDPS & HMI | | |

## When

FOC: **31/12/2021**

## Who

Stakeholders:
- ANSPs
- Airspace users
- Network Manager

## Where

Applicability Area
All ECAC+ States except Armenia, Luxembourg, Georgia, North Macedonia, Malta, Moldova and Morocco.

## Status

Not available

Completion rate - end 2018: **6%**

Estimated achievement: **Not available**

## Applicable regulations & standards

- Regulation (EC) 2150/2005 - Implementation and Application FUA
- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Benefits

Capacity
Increased through better utilisation of airspace resources within and across airspace boundaries leading to reduction of flight delays.

Operational Efficiency
Increased through the availability of more optimum routes/trajectories allowing lower fuel burn.

Safety
Better knowledge of traffic environment, common situational awareness, and some enhancement through reduction in controller workload.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Adapt ATM systems for real-time ASM data exchanges** | 31/12/2021 |
| **ASP02** | **Adapt local ASM support system for real-time ASM data exchanges with NM systems** | 31/12/2021 |
| **ASP03** | **Implement procedures related to real-time (tactical) ASM level III information exchange**<br>- Develop and implement the ASM/ATFCM and ATC procedures for ASM real time data exchanges with different actors and systems (NM, military authorities, AMC, ATC). | 31/12/2021 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Adapt airspace users systems for real-time ASM data exchanges with NM**<br>- Adapt systems (computer flight plan software providers (CFSP)) for real-time ASM data exchanges. | 31/12/2021 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Adapt ATM systems for real-time ASM data exchanges**<br>- Enhance systems to receive and process real-time airspace activation, de-activation and modification of airspace reservation (ARES) and include this information in the Network Operations Plan (NOP). | 31/12/2021 |
| **NM02** | **Implement procedures related to real-time (tactical) ASM level III information exchange**<br>- Develop and deploy procedures for ASM real time data exchanges with different actors and systems (NM, military authorities, CFSPs, ATC, AMC), including a Network impact assessment of the airspace changes resulting of the real-time airspace data exchanges. | 31/12/2021 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+
- Israel added to Applicability Area.

# AOM19.3 – Full Rolling ASM/ATFCM Process and ASM Information Sharing

The full rolling ASM/ATFCM process shall ensure a continuous, seamless and reiterative airspace planning and allocation based on airspace requests at any time period within strategic (level 1), pre-tactical (level 2) and tactical (level 3) ASM levels; the process will also support the deployment of Airspace Configurations. It will result in the enhancement of the daily Network Operations Plan (NOP) allowing airspace users to better benefit from changes in airspace structures in closer to the event.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #31 | **AAS Milestone:** | 1.8 |
| **SESAR Key Feature:** | Optimised ATM Network Services | | |
| **Essential Operational Change / PCP:** | S-AF3.1 Airspace Management and Advanced FUA | | |
| **DP Families:** | 3.1.3 Full rolling ASM/ATFCM process and ASM information sharing | | |
| **OI Steps & *Enablers*:** | AOM-0202, AOM-0202-A | | |
| **Dependencies:** | AOM19.1, AOM19.2 | | |
| **ICAO ASBUs:** | B1-FRTO, B1-NOPS, B2-NOPS | | |
| **Network Strategy Plan:** | SO3/2, SO3/3 | | |
| **Operating Environment:** | Terminal, En-Route, Network | | |
| **EATMN Systems:** | ASM, ATFCM | | |

## When

FOC: **31/12/2021**

## Who

Stakeholders:
- ANSPs
- Airspace users
- Network Manager

## Where

Applicability Area
All ECAC+ States except Armenia, Luxembourg, Georgia, North Macedonia, Malta, Moldova and Morocco.

## Status

Not available

Completion rate - end 2018: **8%**

Estimated achievement: **Not available**

## Applicable regulations & standards

- Regulation (EC) 2150/2005 - Implementation and Application FUA
- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Benefits

Capacity
Increased through better utilisation of airspace resources within and across airspace boundaries leading to reduction of flight delays.

Operational Efficiency
Increased through the availability of more optimum routes/trajectories allowing lower fuel burn.

Safety
Better knowledge of traffic environment, common situational awareness, and some enhancement through reduction in controller workload.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Adapt ASM systems to support a full rolling ASM/ATFCM process**<br>- System improvements supporting a full management of airspace structures via AUP/UUP and initial CDM. | 31/12/2021 |
| **ASP02** | **Implement procedures and processes for a full rolling ASM/ATFCM process**<br>- Develop processes supporting a full rolling and dynamic ASM/ATFCM process – process for a full management of airspace structure via AUP/UUP and process for initial CDM. | 31/12/2021 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Adapt airspace users systems to improve ASM notification process**<br>System improvements at airspace users' operations centers for full management of AUP/UUP airspace structure via B2B service. | 31/12/2021 |
| **USE02** | **Implement procedures in support of an improved ASM notification process** | 31/12/2021 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Adapt NM systems to support a full rolling ASM/ATFCM process** | 31/12/2021 |
| **NM02** | **Implement procedures and processes for a full rolling ASM/ATFCM process** | 31/12/2021 |
| **NM03** | **Improve ASM notification process**<br>- Improve ASM notification process by improving the European AUP/UUP and updates (EAUP/EUUP) including harmonisation of areas notifications and cross border CDRs (Conditional Routes) notifications.<br>- Graphical display of AUP/UUP on NOP Portal. | 31/12/2021 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+
- Israel added to Applicability Area.

# AOM19.4 – Management of Pre-defined Airspace Configurations

Implement an improved ASM solutions process, the management of pre-defined airspace configurations and the process and supporting tools for an improved ASM performance analysis.

The ASM solutions process aims at delivering ASM options (e.g. predefined airspace scenarios) that can help alleviate capacity issues in the European airspace as well as improve flight efficiency assessing impact on capacity and ensuring synchronised availability of optimised airspace structures based on traffic demand.

Pre-defined airspace configurations are based on coordinated and validated combinations of airspace structures and ATC dynamic sectorisation, to meet airspace needs in terms of capacity and/or flight efficiency.

| | | | |
|---|---|---|---|
| **SESAR Solutions** | #31 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Optimised ATM Network Services | | |
| **Essential Operational Change / PCP:** | S-AF3.1 Airspace Management and Advanced FUA | | |
| **DP Families:** | 3.1.4 Management of dynamic airspace configurations | | |
| **OI Steps & *Enablers*:** | Under definition | | |
| **Dependencies:** | AOM19.1, AOM19.2 | | |
| **ICAO ASBUs:** | B1-FRTO, B1-NOPS | | |
| **Network Strategy Plan:** | SO3/2, SO3/3 | | |
| **Operating Environment:** | Terminal, En-Route, Network | | |
| **EATMN Systems:** | ASM, ATFCM | | |

## When

FOC: **31/12/2021**

## Who

Stakeholders:
- ANSPs
- Network Manager

## Where

Applicability Area
All ECAC+ States except Armenia, Luxembourg, Georgia, North Macedonia, Malta, Morocco and Moldova.

## Status

Not available

Completion rate - end 2018: **6%**

Estimated achievement: **Not available**

## Applicable regulations & standards

- Regulation (EC) 2150/2005 - Implementation and Application FUA
- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Benefits

Capacity
Increased through better utilisation of airspace resources within and across airspace boundaries leading to reduction of flight delays.

Operational Efficiency
Increased through the availability of more optimum routes/trajectories allowing lower fuel burn.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Adapt ATM systems to support the management of ASM solutions and pre-defined airspace configurations**<br>Adapt ATM systems including:<br>- system changes for ASM solutions;<br>- system changes for predefined airspace configurations;<br>- sharing of the ASM solutions, pre-defined airspace configuration inputs and outputs via B2B services. | 31/12/2021 |
| **ASP02** | **Implement procedures in support of an improved ASM solution process and the management of pre-defined airspace configurations**<br>- Implement procedures including an ASM solution process and process changes for predefined airspace configurations. | 31/12/2021 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Adapt NM systems to support the management of pre-defined airspace configurations** | Finalised |
| **NM02** | **Implement procedures in support of an improved ASM solution process and the management of pre-defined airspace configurations** | Finalised |
| **NM03** | **Implement tools in support of ASM performance analysis**<br>Implement tools and processes in support of ASM performance analysis in order to assess the flight efficiency gains resulting from the rolling ASM/ATFCM process implementation. | 31/12/2021 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+
- Israel added to Applicability Area..

# FCM03 – Collaborative Flight Planning

Improve collaboration between the NM, ANSPs, airports and airspace users in flight plan (FP) filing, in particular to assist airspace users in filing their FPs and in re-routings according to the airspace availability and ATFM situation.

The ATC flight plan (AFP) messages sent to the NM serve purpose of:
- Enabling NM to provide ATC Units with more accurate FP information, improving their traffic situation awareness and reducing the workload caused by last minute updates or missing FPs.
- Updating the ETFMS with FP information in order to reflect as accurately as possible the current and future flight trajectories, providing accurate sector load calculations.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | 1.14 |
| **SESAR Key Feature:** | Optimised ATM Network Services | | |
| **Essential Operational Change / PCP:** | - Basic Network Operations Planning<br>- Pre-requisite for PCP/AF4 Network Collaborative Management | | |
| **DP Families:** | 4.2.3 Interface ATM systems to NM systems | | |
| **OI Steps & *Enablers*:** | IS-0102 | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B0-NOPS | | |
| **Network Strategy Plan:** | SO4/2, SO5/1, SO5/6 | | |
| **Operating Environment:** | Airport, Terminal, En-Route, Network | | |
| **EATMN Systems:** | ATFCM, FDPS/SDPS & HMI | | |

## When

FOC: **31/12/2017**

## Who

Stakeholders:
- ANSPs
- Network Manager

## Where

Applicability Area
All ECAC+ States.

## Status

**Late**

Completion rate - end 2018: **60%**

Estimated achievement: **12/2019**

## Applicable regulations & standards

N/A

## Benefits

### Operational Efficiency

A better traffic prediction will enhance traffic smoothing allowing less “unnecessary” actions to be taken. Earlier awareness of the updated traffic situation will permit the Flow Management Positions to consider and implement remedial actions to reduce the impact of the measures taken to accommodate the traffic. From the perspective of the airspace users, better traffic prediction will provide improved ability to maintain accurate estimated off-block times (EOBTs) for the return and subsequent legs for a flight/aircraft.

### Capacity

Better use of the available network capacity hence reducing delays.

### Safety

Prevention of ATCO overload.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Provide flight plan message processing in ICAO format** | Finalised |
| **ASP02** | **Automatically process FPLs derived from RPLs** | Finalised |
| **ASP03** | **Provide flight plan message processing in ADEXP format** | 31/12/2012 |
| **ASP04** | **Processing of APL and ACH messages** | Finalised |
| **ASP05** | **Automatically provide AFP for missing flight plans** | 31/12/2017 |
| **ASP06** | **Automatically provide AFP message for change of route** | 31/12/2017 |
| **ASP07** | **Automatically provide AFP message for a diversion** | 31/12/2017 |
| **ASP08** | **Automatically provide AFP message for a change of flight rules or flight type** | 31/12/2017 |
| **ASP09** | **Automatically provide AFP message for a change of requested cruising level** | 31/12/2017 |
| **ASP13** | **Automatically provide AFP message for change of aircraft type** | 31/12/2017 |
| **ASP14** | **Automatically provide AFP message for change of aircraft equipment** | 31/12/2017 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Integration of Automatic AFP in NM systems** | 31/12/2017 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+
- Israel and Morocco added to Applicability Area.

# FCM04.2 – STAM Phase 2

Short-term ATFCM measures (STAM) consists of a system supported approach to smooth sector workloads by reducing traffic peaks through short-term application of minor ground delays, appropriate flight level capping, timing and modalities of ATC re-sectorisation, exiguous re-routings to a limited number of flights. These measures are capable of reducing the traffic complexity for ATC with minimum curtailing for the airspace users.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #17 | **AAS Milestone:** | 1.11 |
| **SESAR Key Feature:** | Optimised ATM Network Services | | |
| **Essential Operational Change / PCP:** | S-AF4.1 Enhanced Short Term ATFCM Measures | | |
| **DP Families:** | 4.1.2 STAM phase 2 | | |
| **OI Steps & *Enablers*:** | DCB-0308, *ER APP ATC 17* | | |
| **Dependencies:** | No dependencies | | |
| **Network Strategy Plan:** | SO4/3, SO5/4 | | |
| **Operating Environment:** | En-Route, Network | | |
| **EATMN Systems:** | ATFCM | | |

## When

FOC: **31/12/2021**

## Who

Stakeholders:
- ANSPs
- Airspace Users
- Network Manager

## Where

Applicability Area
All ECAC+ States except Armenia, Georgia, Israel, Morocco and Moldova.

## Status

Not available

Completion rate - end 2018: **10%**

Estimated achievement: **Not available**

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Benefits

Capacity
Effective capacity is globally optimised thanks to replacement of some ATFCM regulations with the STAM measures, hotspot reduction and its more efficient management.

Operational Efficiency
Improved through the proposition of the most appropriate measures according with the type of flight.

Safety
Small enhancement through the resolution of some conflicts through STAM measures.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Develop STAM procedures and upgrade the local systems**<br>- This SLoA is only applicable to those ANSPs for which, due to their local environments, the NM application is not sufficient, therefore the development/upgrade of local systems is needed. | 31/12/2021 |
| **ASP02** | **Use of STAM phase 2**<br>- This SLoA is relevant for the ANSPs which are using the NM provided STAM P2 application, without deploying local tools. | 31/12/2021 |
| **ASP03** | **Train the personnel** | 31/12/2021 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Airspace Users to deploy the appropriate tools and associated procedures**<br>- This SLoA addresses in particular the flight planning services as well as the communication of the STAM measures to the crews. | 31/12/2021 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Update the NM systems and develop the associated procedures** | 31/12/2021 |
| **NM02** | **Train the personnel** | 31/12/2021 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+

# FCM05 – Interactive Rolling NOP

This objective consists in the implementation of a platform that uses the state-of-the art technologies for creation of a virtual operations room for the physically distributed European ATM Network Operations, in support of the collaborative Network Operations Plan (NOP). This platform will support the network collaborative rolling processes from strategic to real-time operations, including capabilities for online performance monitoring integrated and feeding back into the collaborative network planning. Also, the platform provides access to post-operational data for offline analysis and performance reporting.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #20, #21 | **AAS Milestone:** | 1.12 |
| **SESAR Key Feature:** | Optimised ATM Network Services | | |
| **Essential Operational Change / PCP:** | S-AF4.2 Collaborative NOP | | |
| **DP Families:** | 4.2.2 Interactive Rolling NOP<br>4.2.4 AOP/NOP Information Sharing | | |
| **OI Steps & *Enablers*:** | DCB-0102, DCB-0103-A | | |
| **Dependencies:** | AOM19.1 | | |
| **ICAO ASBUs:** | B1-ACDM, B1-NOPS | | |
| **Network Strategy Plan:** | SO2/1, SO2/2, SO2/3, SO2/4 | | |
| **Operating Environment:** | Airport, Terminal, En-Route, Network | | |
| **EATMN Systems:** | ATFCM | | |

## When

FOC: **31/12/2021**

## Who

Stakeholders:
- ANSPs
- Airspace Users
- Airport Operators
- Network Manager

## Where

Applicability Area
All ECAC+ States except Armenia, North Macedonia, Luxembourg, MUAC, Morocco and Moldova.

## Status

**On time**

Completion rate - end 2018: **8%**

Estimated achievement: **12/2021**

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Benefits

Cost Efficiency
Enhanced through use of cost efficient tools to access network information instead of expensive local tools or procedures.

Capacity
Small benefits through improved use of the airport and airspace capacity resulting from a better knowledge of the airspace availability and of the traffic demand.

Safety
Enhanced by improved sharing of the network situation.

## ANSPs Lines of Action:

ANSP SLoA listed in objective AOM19.1, identified as a dependency to this objective, are also relevant for FCM05. These SLoAs address the "Upgrade the automated ASM support system with the capability of AIXM 5.1 B2B data exchange with NM" and "The integration of the automated ASM support systems with the Network".

| | | |
|---|---|---|
| **ASP04** | **Develop and implement ATFCM procedures for interaction with the NOP** | 31/12/2021 |
| **ASP05** | **Train the relevant personnel for interaction with the NOP** | 31/12/2021 |

## Airport Operators Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Provide the required data to the Network Manager for Demand Data Repository (DDR)** | 31/12/2017 |
| **APO02** | **Perform the integration of the AOP with the NOP** | 31/12/2021 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Provide the required data to the Network Manager for DDR** | 31/12/2017 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **ADR to provide, common and consolidated view of European airspace data containing both static and dynamic digital data** | Finalised |
| **NM02** | **Upgrade NM system for external user access to the airspace data repository (making restrictions available in AIXM 5.1 format via B2B)** | Finalised |
| **NM03** | **Equip Airspace management system with tools for collection of airspace data (Interoperability with ASM tools in AIXM 5.1)** | Finalised |
| **NM04** | **Perform an integration of ASM support systems with the Network** | Finalised |
| **NM05** | **Upgrade NM systems to allow the access of interested users to the DDR** | Finalised |
| **NM06** | **Implement FCM Procedures for on-line access/update to the NOP and notification of updates** | Finalised |
| **NM07** | **Upgrade NM systems to allow FMP to remote access simulation via the NOP Portal (create of simulations and assessment of the results) and in a second step to edit scenario measures (regulation, config, capacities,...) prior to running simulations** | Finalised |
| **NM08** | **Flight Plan filing capability directly via the NOP portal** | Finalised |
| **NM09** | **Develop AOP/NOP interfaces** | 31/12/2018 |
| **NM10** | **Integrate the AOPs into the Network Operation Plan** | 31/12/2021 |
| **NM12** | **Enhance the NM technical platform and services** | 31/12/2021 |
| **NM13** | **Implement appropriate procedures** | 31/12/2021 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+
- Israel added to Applicability Area.

# FCM06 – Traffic Complexity Assessment

The rigid application of ATFCM regulations based on standard capacity thresholds needs to be replaced by a close working relationship between ANSPs and the NM, which would monitor both the real demand and the effective capacity of sectors having taken into account the complexity of expected traffic situation.

The traffic complexity tools continuously monitor sector demand and evaluate traffic complexity (by applying predefined complexity metrics) according to a predetermined qualitative scale. The predicted complexity coupled with traffic demand enables ATFCM actors to take timely action to adjust capacity, or request the traffic profile changes in coordination with ATC and airspace users.

| **SESAR Solutions:** | #19 | **AAS Milestone:** | 1.13 |
|---|---|---|---|
| **SESAR Key Feature:** | Optimised ATM Network Services | | |
| **Essential Operational Change / PCP:** | S-AF4.4 Automated Support for Traffic Complexity Assessment | | |
| **DP Families:** | 4.4.2 Traffic Complexity tools | | |
| **OI Steps & *Enablers*:** | CM-0101, CM-0103-A, *NIMS-20* | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B1-NOPS | | |
| **Network Strategy Plan:** | SO4/3, SO5/4 | | |
| **Operating Environment:** | Terminal, En-Route, Network | | |
| **EATMN Systems:** | ATFCM, FDPS/SDPS & HMI | | |

## When

FOC: **31/12/2021**

## Who

Stakeholders:
- ANSPs
- Network Manager

## Where

Applicability Area
All ECAC+ States except Luxembourg and Morocco.

## Status

Not available

Completion rate - end 2018: **12%**

Estimated achievement: **Not available**

## Applicable regulations & standards

- Regulation (EU) 677/2011 - Implementation of ATM network functions amending Regulation (EU) No 691/2010
- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Benefits

### Operational Efficiency

Increased through use of more optimal routes leading to fuel saving and lower CO2 emissions.

### Safety

The better ATCO workload predictability via deployment of the traffic complexity assessment tool will lead to safety gains. Enhancement also through reduction in controller workload.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Implement Local Traffic Load Management tool**<br>- The automated tools shall support the continuous monitoring of the traffic loads per network node (sector, waypoint, route, route-segment) according to declared capacities and provide support to the local resource management. | 31/12/2021 |
| **ASP02** | **Receive, process and integrate ETFMS Flight Data (EFD)**<br>- The local FDPS to receive, process and integrate EFD provided by NM in the local traffic complexity assessment tool. | 31/12/2021 |
| **ASP03** | **Implement Local Traffic Complexity tools and procedures**<br>- Local traffic complexity assessment tolls shall receive process and integrate EFD provided by NM. | 31/12/2021 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Provide ETFMS Flight Data (EFD) to the local traffic complexity tools** | 31/12/2021 |
| **NM02** | **Improved trajectory in NM systems**<br>- Adapt NM systems to improve the quality of the planned trajectory, thus enhancing flight planning and complexity assessment. They adaptation addresses: operational deployment of EFPL, processing of ATC information, processing of OAT FPL information and support to mixed mode operations. | 31/12/2021 |
| **NM03** | **Network Traffic Complexity Assessment**<br>- Implementation of scenario management tools in support of traffic complexity management in the pre-tactical phase. This tool is built on the planned trajectory information and allows simulating options optimising the use of available capacity.<br>- It is intended to support NM operations by identifying the possible mitigation strategies to be applied at network or local level, in coordination with FMPs and airspace users.<br>- In addition there is a need to develop a procedure related to implementation of traffic count methodologies that do not impact trajectory calculation. | 31/12/2021 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+
- Israel added to Applicability Area.

# FCM07 – Calculated Take-off Time (CTOT) to Target Times for ATFCM Purposes

Target times (TT) shall be applied to selected flights for ATFCM purposes to manage ATFCM at the point of congestion rather than only at departure. Where available, the target times of arrival (TTA) shall be derived from the airport operations plan (AOP).

TTAs shall be used to support airport arrival sequencing processes in the en-route phase. NM's systems shall be able to adjust CTOTs based on refined and agreed TTAs at the destination airport; TTAs shall be integrated into the AOP for subsequent refinement of the NOP. Flight data processing systems may need to be adapted in order to process downlinked trajectory data (ADS-C EPP).

In a first step, NM system will transmit calculated target times (TT) at the most penalising regulation reference point in addition to CTOT to all concerned users. Those users should manage this new feature so potential system upgrades should be foreseen.

| **SESAR Solutions:** | #18 | **AAS Milestone:** | 1.9 |
|---|---|---|---|
| **SESAR Key Feature:** | Optimised ATM Network Services | | |
| **Essential Operational Change / PCP:** | S-AF 4.3 Calculated Take-Off Time (CTOT) to Target Times of Arrival (TTA) for ATFCM | | |
| **DP Families:** | 4.3.1 - Target Time for ATFCM purposes<br>4.3.2 - Reconciled target times for ATFCM and arrival sequencing | | |
| **OI Steps & *Enablers*:** | DCB-0208 | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B1-NOPS | | |
| **Network Strategy Plan:** | SO4/3, SO6/4 | | |
| **Operating Environment:** | Terminal, En-Route, Network | | |
| **EATMN Systems:** | ATFCM, FDPS/SDPS & HMI | | |

## When

FOC: **31/12/2021**

## Who

Stakeholders:
- ANSPs
- Airport Operators
- Airspace users
- Network Manager

## Where

Applicability Area
All EU+ States

## Status

'Initial' objective

Completion rate - end 2018: **n/a**

Estimated achievement: **n/a**

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Benefits

### Capacity

The involvement in TT generation of local actors has a positive impact on capacity and delay reduction.

### Operational Efficiency

Reduced flight time in TMA leading to an optimised flight arrival management in the TMA. Reduction of holdings along with radar vectoring, with positive impact on fuel burn.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Adapt ATM/ATFCM systems to enable the Target Times extraction and presentation to relevant operational personnel** | 31/12/2021 |
| **ASP02** | **Implement procedures and processes in support of Target Time sharing** | 31/12/2021 |
| **ASP03** | **Adapt systems to support Calculated Take-off Time to Target Times for ATFCM purposes** | 31/12/2021 |
| **ASP04** | **Implement procedures and processes in support of Calculated Take-off Time to Target Times for ATFCM purposes** | 31/12/2021 |

## Airport Operators Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Adapt airport systems, as required, to support Calculated Take-off Time to Target Times for ATFCM purposes** | 31/12/2021 |
| **APO02** | **Implement procedures and processes in support of Calculated Take-off Time to Target Times for ATFCM purposes** | 31/12/2021 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Adapt systems at airspace users' operations centers to enable Target Times extraction and distribution** | 31/12/2021 |
| **USE02** | **Implement procedures and processes to adhere to TTs, to the extent possible** | 31/12/2021 |
| **USE03** | **Adapt systems to support Calculated Take-off Time to Target Times for ATFCM purposes** | 31/12/2021 |
| **USE04** | **Implement procedures and processes in support of Calculated Take-off Time to Target Times for ATFCM purposes** | 31/12/2021 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Adapt NM systems to support Target Time sharing** | 31/12/2021 |
| **NM02** | **Adapt systems to support Calculated Take-off Time to Target Times for ATFCM purposes** | 31/12/2021 |
| **NM03** | **Implement procedures and processes in support of Calculated Take-off Time to Target Times for ATFCM purposes** | 31/12/2021 |

NOTE: This objective provides advance notice to stakeholders. Some aspects of the objective require further validation.

## Changes to the Objective since previous edition:

- Nil

# FCM09 – Enhanced ATFM Slot Swapping

The enhanced ATFM slot swapping improves the current slot swapping by allowing its extension to within the same group of airlines/operators (i.e. an alliance), by reprioritizing their flights during the pre-tactical part of operations.

The enhanced process increases flexibility for airspace users and provides a wider range of possibilities, by facilitating the identification of possible swaps for a regulated flight and also by reducing the rate of rejection of swap request.

The Network Manager will supervise the swapping or changing of flight priority requests.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #56 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Optimised ATM Network Services | | |
| **Essential Operational Change:** | Intermediate step towards UDPP - User Driven Prioritisation Process | | |
| **OI Steps & *Enablers*:** | AUO-0101-A | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B1-NOPS | | |
| **Network Strategy Plan:** | SO6/1 | | |
| **Operating Environment:** | Network | | |
| **EATMN Systems:** | ATFCM | | |

## When

FOC: **31/12/2021**

## Who

Stakeholders:
- Airspace Users
- Network Manager

## Where

Applicability Area
All ECAC+ States, except Israel and Morocco.

## Status

**On time**

Completion rate - end 2018: **n/a**

Estimated achievement: **12/2021**

## Applicable regulations & standards

N/A

## Benefits

### Capacity

Maximisation of throughput during period of constrained capacity.

### Operational Efficiency

Airspace users can choose which of their flights to prioritise for operational reasons. Airlines save costs with each slot swap that is executed.

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Upgrade the Flight Operations Centre (FOC) interface**<br><br>- Update as necessary the flight operations centre (FOC) systems and interface with NM so as to allow the use of the ATFM Slot swapping functionality.<br>- Operators who wish to receive NM's slot service via B2B might need to adapt their own FOC interface. | 31/12/2021 |
| **USE02** | **Train the personnel** | 31/12/2021 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Upgrade the NM systems and develop the associated procedures**<br><br>- Update the NM systems, and develop associated procedures as necessary allowing an enhanced ATFM slot swapping process. | 31/12/2017 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+

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## Advanced Air Traffic Services

| | | <15 15 16 17 18 19 20 21 22 23 24 ≥25 | AAS TP |
|---|---|---|---|
| AOM21.1 | Direct Routing (*) | Achieved | - |
| AOM21.2 | Free Route Airspace | | AM-1.6<br>AM-1.10<br>AM-5.1 |
| | | | |
| ATC02.8 | Ground-Based Safety Nets | | - |
| ATC02.9 | Enhanced STCA for TMAs | | - |
| ATC07.1 | AMAN Tools and Procedures | | - |
| ATC12.1 | Automated Support for Conflict Detection, Resolution Support and Conformance Monitoring | | AM-1.15<br>AM-5.1 |
| ATC15.1 | Information Exchange with En-route in Support of AMAN | | - |
| ATC15.2 | Arrival Management Extended to En-route Airspace | | AM-1.3 |
| ATC17 | Electronic Dialogue as Automated Assistance to Controller during Coordination and Transfer | | AM-1.3 |
| ATC18 | Multi Sector Planning En-route - 1P2T | Local | AM-4.3<br>AM-5.1 |
| ATC19 | Enhanced AMAN-DMAN integration | Local | - |
| ATC20 | Enhanced STCA with down-linked parameters via Mode S EHS | Local | - |
| | | | - |
| ENV01 | Continuous Descent Operations | | - |
| ENV03 | Continuous Climb Operations | Local | - |
| | | | |
| NAV03.1 | RNAV 1 in TMA Operations | | - |
| NAV03.2 | RNP1 in TMA Operations | | - |
| NAV10 | RNP Approach Procedures to instrument RWY | | - |
| NAV12 | ATS IFR Routes for Rotorcraft Operations | | - |

*(**) AOM21.1 was achieved during 2017 and therefore removed from the Implementation Plan. It is kept in this graph for traceability purposes but no deployment view is presented in the next chapters.*

◊ Means that the objective has an FOC prior to 2015 but has not yet been fully implemented.

The objective codes in the MP Level 3 appearing in this section refer to:

- AOM – Airspace Organisation and Management
- AOP – Airport Operations
- ATC – Air Traffic Control
- ENV – Environment
- NAV – Navigation

A full definition of all acronyms can be found in Annex 1-Definitions and Terminology.

A list containing all airports to which objectives ATC07.1 and ENV01 apply can be found in **Error! Reference source not found.-Error! Reference source not found.**.

# AOM21.2 – Free Route Airspace

Free route airspace (FRA) is a specified airspace within which users may freely plan a route between a defined entry point and a defined exit point, with the possibility to route via intermediate (published or unpublished) waypoints, without reference to the ATS route network, subject to airspace availability.

The PCP IR requires the deployment of free route airspace within of the ICAO EUR region at and above FL 310. Within the PCP the implementation of FRA is closely linked to the deployment of airspace management procedures and advanced flexible use of airspace.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #33, #66 | **AAS Milestone:** | 1.6, 1.10, 5.1 |
| **SESAR Key Feature:** | Advanced Air Traffic Services<br>Optimised ATM Network Services | | |
| **Essential Operational Change / PCP:** | S-AF3.2 Free Route | | |
| **DP Families:** | 3.2.1 Upgrade of ATM systems to support Direct Routing and Free Routing<br>3.2.4 Implement Free Route Airspace | | |
| **OI Steps & *Enablers*:** | AOM-0401, AOM-0402, AOM-0501, AOM-0505, CM-0102-A | | |
| **Dependencies:** | ATC 12.1 (MTCD), ITY-COTR (OLDI) , ATC17 (SYSCO) and ATC02.8 (APW) | | |
| **ICAO ASBUs:** | B1-FRTO | | |
| **Network Strategy Plan:** | SO3/1, SO3/4 | | |
| **Operating Environment:** | En-Route, Network | | |
| **EATMN Systems:** | ASM, ATFCM, FDPS/SDPS & HMI | | |

## When

FOC: **31/12/2021**

## Who

Stakeholders:
- ANSPs
- Airspace Users
- Network Manager

## Where

Applicability Area
All ECAC+ States except Azerbaijan, Belgium, Luxembourg, Israel and the Netherlands

## Status

**On time**

Completion rate - end 2018: **55%**

Estimated achievement: **12/2021**

## Applicable regulations & standards

- Regulation (EU) 677/2011 - Implementation of ATM network functions amending Regulation (EU) No 691/2010
- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Benefits

Operational Efficiency
Savings in route distances and fuel efficiency through increased use of preferred flight profiles.

Environment
Reductions in emissions through use of optimal routes.

Capacity
Increased through better airspace utilisation to and reduced controller workload.

Safety
Although the main benefits are expected in the area of environment the FRA implementation has the ambition to at least maintain the current level of safety.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Implement procedures and processes in support of the network dimension**<br>- Identify the local FRA airspace in coordination with the Network and FAB partners and the update Route Availability Document (RAD) accordingly.<br>- Update the local ATFCM procedures in cooperation with the network to take on board the FRA impact. | 31/12/2021 |
| **ASP02** | **Implement system improvements**<br>- Upgrade FDP and CWP to support FRA, if required. | 31/12/2021 |
| **ASP03** | **Implement dynamic sectorisation** | 31/12/2021 |
| **ASP04** | **Implement procedures and processes in support of the local dimension**<br>- Describe and publish FRA airspace in the AIP and charts.<br>- Update letters of agreement, if necessary.<br>- Update ASM and ATC procedures to take on board the FRA impact. | 31/12/2021 |
| **ASP05** | **Implement transversal activities in support of the operational deployment of FRA (validation, safety case and training)** | 31/12/2021 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Implement system improvements**<br>- Adapt as necessary the flight Planning system to support free routing. | 31/12/2021 |
| **USE02** | **Implement procedures and processes** | 31/12/2021 |
| **USE03** | **Train aircrews and operational staff for FRA operations** | 31/12/2021 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Implement system improvements**<br>- Adapt NM systems (IFPS and Airspace Management tools) to support FRA. | 31/12/2019 |
| **NM02** | **Implement procedures and processes**<br>- Update European Airspace with the integration of the coordinated FRA definition.<br>- Update Route Availability Document (RAD) accordingly. | 31/12/2017 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+ . Morocco added to Applicability Area.

# ATC02.8 - Ground-Based Safety Nets

This objective covers the implementation of the following ground-based safety nets:
- Area proximity warning (APW) warns the controller when an aircraft is, or is predicted to be, flying into a volume of notified airspace (e.g. controlled airspace; danger, prohibited or restricted areas). APW has been identified as a pre-requisite for the implementation of free route airspace (FRA) in the PCP Regulation No 716/2014.
- Minimum safe altitude warning (MSAW) warns the controller about the risk of controlled flight into terrain by generating an alert of proximity to terrain or obstacles.
- Approach path monitor (APM) warns the controller about the risk of controlled flight into terrain accidents by generating an alert of proximity to terrain or obstacles during final approach.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **Essential Operational Change / PCP:** | ATM Systems (PCP) | | |
| **DP Families:** | 3.2.1 Upgrade of ATM systems to support Direct Routing and Free Routing | | |
| **OI Steps & *Enablers*:** | CM-0801 | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B0-SNET, B1-SNET | | |
| **Network Strategy Plan:** | SO4/1 | | |
| **Operating Environment:** | Terminal, En-Route | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## When

FOC: **31/12/2016**

## Who

Stakeholders:
- ANSPs

## Where

Applicability Area
All ECAC+ States, except the Netherlands .

## Applicable regulations & standards

- Only for APW: Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Status

**Late**

Completion rate - end 2018: **54%**

Estimated achievement: **12/2020**

## Benefits

### Safety

Major safety improvement through the systematic presentation of:
- imminent and actual unauthorized penetrations into airspace volumes to controllers ahead of their occurrence, as provided by APW;
- possible infringements of minimum safe altitude to controllers ahead of their occurrence, as provided by MSAW;
- deviations from the glide path to controllers, as provided by APM.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Implement the APW function**<br>- Upgrade ground systems to support the APW function.<br>- Put into service APW function. | 31/12/2016 |
| **ASP02** | **Align ATCO training with the use of APW ground-based safety tools**<br>- Train operational staff in the use of APW according to adapted procedures. | 31/12/2016 |
| **ASP03** | **Implement the MSAW function**<br>- Upgrade ground systems to support the MSAW function.<br>- Put into service MSAW function. | 31/12/2016 |
| **ASP04** | **Align ATCO training with the use of MSAW ground-based safety tools**<br>- Train operational staff in the use of MSAW according to adapted procedures. | 31/12/2016 |
| **ASP05** | **Implement the APM function**<br>- Upgrade ground systems to support the APM function.<br>- Put into service APM function. | 31/12/2016 |
| **ASP04** | **Align ATCO training with the use of APM ground-based safety tools**<br>- Train operational staff in the use of APM according to adapted procedures. | 31/12/2016 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+
- Israel and Morocco added to Applicability Area.

# ATC02.9 – STCA for TMAs

STCA (Short Term Conflict Alert) is a ground system designed and deployed to act as safety net against the risk of having collisions between aircraft during airborne phases of flight. The difficulty of STCA development lies in the need to avoid having a high nuisance alert rate, while still making sure that real conflicts always trigger an appropriate and timely warning. Specific tuning is necessary for STCA to be effective in the TMA, in order to account for lower separation minima, as well as increased frequency of turns, climbs and descents.

It is therefore recognised that STCA may not be operationally usable in some dense TMA operations, because the nuisance alert rate generated by a linear STCA algorithm is evaluated to be too high.

The aim of this Objective twofold:

- To address the implementation of STCA functionality in TMAs

- For the TMA where, due to their complexity, the linear STCA algorithms are not fit for purpose, to address the improvement of the STCA functionality. This could be achieved by using multi-hypothesis algorithms, or other technical solutions ensuring earlier warning and lower nuisance alert rates related to steady and maneuvering aircraft, in comparison to linear STCA algorithms.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #60 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **Operational Change :** | ATM Systems | | |
| **OI Steps & *Enablers*:** | CM-0801, CM-0811 | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B0-SNET, B1-SNET | | |
| **Network Strategy Plan:** | SO4/1 | | |
| **Operating Environment:** | Terminal | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## When

FOC: **31/12/2020**

## Who

Stakeholders:
- ANSPs

## Where

Applicability Area
ECAC+, except Bosnia and Herzegovina, MUAC.
TMAs and enhancements, according to local business needs

## Status

**On time**

Completion rate - end 2018: **72%**

Estimated achievement: **12/2020**

## Applicable regulations & standards

N/A

## Benefits

Safety

Identification of conflicts between flights in TMAs.
STCA based multi-hypothesis algorithm will provide an improved STCA (improved rate of genuine alert while maintaining the rate of nuisance alerts at an operationally acceptable level), thereby enhancing safety in TMAs.
For TMAs with high trajectory uncertainty where operation of a single-hypothesis STCA would currently unacceptable due to its low performance, the introduction of multi-hypothesis algorithms will make it possible to implement STCA.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Implement the STCA function in TMA**<br>- Put into service STCA functionality to provide automated alerting of conflicts to approach controller workstations whilst avoiding false alerts (adapted for the specific TMA operating modes, flight characteristics and separation). | 31/12/2020 |
| **ASP02** | **Improve the STCA functionality**<br>- Put into service or improve the STCA functionality with the use of e.g. multi-hypothesis algorithms or other technical solutions, where required<br>- The improved STCA for TMA operation shall be considered to be deployed by the High Complexity ATS units that provide the services within TMA boundaries where the linear STCA algorithm addressed by SLoA ATC02.9-ASP01 is deemed not sufficient<br>- The SLoA does not have an associated FOC date and should be considered for specific local needs | n/a |
| **ASP03** | **Develop and implement ATC procedures related to the use of STCA in TMA** | 31/12/2020 |
| **ASP04** | **Align ATCO training with the use of STCA in TMA** | 31/12/2020 |
| **ASP05** | **Develop a local safety assessment** | 31/12/2020 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+
- Israel, Morocco and Romania added to Applicability Area.
- title changed (from “Enhanced STCA in TMAs”; into “STCA in TMAs”) as the STCA logic is not required to be modified, but only fined-tuned for the use in TMA environment.
- New SLoA “Improve STCA functionality”

# ATC07.1 – AMAN Tools and Procedures

Implement basic arrival manager (AMAN) tools to improve sequencing and metering of arrival aircraft in selected TMAs and airports.

AMAN interacts with several systems resulting in a 'planned' time for any flight. When several aircraft are predicted around the same time on the runway it plans a sequence with new 'required' times that need to be applied to create/maintain the sequence.

AMAN also outputs the required time for the ATCO in the form of 'time to lose/time to gain', and the ATCO is then responsible for applying an appropriate method for the aircraft to comply with the sequence.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **Essential Operational Change / PCP:** | - Basic AMAN<br>Facilitator for:<br>- S-AF1.1 AMAN Extended to En-route Airspace (PCP)<br>- AMAN/DMAN Integration Including Multiple Airports (OC) | | |
| **DP Families:** | 1.1.1 Basic AMAN | | |
| **OI Steps & *Enablers*:** | TS-0102 | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B0-RSEQ | | |
| **Network Strategy Plan:** | SO4/1 | | |
| **Operating Environment:** | Terminal | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## Applicable regulations & standards

N/A

## When

FOC: **31/12/2019**

## Who

Stakeholders:
- ANSPs

## Where

Applicability Area
22 PCP Airports
11 non-PCP airports

## Status

**On time**

Completion rate - end 2018: **64%**

Estimated achievement: **12/2019**

## Benefits

### Environment
Reduced holding and low level vectoring has a positive environmental effect in terms of noise and CO2 emissions.

### Operational Efficiency
Optimised arrival sequencing produces a positive effect on fuel burn.

### Capacity
Improved airport/TMA capacity and reduced delays.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Implement initial basic arrival management tools** | 31/12/2019 |
| **ASP02** | **Implement initial basic AMAN procedures**<br>- Define, validate and implement ATC procedures for operational use of basic AMAN tools. | 31/12/2019 |
| **ASP03** | **Adapt TMA organisation to accommodate use of basic AMAN** | 31/12/2019 |
| **ASP04** | **Adapt ground ATC systems to support basic AMAN functions** | 31/12/2019 |

## Changes to the Objective since previous edition:

- LLBG and GMMN added to Applicability Area.

# ATC12.1 - Automated Support for Conflict Detection, Resolution Support Information and Conformance Monitoring

The implementation of free route airspace (FRA) needs to be supported by conflict detection tools (CDT), resolution support information and conformance monitoring.

The term 'conflict detection tool' is used to generally indicate the trajectory based medium conflict detection tool (MTCD – an automated decision-support tool that detects conflicts between aircraft trajectories up to 20 minutes in advance) or/and tactical controller tool (TCT - an automated tool that allows the tactical controller (radar/executive) to detect and resolve conflicts up to 8 minutes in advance). TCT is not a replacement of MTCD. The decision to implement either one or both tools) is left to each ANSP depending on local conditions.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #27, #104 | **AAS Milestone:** | 1.15, 5.1 |
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **Essential Operational Change / PCP:** | ATM Systems /Pre-requisite for S-AF3.2 Free Route (PCP) | | |
| **DP Families:** | 3.2.1 Upgrade of ATM systems to support Direct Routing and Free Routing | | |
| **OI Steps & *Enablers*:** | CM-0202, CM-0203, CM-0205, CM-0207-A | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B1-FRTO | | |
| **Network Strategy Plan:** | SO3/1, SO4/1 | | |
| **Operating Environment:** | En-Route | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## When

FOC: **31/12/2021**

## Who

Stakeholders:
- ANSPs

## Where

Applicability Area
All ECAC+ States except Luxembourg.

## Status

**On time**

Completion rate - end 2018: **44%**

Estimated achievement: **12/2021**

## Applicable regulations & standards

N/A

## Benefits

### Safety

Early and systematic conflict detection and conformance monitoring enabled by ground based automated tools will reduce the need for tactical interventions, conformance monitoring reduces the risk of the impact of controllers and pilots errors. Possibility to maintain high level of safety with an increase in capacity due to a reduction of controller workload per aircraft.

### Capacity

Reduction of tactical controller workload, and better sector team productivity, compared to the conventional systems without automated support will open potential for capacity up to 15% in comparison to a baseline case without a detection tool (MTCD and/or TCT).

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Implement MTCD and associated procedures**<br>- Deploy the MTCD related for detection conflicts and risks - between aircraft, between aircraft and reserved airspace or area (such as holding stack area) upon activation or de-activation, including posting detection to the sector responsible for acting on it.<br>- Adapt the operational procedures and working methods to support the MTCD deployment. | 31/12/2021 |
| **ASP02** | **Implement resolution support function and associated procedures**<br>- Deploy the resolution support information which includes conflict probe and passive conflict resolution assistant as appropriate and in accordance with the ANSP's concept of operation and identified needs.<br>- Adapt the operational procedures and working methods for the resolution support function deployment. | 31/12/2021 |
| **ASP03** | **Implement TCT and associated procedures (optional)**<br>- Deploy the tactical controller tool (TCT) to:<br>• Detect conflicts between state vector trajectories( extended STCA);<br>• Detect conflicts between state vector trajectories and tactical trajectories;<br>• Detect conflicts between tactical trajectories;<br>as appropriate and in accordance with the ANSP's Concept of Operation and identified needs.<br>- Adapt the operational procedures and working methods to support the TCT deployment. | 31/12/2021 |
| **ASP04** | **Implement monitoring aids (MONA) functions**<br>- Deploy MONA functions (lateral deviation, longitudinal deviation, vertical deviation CFL deviation, aircraft derived data (ADD) deviations) as appropriate and in accordance with the ANSP's concept of operation and identified needs.<br>- Adapt the operational procedures and working methods to support the MONA deployment. | 31/12/2021 |
| **ASP05** | **Perform ATCO training for the use of CDT (MTCD and or TCT), resolution support and MONA related functions** | 31/12/2021 |
| **ASP06** | **Develop safety assessment for the changes** | 31/12/2021 |
| | - Develop safety assessment of the changes, notably ATC systems and procedures that will implement conflict detection tools, resolution support function and conformance monitoring. | |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+
- Israel and Morocco added to Applicability Area.

# ATC15.1 - Information Exchange with En-route in Support of AMAN

Implement, in en-route operations in selected ACCs, information exchange mechanisms, tools and procedures in support of basic AMAN operations in adjacent ACCs and/or subjacent TMAs (including, where relevant, support for AMAN operations involving airports located in adjacent ATSUs). Arrival management requires the capability for an accepting unit to pass to the transferring unit information on the time that a flight is required to lose or gain to optimise the approach sequence. The system integrates information from arrival management systems operating to a limited distance around the TMA to provide a consistent arrival sequence.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **Essential Operational Change / PCP:** | Predecessor of S-AF1.1 AMAN extended to En-Route Airspace (PCP) | | |
| **DP Families:** | 1.1.2 AMAN upgrade to include Extended Horizon function | | |
| **OI Steps & *Enablers*:** | TS-0305 | | |
| **Dependencies:** | ATC07.1 - AMAN tools and procedures | | |
| **ICAO ASBUs:** | B1-RSEQ | | |
| **Network Strategy Plan:** | SO4/1 | | |
| **Operating Environment:** | Terminal, En-route | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## Applicable regulations & standards

N/A

## Benefits

### Capacity
Improved airport/TMA capacity.

### Environment
Reduction in holding and in low-level vectoring, by applying delay management at an early stage of flight, has a positive environmental effect in terms of noise and CO2 emissions.

### Operational Efficiency
Reduction in holding and in low-level vectoring, by applying delay management at an early stage of flight, reduces delay and has a positive effect on fuel burn.

## When

FOC: **31/12/2019**

## Who

Stakeholders:
- ANSPs

## Where

Applicability Area
EU States except Cyprus, Greece, Latvia, Lithuania, Luxembourg, Malta, Slovenia.
Plus: Bosnia and Herzegovina, Israel, MUAC, Morocco, Norway, Switzerland, Turkey

## Status

**Planned delay**

Completion rate - end 2018: **48%**

Estimated achievement: **12/2020**

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Develop safety assessment for the changes**<br>- Develop safety assessment of the changes, notably ATC systems and procedures that will implement arrival management functionality in en-route sectors and associated procedures. | 31/12/2019 |
| **ASP02** | **Adapt the ATC systems that will implement arrival management functionality in en-route sectors in support of AMAN operations in adjacent/subjacent TMAs**<br>- Implement, in selected ATC systems, the necessary functionality and information exchanges to support the use of AMAN information in en-route sectors requiring data exchange generated from AMAN systems and operations in adjacent/subjacent TMAs. | 31/12/2019 |
| **ASP03** | **Implement ATC procedures in en-route airspace/sectors that will implement AMAN information and functionality**<br>- Define, validate and implement the necessary ATC procedures in selected en-route airspace/sectors, to support the use of AMAN information in en-route sectors that are interfacing with AMAN systems operating in adjacent/subjacent TMAs. | 31/12/2019 |
| **ASP04** | **Train operational and technical staff and update training plans**<br>- Train operational staff in the use of ATC procedures in en-route airspace/sectors that will implement AMAN information and functionality in support of AMAN in adjacent/subjacent TMAs. | 31/12/2019 |

## Changes to the Objective since previous edition:

- Slovak Republic ,Israel and Morocco added to Applicability Area

# ATC15.2 - Arrival Management Extended to En-route Airspace

Arrival management (AMAN) extended to en-route airspace extends the AMAN horizon from the 100-120 nautical miles to at least 180-200 nautical miles from the arrival airport.

Arrival sequencing may be anticipated during en-route and early descent phases.

The objective supplements the existing ATC15.1, which consider the AMAN extension to a limited distance around the TMA.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #05 | **AAS Milestone:** | 1.3 |
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **Essential Operational Change / PCP:** | S-AF1.1 AMAN extended to En-Route Airspace (PCP) | | |
| **DP Families:** | 1.1.2 AMAN upgrade to include Extended Horizon function | | |
| **OI Steps & *Enablers*:** | TS-0305-A | | |
| **Dependencies:** | ATC07.1 - Implement AMAN tools and procedures | | |
| **ICAO ASBUs:** | B1-RSEQ | | |
| **Network Strategy Plan:** | SO4/1 | | |
| **Operating Environment:** | Terminal, En-route | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## When

FOC : **31/12/2023**

*Only for ACCs within the extended AMAN horizon, including those adjacent to TMAs serving/associated to PCP airports*

## Who

Stakeholders:
- ANSPs
- Network Manager

## Where

Applicability Area
All ECAC+ States except Armenia, Cyprus, Finland, North Macedonia, Latvia, Lithuania, Luxembourg , Montenegro, Morocco and Serbia.

## Status

Not available

Completion rate - end 2018: **12%**

Estimated achievement: **Not available**

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Benefits

Capacity
Optimal use of TMA capacity.

Environment
Delays are resorbed by reducing speed in early phases of arrivals leading to reduction of holding and vectoring which has a positive environmental impact in terms of fuel savings.

Operational Efficiency
Improved arrival flow.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Upgrade ATC systems to support extended AMAN**<br>- The upgrade should consider data exchange, data processing and information display at the ATCO working positions in support the handling of AMAN constrains as appropriate. Systems must be able to generate, communicate, receive and display AMA OLDI messages or other extended AMAN data exchanges via B2B services. | 31/12/2023 |
| **ASP02** | **Implement ATC procedures to support extended AMAN**<br>- Define and implement the needed ATC procedures to support the extended AMAN functionality. | 31/12/2023 |
| **ASP03** | **Develop, and deliver as necessary, a safety assessment**<br>- Develop safety assessment of the changes related to implementation of extended arrival management functionality. | 31/12/2023 |
| **ASP04** | **Establish bilateral agreements**<br>- Establish Bilateral agreements between the ATS units involved for extended operational procedures and data exchanges, as well as between the concerned ATS unit and NM. | 31/12/2023 |
| **ASP05** | **Ensure that all operational personnel concerned is adequately trained**<br>- Train operational staff in the use of ATC procedures. | 31/12/2023 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Upgrade NM systems to support extended AMAN**<br>- Adapt NM systems including reception, processing and presentation of extended AMAN data, provision of network information (EFD) as well as development of network impact assessment tools to include extended AMAN. | 31/12/2023 |
| **NM02** | **Establish bilateral agreements**<br>- Define the data exchanges and operational procedures between NM and concerned ATS units. | 31/12/2023 |
| **NM03** | **Implement ATFCM procedures for management of extended AMAN info**<br>- Define and implement the required ATFCM procedures to support the extended AMAN functionality. | 31/12/2023 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+
- Israel added to Applicability Area.

# ATC17 - Electronic Dialogue as Automated Assistance to Controller during Coordination and Transfer

Implement automated assistance to controller during coordination and transfer between ATC components serving ATC units for the purpose of achieving:
1. Electronic dialogue in coordination prior to the transfer of flights from one ATC unit to the next.
2. Transfer of communication from one ATC unit to the next ATC unit of such flights.
3. Coordination processes that support the exchange of OLDI messages related to the basic procedure.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | 1.3 |
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **Essential Operational Change / PCP:** | Enabler for S-AF3.2 Free Route | | |
| **DP Families:** | 3.2.1 Upgrade of ATM systems to support Direct Routing and Free Routing | | |
| **OI Steps & *Enablers*:** | CM-0201 | | |
| **Dependencies:** | ITY-COTR – Ground/ground automated co-ordination processes | | |
| **Network Strategy Plan:** | SO3/1, SO4/1 | | |
| **Operating Environment:** | Terminal, En-Route, Network | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## When

FOC: **31/12/2018**

## Who

Stakeholders:
- ANSPs

## Where

Applicability Area
All ECAC+ States except Ireland, Slovak Republic and Ukraine.

## Applicable regulations & standards

- EUROCONTROL - SPEC 106 - Specification for On-Line Data Interchange (OLDI) - Edition 4.3 - recognised as Community specification; OJ 2011/C 146/11 / 12/2017

## Status

**Late**

Completion rate - end 2018: **26%**

Estimated achievement: **12/2021**

## Benefits

Capacity
Reduction of controller workload compared to conventional processes without automated support.

Safety
Reduction of human error due to automation of controller tasks during coordination and transfer.

Operational Efficiency
More efficient planning and operational decision making.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Develop safety assessment for the changes**<br>- Develop safety assessment of the changes, notably upgrades of the system to support electronic dialogue during coordination and transfer. | 31/12/2018 |
| **ASP02** | **Upgrade and put into service ATC system to support the Basic procedure (specifically PAC and COD)**<br>- When bilaterally agreed between ANSPs, upgrade and put into service ATC system to support the basic procedure, specifically Preliminary Activation Message (PAC) and, if applicable, SSR Code Assignment Message (COD). | 31/12/2018 |
| **ASP03** | **Upgrade and put into service ATC system to support electronic dialogue procedure in Transfer of communication process**<br>- Upgrade ground systems with the functions to support electronic dialogue procedure in transfer of communication process using OLDI messages, as identified by the individual administration from the following list: - ROF, COF, TIM, HOP, MAS and SDM. | 31/12/2018 |
| **ASP04** | **Upgrade and put into service ATC system to support electronic dialogue procedure in Coordination process**<br>- Upgrade ground systems with the functions to support electronic dialogue procedure in coordination process using OLDI messages, as identified by the individual administration from the following list: - RAP, RRV, CDN, ACP, RJC and SBY. | 31/12/2018 |
| **ASP05** | **Train ATC staff for applying electronic dialogue procedure** | 31/12/2018 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+
- Israel and Morocco added to Applicability Area.
- Status changed from “Planned delay” to “Late”

# ATC18 - Multi Sector Planning En-route - 1P2T [Local]

The multi-sector planner (MSP) defines a new organisation of controller team(s) and new operating procedures to enable the planning controller to provide support to several tactical controllers operating in different adjacent en-route or TMA sectors.

This Implementation Objective proposes a structure whereby, in en-route sectors, a single planner controller (P) is planning and organising the traffic flows for two tactical controllers (T), each of whom is controlling a different sector (1P-2T configuration). There is no need for exit/entry coordination with the airspace volume of multi-sector planner. However, the coordination capability with adjacent planner/multi-planner should remain.

This concept is intended for operation with suitably configured flight data processing components, flexible allocation of ATC roles and volumes and multi-sector planning.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #63 | **AAS Milestone:** | 4.3, 5.1 |
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **Essential Operational Change :** | Sector Team Operation | | |
| **DP Families:** | No direct link, although implementation is recommended in Family 3.2.1 | | |
| **OI Steps & *Enablers*:** | CM-0301 | | |
| **Dependencies:** | No dependencies | | |
| **Network Strategy Plan:** | SO4/1 | | |
| **Operating Environment:** | En-Route | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## When

FOC: **n/a**

## Who

Stakeholders:
- ANSPs

## Where

Applicability Area
Subject to local needs and complexity

## Status

Not available

Completion rate - end 2018:

Implemented by 4 ANSPs
Planned / ongoing by 8 ANSPs

## Applicable regulations & standards

N/A

## Benefits

### Cost Efficiency

Improved through improved ATCO Productivity. The improvement comes from handling traffic levels with fewer ATCO hours than in current operations and through workload reduction from new ATCO support tools.

### Capacity

The workload reduction might be translated in marginal capacity gains.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **ATM system support to permit a single planner role associated to two adjacent tactical roles**<br>- The en-route ATM system functions are enhanced to allow a planner role to be associated to two adjacent sector tactical roles. The planner role shall be given the data access and eligibility to modify relevant traffic attributes for the airspace volume allocated to him so that the planner can identify the s potential conflicts or risk of conflicts and de-conflict/ smooth the traffic flows in order to avoid the tactical interventions.<br>The actually necessary capabilities depend on the individual level of complexity. In many cases a stripless HMI, trajectory prediction and medium-term conflict detection might be required. | n/a |
| **ASP02** | **Develop multi-sector planning procedures and working methods for en-route sectors**<br>- Develop procedures and working methods to cater for enhanced planner tools and adapted workplace layout requirements triggered by the change of coordination and communication among ATCOs. | n/a |
| **ASP03** | **Train air traffic controllers to multi-sector planning** | n/a |
| **ASP04** | **Develop, and deliver as necessary, a safety assessment** | n/a |

## Changes to the Objective since previous edition:

- Nil

# ATC19 – Enhanced AMAN-DMAN integration [Local]

Integrated AMAN and DMAN aims at increasing predictability and resilience at an airport by improved co-ordination between ACC/APP and TWR controllers. Arrival and Departure flows to the respective runway are integrated by setting up fixed arrival departure sequencing pattern for defined periods. The successive pattern shall be agreed between ATSUs with the support of a tool considering arrival and departure demand for the RWY(s) concerned. Departure flow to the runway is managed by pre-departure sequencing (integrating route planning) while arrival flow to the runway is managed by arrival metering. Procedures for adjusting the Arrival and Departure sequence shall remain unchanged compared to the previous operating method of just using AMAN and DMAN work independently .

The integration of the two systems is achieved as follows:

- AMAN and DMAN systems shall be coupled and shall provide with an integrated and shared view on the planned arrival and departure flow (and sequence pattern) to the relevant TWR and APP CWPs.

- Coupled AMAN/DMAN shall operate in a master/slave configuration; the AMAN setting-up gaps (Arrival Free Intervals) to be filled by the DMAN.

This integration shall rely on a stable and optimised pre-departure sequence supported by an enhanced DMAN as described in PCP sub AF 2.1 and 2.2

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #54 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **Operational Change :** | AMAN/DMAN integration including multiple airports | | |
| **OI Steps & *Enablers*:** | TS-0308 | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B2-RSEQ | | |
| **Network Strategy Plan:** | SO6/5, SO4/1 | | |
| **Operating Environment:** | Airport, Terminal | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## When

FOC: **n/a**

## Who

Stakeholders:
- International Organisations
- ANSPs

## Where

Applicability Area
Subject to local needs

## Status

Not available

Completion rate - end 2018: **n/a**

## Applicable regulations & standards

N/A

## Benefits

Operational Efficiency
Contribution to Predictability; increase in resilience.

Environment
The coupling of AMAN with DMAN has been shown to save departure fuel and improve local air quality due to a reduction in the taxi-out time during peak traffic (up to 7% savings in taxi-out fuel ).

## International Organisations Lines of Action:

| | | |
|---|---|---|
| **INT01** | **Promulgate AMCs to ensure a harmonised application of the functional system, including roles and responsibilities** | n/a |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Couple AMAN and DMAN systems**<br>- AMAN and DMAN systems shall be coupled in a master/slave configuration and shall support co-ordination between ACC/APP and TWR controllers. The AMAN acting as the master is setting-up gaps (Arrival Free Intervals - AFI) which shall be filled by the DMAN allocating departures in the AFIs.<br>- Changes must be synchronised between the ANSP units (TWR, APP and ACC) providing services to the airport / runway.<br>- Integration between ANSP and Airport systems may be required at each deployment location depending on the ownership arrangement. | n/a |
| **ASP02** | **Integrate surface movement processing system with DMAN**<br>- The integration of AMAN and DMAN shall rely on a stable and optimized pre-departure sequence The aircraft operator provides DMAN with an accurate Target off Block Times (TOBT) via its AOCC or via airport's CDM interface. This provides accurate Target Start-Up Approval Times (TSATs), reliable enough to allow the Controller to adhere to the pre-departure sequence. | n/a |
| **ASP03** | **Upgrade CWP to incorporate the information from integrated AMAN/DMAN** | n/a |
| **ASP04** | **Develop safety assessment of the changes** | n/a |
| **ASP05** | **Train the controllers in the use of integrated Arrival and Departure Management** | n/a |

## Changes to the Objective since previous edition:

- New Objective

# ATC20 – Enhanced STCA with down-linked parameters via Mode S EHS [Local]

STCA (Short Term Conflict Alert) is a ground system designed and deployed as last Safety Net against the risk of collisions between aircraft due to separation loss. Enhanced STCA can be used both in En-Route and TMA radar environments to improve prediction of potential conflicts and reduce false alert rate. The difficulty of STCA development lies with the need to avoid a high false alert rate versus the need of ensure that all risk of collision always triggers a timely warning.

This objective addresses the enhancement of the STCA safety net with selected flight level (SFL) information down-linked from the suitably equipped aircraft via the Mode-S EHS protocol. Enhancing the STCA with the information downlinked from the aircraft will improve the warning times, decrease the rate of nuisance alerts and maintain or improve the rate of genuine alerts.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #69 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **Operational Change :** | ATM Systems | | |
| **OI Steps & *Enablers*:** | CM-0807-A | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B1-SNET | | |
| **Network Strategy Plan:** | SO7/2 | | |
| **Operating Environment:** | En-route, Terminal | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## When

FOC: **n/a**

## Who

Stakeholders:
- Regulators
- ANSPs

## Where

Applicability Area
- Subject to local needs, relevant to:
- ACCs and collocated ACCs/APPs
- APP Units providing services to more than 100K IFR movements per year

## Applicable regulations & standards

Regulation (EU) No 2017/386 amending Regulation (EU) No 1207/2011 (SPI)

## Status

Not available

Completion rate - end 2018: **n/a**

## Benefits

Safety

A comparative analysis of STCA enhanced with the SFL DAP against conventional STCA showed that the use of the SFL DAP improves warning times, decreases the rate of nuisance alerts and maintains or increases the rate of genuine alerts.

## Regulators Lines of Action:

| | | |
|---|---|---|
| **REG01** | **Mandate the airborne carriage and operation of suitable equipment (Mode S EHS transponders)**<br><br>- Mandate the equipage of fixed winged aircraft, with a maximum certified take-off mass exceeding 5700 kg or having a maximum cruising true airspeed capability greater than 250 knots, operating as IFR/GAT with appropriate equipment allowing the downlink of the Selected Flight Level information, via the Mode S EHS protocol.<br>- For the EU States, the carriage requirement is addressed by the SPI Regulation (No 2017/386 amending Regulation (EU) No 1207/2011), therefore this SLoA is not relevant and should be considered as not applicable. The non-EU States may have to issue local mandates for the carriage and operation of EHS transponders. | n/a |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Deploy enhanced STCA function with the use of Selected Flight Level downlinked parameter** | n/a |
| **ASP02** | **Develop and implement ATC procedures related to the availability for display and use of SFL in the STCA functionality** | n/a |
| **ASP03** | **Align ATCO training to address the availability and use of the SFL downlinked parameter** | n/a |
| **ASP04** | **Develop a local safety assessment** | n/a |

## Changes to the Objective since previous edition:

- New Objective

# ENV01 - Continuous Descent Operations

A continuous descent operation (CDO) is an aircraft operating technique, enabled by airspace design, procedure design and ATC clearances in which arriving aircraft descend without interruption, to the greatest possible extent, by employing minimum thrust to optimise fuel burn.

Many major airports now employ PBN procedures which can enable both CDO and continuous climb operations (CCO). CDO does not adversely affect safety and capacity and will produce environmental and operational benefits including reductions to fuel burn, gaseous emissions and noise impact.

It is important that, to avoid misleading interpretations, monitoring and measuring of CDO execution is done using harmonised definitions, methodology and parameters. The proposed methodology(*) identified by the European TF on CCO/CDO is detailed at http://www.eurocontrol.int/articles/continuous-climb-and-descent-operations.

*(*) Note that at the time of publication of this document, the methodology released in 2016 by the CCO/CDO TF1 is currently being reviewed by the CCO/CDO TF2.*

| | | | |
|---|---|---|---|
| **SESAR Solutions:.** | Nil | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **OI Steps & *Enablers*:** | AOM-0701, AOM-0702-A | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B0-CDO, B1-CDO | | |
| **Network Strategy Plan:** | SO6/5 | | |
| **Operating Environment:** | Airport, Terminal | | |
| **EATMN Systems:** | No impact on EATMN systems | | |

## When

FOC: **31/12/2023**

## Who

Stakeholders:
- ANSPs
- Airport Operators
- Airspace Users

## Where

Applicability Area
68 Airports

## Status

**On time**

Completion rate - end 2018: **41%**

Estimated achievement: **12/2023**

## Applicable regulations & standards

- Regulation (EU) 598/2014 on rules and procedures on noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC (as from 16/06/2016)
- EC Directive 2002/49/EC, on the assessment and management of environmental noise
- EC Directive 2008/50/EC, on ambient air quality and cleaner air for Europe

## Benefits

### Environment

Reduction of fuel burn (and consequently, atmospheric emissions) has been estimated to be 51kg per flight for those flying CDO over those flying non-CDO. In addition, studies have indicated that due to lower drag and thrust facilitated by CDO, over certain portions of the arrival profile, noise can be reduced by up to 5dB.

### Operational Efficiency

Reduction in fuel consumption by the flying of optimised profiles (no vertical containment required). If the CDO is flown as part of a PBN procedure, the predictability of the vertical profile will be enhanced for ATC. CDOs are also a proxy for Vertical Flight Efficiency (VFE) and should be monitored according to harmonised definitions and parameters in order to measure efficiency.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Implement rules and procedures for the application of CDO techniques**<br><br>Implement rules and ATC procedures for the application of CDO techniques in the TMA, whenever practicable. Coordination should be, in all circumstances, undertaken with adjacent ATS units, NM, aircraft operators and airport operators.<br>Provide situational awareness support to allow aircrew to apply CDO. | 31/12/2023 |
| **ASP02** | **Design and implement CDO procedures enabled by PBN**<br><br>Deploy PBN airspace and arrival procedures that allow the aircraft to fly a continuous descent approach taking into account airspace and traffic complexity.<br>This enhances vertical flight path precision and enables aircraft to fly an arrival procedure not reliant on ground-based equipment for vertical guidance. | 31/12/2023 |
| **ASP03** | **Train controllers in the application of CDO techniques** | 31/12/2023 |
| **ASP04** | **Monitor and measure the execution of CDO**<br><br>- In cooperation with airport, monitor and measure CDO execution, where possible based upon a harmonised methodology (*) and metrics.<br>The methodology should be used also to identify the cause of any restrictions to CDO (such as inefficient LoAs (reflecting older more inefficient aircraft types and their corresponding vertical profiles)). Route changes should then be proposed to facilitate CDOs, in order to enhance vertical flight efficiency.<br>- Provide any feedback to all concerned stakeholders on the level of CDO execution together with any other trends observed by the CDO performance monitoring. | 31/12/2023 |

## Airport Operators Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Monitor and measure the execution of CDO**<br><br>- In cooperation with the ANSP, monitor and measure CDO execution, where possible based upon a harmonised methodology (*) and metrics.<br>The methodology should be used also to identify the cause of any restrictions to CDO (such as inefficient LoAs (reflecting older more inefficient aircraft types and their corresponding vertical profiles)). Route changes should then be proposed by the ANSP to facilitate CDOs, in order to enhance vertical flight efficiency.<br>- Provide any feedback to all concerned stakeholders on the level of CDO execution together with any other trends observed by the CDO performance monitoring. | 31/12/2023 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Include CDO techniques in the aircrew training manual and support its implementation wherever possible** | 31/12/2013 |

*(*) Note that at the time of publication of this document, the methodology released in 2016 by the CCO/CDO TF1 is currently being reviewed by the CCO/CDO TF2.*

## Changes to the Objective since previous edition:

- Status “On time”.
- LLBG and GMMN added to Applicability Area.

# ENV03 - Continuous Climb Operations [Local]

A continuous climb operation (CCO) is an aircraft operating technique, enabled by airspace design, procedure design and ATC clearances in which departing aircraft climb without interruption, to the greatest possible extent, by employing optimum climb engine thrust at climb speeds until reaching the cruise flight level.

Many major airports now employ PBN procedures which can enable both CDO and continuous climb operations (CCO). CCO does not adversely affect safety and capacity and will produce environmental and operational benefits including reductions to fuel burn, gaseous emissions and noise impact.

It is important that monitoring and measuring of CDO execution is done using harmonised definitions, methodology and parameters to avoid misleading interpretations. The proposed methodology (*) identified by the European TF on CCO/CDO is detailed at http://www.eurocontrol.int/articles/continuous-climb-and-descent-operations.

*(*) Note that at the time of publication of this document, the methodology released in 2016 by the CCO/CDO TF1 is currently being reviewed by the CCO/CDO TF2.*

| | | | |
|---|---|---|---|
| **SEASR Solutions:** | Nil. | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **OI Steps & *Enablers*:** | AOM-0703 | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B0-CCO | | |
| **Network Strategy Plan:** | SO6/5 | | |
| **Operating Environment:** | Airport, Terminal | | |
| **EATMN Systems:** | No impact on EATMN systems | | |

## Applicable regulations & standards

- Regulation (EU) 598/2014 on rules and procedures on noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC (as from 16/06/2016)
- EC Directive 2002/49/EC, on the assessment and management of environmental noise
- EC Directive 2008/50/EC, on ambient air quality and cleaner air for Europe

## When

FOC: **n/a**

## Who

Stakeholders:
- ANSPs
- Airport Operators
- Airspace users

## Where

Applicability Area
Aerodromes subject to local needs and complexity

## Status

Not available

Completion rate - end 2018: **Implemented in 42 locations**

**Planned / ongoing in 40 locations**

## Benefits

### Environment

Reduction of fuel burn (and consequently, atmospheric emissions) has been estimated to be 17kg per flight for those flying CCO over those flying non-CCO. In addition, studies have indicated that due to lower drag and thrust facilitated by CCO, over certain portions of the arrival profile, noise may be reduced. Studies are currently ongoing to gauge such noise reductions.

### Operational Efficiency

CCOs contribute to reducing airlines operating costs including a reduction in fuel consumption by the flying of optimised profiles (no vertical containment required). If the CCO is flown as part of a PBN procedure, the predictability of the vertical profile will be enhanced for ATC. CCOs are also a proxy for Vertical Flight Efficiency (VFE) and should be monitored according to harmonised definitions and parameters in order to measure efficiency.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Implement rules and procedures for the application of CCO techniques**<br><br>Implement rules and ATC procedures for the application of CCO techniques in the TMA, whenever practicable. Coordination should be, in all circumstances, undertaken with adjacent ATS units, the NM, aircraft operators and airport operators.<br>Provide the tactical and operational situational awareness support to allow aircrew to apply CCO. | n/a |
| **ASP02** | **Train controllers in the application of CCO techniques** | n/a |
| **ASP03** | **Monitor and measure the execution of CCO**<br><br>- In cooperation with airports, monitor and measure CCO execution, where possible based upon a harmonised methodology (*) and metrics.<br>The methodology should be used also to identify the cause of any restrictions to CCO (such as inefficient LoAs (reflecting older more inefficient aircraft types and their corresponding vertical profiles)). Route changes should then be proposed to facilitate CCOs, in order to enhance vertical flight efficiency.<br>- Provide any feedback to airports, aircraft operators and the NM on the level of CCO execution together with any other trends observed by the CCO performance monitoring. | n/a |

## Airport Operators Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Monitor and measure the execution of CCO**<br><br>- In cooperation with the ANSP, monitor and measure CCO execution, where possible based upon a harmonised methodology (*) and metrics.<br>The methodology should be used also to identify the cause of any restrictions to CCO (such as inefficient LoAs (reflecting older more inefficient aircraft types and their corresponding vertical profiles)). Route changes should then be proposed, by the ANSP, to facilitate CCOs, in order to enhance vertical flight efficiency.<br>- Provide any feedback to the ANSP, aircraft operators and the NM on the level of CCO execution together with any other trends observed by the CCO performance monitoring. | n/a |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Include CCO techniques in the aircrew training manual** | n/a |

*(*) Note that at the time of publication of this document, the methodology released in 2016 by the CCO/CDO TF1 is currently being reviewed by the CCO/CDO TF2.*

## Changes to the Objective since previous edition:

- Nil

# NAV03.1 - RNAV 1 in TMA Operations

Performance-based navigation distinguishes between RNAV and RNP Specifications, both of which rely on area navigation techniques which allow aircraft to operate on any desired flight path within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained aids, or a combination of these. An RNAV 1 specification includes several requirements, one being a requirement for the lateral and longitudinal total system error (TSE) to be within +/- 1NM at least 95% of the flight time.

Individual States, ANSPs, and airports will evaluate the business need for SID routes or STAR routes. Where providers of ATM/ANS have established SID or STAR, they shall implement those routes in accordance with the requirements of RNAV 1 or RNP1 specification, as applicable.

| **SESAR Solutions:** | #62 | **AAS Milestone:** | Nil |
|---|---|---|---|
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **Essential Operational Change / PCP:** | - Introduction of P-RNAV<br>- Predecessor of S-AF1.2 Enhanced TMA using RNP-based operations | | |
| **OI Steps & *Enablers*:** | AOM-0601, *CTE-N08* | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B0-CDO, B0-CCO, B1-RSEQ | | |
| **Network Strategy Plan:** | SO6/5 | | |
| **Operating Environment:** | Terminal | | |
| **EATMN Systems:** | FDPS/SDPS & HMI, NAV | | |

## Applicable regulations & standards

Regulation (EU) 2018/1048 – PBN airspace usage requirements and operating procedures

## Benefits

### Operational Efficiency
Reduction in fuel burn through optimised routes and TMA procedures.

### Environment
Emissions and noise nuisance reduced by use of optimal flight procedures and routings.

### Safety
Increased situational awareness and indirect benefit to both ATC and pilot through reduction of workload during RNAV operations.

## When

FOC: **06/06/2030**

For intermediate FOC dates, see SLoA list

## Who

Stakeholders:
- Regulators
- ANSPs
- Airspace users

## Where

Applicability Area
App.1=EU SES RWYs
App.2= Other ECAC+ RWYs (except MUAC )

## Status

Completion rate - end 2018:

Estimated achievement:

N/A - Objective fully revised to comply with PBN IR.

## Regulators Lines of Actions

| | | |
|---|---|---|
| **REG01** | **Verify the transition plan for PBN in ANS provision** | 06/06/2030 |

## ANSPs Lines of Action:

*Note: PBN Regulation (EU) 2018/1048, **does not impose obligatory establishment** of SID or STAR (business decision on having SID or STAR is up to an individual stakeholder). However, the regulation does prescribe **obligatory set of specifications** to be complied with, **where a stakeholder had decided to establish** SID or STAR.*

| | | |
|---|---|---|
| **ASP01** | **Develop an airspace concept based on RNAV 1 arrival and departure procedures** | 06/06/2030 |
| **ASP02** | **Provide appropriate terrestrial navigation infrastructure to support RNAV 1 operations**<br>- Implement appropriate DME/DME infrastructure to support nominal or non-nominal mode, dependent on the Airspace Concept at NAV03.1-ASP01. Where RNAV 1 procedures are dependent upon sufficient DME transponders being distributed geographically to allow for DME/DME navigation either in nominal or in non-nominal mode (in the absence of onboard GNSS equipment or GNSS failure), this may result in a requirement to install new DME stations and/or the relocation of existing units, where possible... | 06/06/2030 |
| **ASP03** | **Train air traffic controllers in RNAV 1 procedures** | 06/06/2030 |
| **ASP04** | **Train procedure designers in RNAV 1 capabilities** | Finalised |
| **ASP05** | **Develop and implement <u>at least one</u> RNAV 1 SID and RNAV 1 STAR per instrument RWY** | EU SES states 25/01/2024<br>Other ECAC + states 06/06/2030 |
| **ASP06** | **Publish in AIPs all co-ordinate data in WGS-84 meeting the quality requirements set out in ICAO Annex 15** | Finalised |
| **ASP08** | **Adapt ATS automated systems to ensure the availability of information regarding aircraft RNAV equipage for systematic display to relevant control positions** | Finalised |
| **ASP11** | **Develop a local RNAV 1 safety assessment** | 06/06/2030 |
| **ASP12** | **Establish the transition plan for PBN in ANS provision** | 06/06/2030 |
| **ASP13** | **Develop and implement <u>all</u> RNAV 1 SID and RNAV 1 STAR per instrument RWY** | 06/06/2030 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Install appropriate RNAV 1 equipment** | 06/06/2030 |
| **USE02** | **Train flight crews in RNAV 1 TMA procedures** | 06/006/2030 |

## Changes to the Objective since previous edition:

- NAV03.1 is completely revised to comply with PBN IR.
- Two distinctive App. areas (EU SES and other ECAC+ RWYs) to enable proper monitoring in LSSIP and indication of different type of obligations with respect to PBN IR.
- New FOC date 25/01/2024 for EU SES instrument RWYs, and 06/06/2030 for other ECAC instrument RWYs.
- Added new SLoAs: REG01, ASP12, ASP13. Revised SLoA ASP02 and ASP05.
- Scope changed from ECAC to ECAC+. Israel and Morocco added to Applicability Area.

# NAV03.2 – RNP 1 in TMA Operations

Where ANS providers have established SID or STAR and where higher performance requirements than those of RNAV 1 are required in order to maintain air traffic capacity and safety in environments with high traffic density, traffic complexity or terrain features, they shall implement those routes in accordance with the requirements of the RNP 1 specification, including one or more of the following additional navigation functionalities:

(a) operations along a vertical path and between two fixes and with the use of:

(i) an 'AT' altitude constraint;

(ii) an 'AT or ABOVE' altitude constraint;

(iii) an 'AT or BELOW' altitude constraint;

(iv) a 'WINDOW' constraint;

(b) the radius to fix (RF) leg.

RNP 1 operations require on-board performance monitoring and alerting capability, and inputs from global navigation satellite systems (GNSS).

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #09, #51 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **Essential Operational Change / PCP:** | S-AF1.2 Enhanced TMA using RNP-based operations | | |
| **DP Families:** | 1.2.3 RNP 1 Operations in high density TMAs (ground)<br>1.2.4 RNP 1 Operations (aircraft) | | |
| **OI Steps & *Enablers*:** | AOM-0603, AOM-0605 | | |
| **Dependencies:** | Improvements might be required in e.g. ATC12.1 (MTCD, conflict resolution support and MONA), ATC02.9 (STCA) and ATC02.8 (APW) | | |
| **ICAO ASBUs:** | B1-RSEQ | | |
| **Network Strategy Plan:** | SO6/5 | | |
| **Operating Environment:** | Terminal | | |
| **EATMN Systems:** | FDPS/SDPS & HMI, NAV | | |

## When

FOC: **06/06/2030**

For intermediate FOC dates, see SLoA list

## Who

Stakeholders:

- ANSPs
- Airspace users
- Regulators

## Where

Applicability Area

App.1=EU SES RWYs

App.2= Other ECAC+ RWYs (except MUAC )

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project
- Regulation (EU) 2018/1048 – PBN IR

## Status

| | |
|---|---|
| Completion rate - end 2018: | N/A - Objective fully revised to comply with PBN IR. |
| Estimated achievement: | |

## Benefits

### Operational Efficiency

Reduction in fuel burn through optimised TMA procedures.

### Environment

Emissions and noise nuisance reduced by use of optimal flight procedures and routings.

### Safety

Increased situational awareness and indirect benefit to both ATC and pilot through reduction of workload during RNP operations.

## Regulators Lines of Actions

| | | |
|---|---|---|
| **REG01** | **Verify the transition plan for PBN in ANS provision** | 06/06/2030 |

## ANSPs Lines of Action:

*Note: **Except for** the airports listed in section 1.2.1 of the Annex of the PCP Regulation, **establishment of** RNP1 SID or STAR is **not imposed as obligatory** requirement **by the PBN Regulation** (EU) 2018/1048 (business decision on having SID or STAR is up to an individual stakeholder). However, the **PBN** regulation does prescribe **obligatory set of specifications** to be complied with, **where a stakeholder had decided to establish** SID or STAR.*

| | | |
|---|---|---|
| **ASP01** | **Develop an airspace concept based on designated RNP 1 arrival and departure procedures with Radius to Fix (RF)**<br>RWYs in EU SES (mandatory for PCP) by<br>Other RWYs in ECAC+ by | <br>25/01/2024<br>06/06/2030 |
| **ASP02** | **Where necessary, provide appropriate navigation infrastructure to support RNP 1 operations including the infrastructure required for GNSS reversion** | 06/06/2030 |
| | ANSPs determine whether and to what extent a DME infrastructure is needed to accommodate non-nominal operations in the event of a GNSS outage requiring reversion from RNP 1 operations. This may result in a requirement to install new DME stations and/or the relocation of existing units. | |
| **ASP03** | **Train air traffic controllers in RNP 1 procedures with Radius to Fix (RF)** | 06/06/2030 |
| **ASP04** | **Implement <u>at least one</u> RNP1 SID & STAR with radius to Fix (RF), per instrument RWY**<br>RWYs in EU SES by<br>Other RWYs in ECAC+ by | <br>25/01/2024<br>06/06/2030 |
| **ASP05** | **Develop a local RNP 1 safety assessment** | 06/06/2030 |
| **ASP06** | **Establish the transition plan for PBN in ANS provision** | 06/06/2030 |
| **ASP07** | **Implement <u>all</u> RNP1 SID and STAR with radius to Fix (RF), per instrument RWY**<br>RWYs in EU SES at PCP airports<br>Other RWYs in ECAC+ | <br>25/01/2024<br>06/06/2030 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Install appropriate RNP 1 with Radius to Fix (RF) equipment** | 06/06/2030 |
| **USE02** | **Train flight crews in RNP 1 TMA procedures** | 06/06/2030 |

## Changes to the Objective since previous edition:

- NAV03.2 is completely revised to comply with PBN IR.
- Two distinctive App. areas (EU SES and other ECAC+ RWYs) to enable proper monitoring in LSSIP and indication of different type of obligations with respect to PBN IR.
- New FOC date 25/01/2024 for EU SES instrument RWYs, and 06/06/2030 for other ECAC+ instrument RWYs.
- Added new SLoAs: REG01, ASP06, ASP07. Revised SLoA ASP04.
- Scope changed from ECAC to ECAC+. Israel and Morocco added to Applicability Area.

# NAV10 - RNP Approach Procedures to instrument RWY

The main intention is to transition from conventional Non Precision Approach (NPA) procedures to RNP approach procedures with vertical guidance using: SBAS flown to LPV minima, and Baro flown to LNAV/VNAV minima. In addition, RNP approach operations using SBAS can be flown to LNAV/VNAV minima.

At RWY ends where, due to terrain, obstacles or ATC conditions, the implementation of RNP approach procedures to LNAV/VNAV and LPV minima is excessively difficult or not feasible, ANSP shall implement RNP Non-precision approach procedures (NPA) in accordance with RNP APCH specification, flown to LNAV minima.

The main incentive is to enhance safety but there are potential benefits in terms of reduced minima and better access to airports that do not have precision approach and landing capabilities.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #103 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **Essential Operational Change / PCP:** | Pre-requisite for s-AF1.2 Enhanced TMA using RNP-based operations | | |
| **DP Families:** | 1.2.1 RNP APCH with vertical guidance<br>1.2.2 Geographic Database for procedure design | | |
| **OI Steps & *Enablers*:** | AOM-0602, AOM-0604, CTE-N06a, CTE-N06b | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B0-APTA | | |
| **Network Strategy Plan:** | SO6/5 | | |
| **Operating Environment:** | Terminal, Airport | | |
| **EATMN Systems:** | AIS, NAV | | |

## When

FOC: **25/01/2024**

## Who

Stakeholders:
- Regulators
- ANSPs
- Airspace Users

## Where

Applicability Area
App.1=EU SES
App.2= Other ECAC+ states (except MUAC)

## Status

Completion rate - end 2018

Estimated achievement: N/A - Objective fully revised to comply with PBN IR.

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project
- Regulation (EU) 2018/1048 - airspace usage requirements and operating procedures concerning PBN.

## Benefits

### Safety
Reduction in Controlled Flight Into Terrain (CFIT) occurrences. Improved pilot situation awareness and reduced crew workload.

### Capacity
Potential to enhance capacity due to lower minima than be achieved through conventional NPA.

### Operational Efficiency
Improved through shortened approaches, increased flexibility in the use of runways, reduced landing minima with only conventional NPAs, fallback during precision approach system outages.

### Environment
Emissions and noise nuisance reduced by use of optimal flight procedures and routings and the elimination of step-down approach procedures.

## Regulators Lines of Action:

| | | |
|---|---|---|
| **REG01** | **Apply EASA material to local national regulatory activities**<br>- Publish national regulatory material for RNP approach procedures based on EASA AMC 20-27 (LNAV/VNAV minima) and EASA AMC 20-28 (LPV minima). | 25/01/2024 |
| **REG02** | **Verify the transition plan for PBN in ANS provision** | 25/01/2024 |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Design and Publish RNP approach procedures to LNAV, LNAV/VNAV and LPV minima to RWYs served by precision approach** | 25/01/2024 |
| **ASP02** | **Provide approved SBAS Service to support APV/SBAS and declare the Service area** | Finalised |
| **ASP03** | **Develop National safety case for RNP APCH down to LNAV/VNAV and LPV minima** | 25/01/2024 |
| **ASP04** | **Publish in AIPs all coordinates data in WGS-84 in accordance with ICAO Annex 15 requirements and Article 14 of Regulation (EU) No 73/2010**<br>- It is an essential requirement for RNAV procedures that all coordinates data published in AIPs are surveyed with reference to the WGS84 standard. | 25/01/2024 |
| **ASP05** | **Design and Publish RNP approach procedures to LNAV, LNAV/VNAV and LPV minima to RWYs without precision approach**<br>EU SES RWY, at Non-PCP airports by<br>Other ECAC+ RWY by | <br>03/12/2020<br>25/01/2024 |
| **ASP06** | **Design and Publish RNP non-precision (NPA) approach procedures to LNAV minima**<br>This SLoA is alternative option to the SLoA-ASP01 and SLoA-ASP05 of this objective.<br>EU SES RWY, at Non-PCP airports by<br>Other ECAC+ RWY by | <br>03/12/2020<br>25/01/2024 |
| **ASP07** | **Establish the transition plan for PBN in ANS provision** | 25/01/2024 |
| **ASP08** | **At PCP airport, Design and Publish RNP approach procedures to LNAV, LNAV/VNAV and LPV minima to RWYs without precision approach.** | 25/01/2024 |
| **ASP09** | **At PCP airport, Design and Publish RNP non-precision (NPA) approach procedures to LNAV minima**<br>This SLoA is alternative option to the SLoA-ASP01 and SLoA-ASP08 of this objective. | 25/01/2024 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Equip aircraft with systems approved for RNP APCH down to LNAV/VNAV and/or LPV minima operations**<br>Fit the aircraft with suitably approved equipment (Stand alone or integrated with existing FMS) compliant to AMC 20-27 (APV/Baro) and AMC 20-28 (APV/SBAS). | 25/01/2024 |
| **USE02** | **Get airworthiness certification and operational approval** | 25/01/2024 |

## Changes to the Objective since previous edition:

- NAV10 is completely revised to comply with PBN IR.
- Two distinctive App. areas (EU SES and other ECAC+ RWYs) to enable proper monitoring in LSSIP and indication of different type of obligations with respect to PBN IR and PCP.
- Title changed to “RNP Approach Procedures to instrument RWY” due to addition of NPA to LNAV minima .
- New FOC date of the objective 25/01/2024. Scope changed from ECAC to ECAC+. IL+MA added to App.Area
- Added new SLoAs: REG02, ASP05, ASP06, ASP07, ASP08, ASP09. Revised SLoAs ASP01, ASP03 and ASP04.

# NAV12 – ATS IFR Routes for Rotorcraft Operations

This implementation objective consists in the implementation of ATS routes for rotorcraft operations, SID and STAR for rotorcraft, and low level IFR routes (LLR) based on GNSS technology.

Where ANSPs have established ATS routes, SID or STAR for rotorcraft operations, they shall implement those routes in accordance with the requirements of the RNP 0.3, or RNP 1, or RNAV 1 specifications. In that case, they are entitled to decide which of those three requirements they comply with.

This objective supports connectivity between the airports included into the TMA airspace and also better approach procedures thanks to the implementation of "Standard PinS - Point In Space" procedures concept.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #113 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **OI Steps & *Enablers*:** | AOM-0810 | | |
| **Dependencies:** | NAV03.1, NAV03.2 | | |
| **ICAO ASBUs:** | B1-APTA | | |
| **Network Strategy Plan:** | SO6/5 | | |
| **Operating Environment:** | Terminal, En-route | | |
| **EATMN Systems:** | FDPS/SDPS, HMI, NAV | | |

## When

FOC: **06/06/2030**

For intermediate FOC dates, see SLoA list.

## Who

Stakeholders:
- Regulators
- ANSPs
- Airspace users

## Where

Applicability Area
App.1=EU SES
App.2= Other ECAC+ states (except MUAC, Israel and Morocco)

## Status

Completion rate - end 2018: N/A - Objective fully revised to comply with PBN IR.

## Applicable regulations & standards

Commission Implementing Regulation (EU) 2018/1048 of 18 July 2018 laying down airspace usage requirements and operating procedures concerning PBN.

## Benefits

### Safety
Improved through airspace de-confliction of low altitude routes. It can provide more visibility into planning of those sectors (up-stream sectors) where the ATCO is arranging the arrivals sequence.

### Operational Efficiency
Improved through reduced track mileage, resulting in less fuel consumption and associated CO2 emissions, enhanced transition from the en-route phase to the approach phase to the Final Approach and Takeoff Area-FATO (and vice versa) and more direct routing in dense terminal airspace (obstacle-rich or noise-sensitive terminal environment).

### Environment
Reduced track mileage, resulting in less fuel consumption and associated CO2 emissions.

### Capacity
Potential to enable an increase of passenger throughput at medium and large airports, by removing IFR rotorcraft from active runways.

## Regulators Lines of Action

| | | |
|---|---|---|
| **REG01** | **Verify the transition plan for PBN in ANS provision** | 06/06/2030 |

## ANSPs Lines of Action:

*Note: PBN Regulation (EU) 2018/1048, **does not impose obligatory establishment** of ATS routes, SID or STAR for rotorcraft operations. However, the regulation does **prescribe obligatory set of specifications** to be complied with, **where a stakeholder had decided to establish** ATS routes, SID or STAR for rotorcraft operations.*

| | | |
|---|---|---|
| **ASP01** | **Implement low-level IFR routes (LLR) for rotorcraft operations** | EU SES 25/01/2024<br>Other ECAC+ 06/06/2030 |
| **ASP02** | **Train air traffic controllers procedures supporting low-level IFR routes (LLR) and other routes for rotorcraft operations** | 06/06/2030 |
| **ASP03** | **Develop a local safety assessment for the implementation of LLR and other ATS routes for rotorcraft operations** | 06/06/2030 |
| **ASP04** | **Implement Rotorcraft ATS routes <u>above</u> FL150** | EU SES 03/12/2020<br>Other ECAC+ 06/06/2030 |
| **ASP05** | **Implement Rotorcraft ATS routes <u>below</u> FL150** | EU SES 25/01/2024<br>Other ECAC+ 06/06/2030 |
| **ASP06** | **Implement <u>one</u> rotorcraft RNP0.3,01 or RNAV1 SID and STAR per instrument RWY** | EU SES 25/01/2024<br>Other ECAC+ 06/06/2030 |
| **ASP07** | **Implement <u>all</u> rotorcraft RNP0.3, 01 or RNAV1 SID and STAR per instrument RWY** | 06/06/2030 |
| **ASP08** | **Establish the transition plan for PBN in ANS provision** | 06/06/2030 |

06/06/2030

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Install appropriate RNP and/or RNAV equipment** | 06/06/2030 |
| **USE02** | **Train flight crews in RNP and/or RNAV ATS routes** | 06/06/2030 |

## Changes to the Objective since previous edition:

- NAV12 is completely revised to comply with PBN IR
- Two distinctive App. areas (EU SES and other ECAC+ states) to enable proper monitoring in LSSIP and indication of different type of obligations with respect to PBN IR.
- Multiple deadlines corresponding to individual requirements of PBN IR to enable, in a systemic manner, appropriate reporting through LSSIP,
- Scope of NAV12 changed from Local to ECAC+.
- Extension to cover all rotorcraft operations requirements (not only LLR as until now).Thus, the title changed to “ATS IFR Routes for Rotorcraft Operations”..

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## High Performing Airport Operations

| | | <15 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | ≥25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AOP04.1 | A-SMGCS Surveillance (former Level 1) | ◊ | | | | | | | | | | | |
| AOP04.2 | A-SMGCS Runway Monitoring and Conflict Alerting (RMCA) (former Level 2) | | | | | | | | | | | | |
| AOP05 | Airport CDM | | | | | | | | | | | | |
| AOP10 | Time-Based Separation | | | | | | | | | | | | |
| AOP11 | Initial Airport Operations Plan | | | | | | | | | | | | |
| AOP12 | Improve Runway and Airfield Safety with ATC Clearances Monitoring | | | | | | | | | | | | |
| AOP13 | Automated Assistance to Controller for Surface Movement Planning and Routing | | | | | | | | | | | | |
| AOP14 | Remote Tower Services (*) | Local | | | | | | | | | | | |
| AOP15 | Enhanced traffic situational awareness and airport safety nets for the vehicle drivers | Local | | | | | | | | | | | |
| AOP16 | Guidance assistance through airfield ground lighting | Local | | | | | | | | | | | |
| AOP17 | Provision/integration of departure planning information to NMOC | Local | | | | | | | | | | | |
| AOP18 | Runway Status Lights (RWSL) | Local | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| ENV01 | Continuous Descent Operations (*) | | | | | | | | | | | | |
| ENV02 | Collaborative Environmental Management | Local | | | | | | | | | | | |
| ENV03 | Continuous Climb Operations (*) | Local | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| NAV11 | Implement precision approach procedures using GBAS CAT II/III based on GPS L1 | Local | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| SAF11 | Improve Runway Safety by Preventing Runway Excursions | | | | | | | | | | | | |

◊ Means that the objective has an FOC prior to 2015 but has not yet been fully implemented.

The objective codes in the MP Level 3 appearing in this section refer to:

- AOP – Airport Operations
- ENV – Environment
- SAF – Safety Management
- NAV - Navigation

A full definition of all acronyms can be found in Annex 1-Definitions and Terminology.

A list containing all airports to which objectives ATC07.1 and ENV01 apply can be found in **Error! Reference source not found.-Error! Reference source not found.**.

# AOP04.1 – A-SMGCS Surveillance (former Level 1)

Advanced surface movement guidance and control system (A-SMGCS) Surveillance' service (former Level 1) is a surface consists in a surveillance system that provides ATC the controller with the position and automatic identity of all suitably equipped relevant aircraft on the movement area and all suitably equipped relevant vehicles on the manoeuvring area.

A-SMGCS Surveillance service may be used to replace visual observation and as the basis of controller decision making. Traffic is controlled through appropriate procedures allowing the issuance of information and clearances. to traffic on the basis of A-SMGCS Surveillance data.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #70 | **AAS Milestone :** | Nil |
| **SESAR Key Feature:** | High Performing Airport Operations | | |
| **Essential Operational Change / PCP:** | Pre-requisite for:<br>- S-AF2.4 Automated Assistance to Controller for Surface Movement Planning and Routing (PCP)<br>- S-AF2.2 DMAN integrating Surface Management Constraints (PCP)<br>- Integrated Surface Management (EOC) | | |
| **DP Families:** | 2.2.1 A-SMGCS level 1 and 2 | | |
| **OI Steps & *Enablers*:** | AO-0201, *CTE-S02b, CTE-S03b, CTE-S04b* | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B0-SURF | | |
| **Network Strategy Plan:** | SO6/6 | | |
| **Operating Environment:** | Airport | | |
| **EATMN Systems:** | FDPS/SDPS & HMI, SUR | | |

## When

FOC: **31/12/2011**

## Who

Stakeholders:
- Regulators
- ANSPs
- Airport Operators
- Airspace users

## Where

Applicability Area
25 PCP airports
30 non-PCP airports

## Status

**Late**

Completion rate - end 2018: **70%**

Estimated achievement: **12/2019**

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project
- Community Specification for application under the SES Interoperability Regulation EC 552/2004 - Ver. 1.1.1
- EUROCAE ED-87C, ED-116 & ED-117

## Benefits

### Safety
Through improved situational awareness of the controller, especially during periods of reduced visibility and darkness.

### Capacity
Traffic throughput notably increased in low visibility conditions.

### Operational Efficiency
More efficient control of surface traffic.

### Environment
Reduction in fuel burn and emissions.

## Regulators Lines of Action:

| | | |
|---|---|---|
| **REG01** | **Mandate the carriage of required aircraft equipment to enable location and identification of aircraft on the movement area (including military aircraft, as appropriate)** | 31/12/2010 |
| **REG02** | **Mandate the carriage of required vehicle equipment to enable location and identification of vehicles on the manoeuvering area** | 31/12/2010 |
| **REG03** | **Publish A-SMGCS Surveillance procedures (including transponder operating procedures) in national aeronautical information publications** | 31/12/2010 |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Install required surveillance equipment**<br>- Install all the surveillance equipment and related systems to enable aerodrome controllers to locate and identify aircraft and vehicles on the manoeuvering area. | 31/12/2010 |
| **ASP02** | **Train aerodrome control staff in the use of A-SMGCS Surveillance in the provision of aerodrome control service** | 31/12/2010 |
| **ASP03** | **Implement approved A-SMGCS operational procedures** | 31/12/2011 |

## Airport Operators Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Install required A-SMGCS control function equipment**<br>- Install all the surveillance equipment and related systems to enable aerodrome controllers to locate and identify aircraft and vehicles on the manoeuvering area. | 31/12/2010 |
| **APO02** | **Equip ground vehicles**<br>- Equip vehicles operating on the manoeuvering area to provide their position and identity to the A-SMGCS Surveillance system. | 31/12/2010 |
| **APO03** | **Train ground vehicle drivers** | 31/12/2010 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Update aircrew training manual to include procedures for use of correct Mode-S transponder setting for enabling cooperative A-SMGCS detection on the movement areas** | Finalised |

## Changes to the Objective since previous edition:

- LDZA, LLBG, GMMN, GMMX and LUKK added to Applicability Area

# AOP04.2 – A-SMGCS Runway Monitoring and Conflict Alerting (RMCA) (former Level 2)

Runway monitoring and conflict alerting (RMCA) (former Level 2) is the first element of the A-SMGCS 'Airport Safety Support' service. RMCA consists of an airport surface surveillance system (i.e. A-SMGCS Surveillance – former Level 1) complemented with a short term conflicting alerting tool that monitors movements on or near the runway and detects conflicts between an aircraft and another mobile as well as runway incursion by intruders. Appropriate alerts are visualized on the controller's HMI.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | High Performing Airport Operations | | |
| **Essential Operational Change / PCP:** | Pre-requisite for:<br>- S-AF2.4 Automated Assistance to Controller for Surface Movement Planning and Routing (PCP)<br>- S-AF2.2 DMAN integrating Surface Management Constraints (PCP)<br>- Integrated Surface Management (EOC) | | |
| **DP Families:** | 2.2.1 A-SMGCS level 1 and 2 | | |
| **OI Steps & *Enablers*:** | AO-0102, AO-0201, *CTE-S02b, CTE-S03b, CTE-S04b* | | |
| **Dependencies:** | AOP04.1 (A-SMGCS Surveillance) | | |
| **ICAO ASBUs:** | B0-SURF | | |
| **Network Strategy Plan:** | SO6/6 | | |
| **Operating Environment:** | Airport | | |
| **EATMN Systems:** | FDPS/SDPS & HMI, SUR | | |

## When

FOC: **31/12/2017**

## Who

Stakeholders:
- ANSPs
- Airport Operators

## Where

Applicability Area
25 PCP airports
26 non-PCP airports

## Status

**Late**

Completion rate - end 2018: **52%**

Estimated achievement: **12/2020**

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project
- Community Specification for application under the SES Interoperability Regulation EC 552/2004 - Ver. 1.1.1 - OJ 2010/C 330/02 / 10/2010: ETSI - EN 303 213-2, 213-3, 213-4-1, 213-4-2
- EUROCAE ED-87C, ED-116 & ED-117

## Benefits

### Safety

Better situational awareness and support to controller in detecting potentially hazardous conflicts on or near the runway or infringements of runway.

### Operational Efficiency

More efficient control of surface traffic.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Install required A-SMGCS RMCA function equipment**<br>- Install runway monitoring and conflict alerting (RMCA) function systems in order to enable the detection of conflicts and intrusions in accordance with A-SMGCS RMCA requirements. | 31/12/2017 |
| **ASP02** | **Train aerodrome control staff in the use of A-SMGCS RMCA in the provision of an aerodrome control service** | 31/12/2017 |
| **ASP03** | **Implement approved A-SMGCS RMCA operational procedures** | 31/12/2017 |

## Airport Operators Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Install required A-SMGCS RMCA function equipment**<br>- Install runway monitoring and conflict alerting (RMCA) function systems in order to enable the detection of conflicts & intrusions in accordance with A-SMGCS RMCA requirements. | 31/12/2017 |

## Changes to the Objective since previous edition:

- LLBG added to Applicability Area.

# AOP05 – Airport CDM

Implement airport CDM (A-CDM) aims to enhance the operational efficiency of airports and improve their integration into the air traffic management Network.

This is achieved by increasing the information sharing between the local ANSP, airport operator, aircraft operators, ground handlers, the NM and other airport service providers, and also by improving the cooperation between these partners. A-CDM allows to enhance the predictability of events, optimise the utilisation of resources and therefore increase the efficiency of the overall system.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #106 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | High Performing Airport Operations | | |
| **Essential Operational Change / PCP:** | - S-AF2.1 DMAN synchronised with Pre-departure sequencing (PCP)<br>Pre-requisite for:<br>- Collaborative Airport (EOC) | | |
| **DP Families:** | 2.1.1 Initial DMAN<br>2.1.3 Basic A-CDM | | |
| **OI Steps & *Enablers*:** | AO-0501, AO-0601, AO-0602, AO-0603, TS-0201 | | |
| **Dependencies:** | AOP12-ASP03 (Electronic Flight Strips) | | |
| **ICAO ASBUs:** | B0-ACDM, B0-RSEQ | | |
| **Network Strategy Plan:** | SO6/4 | | |
| **Operating Environment:** | Airport, Network | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## When

FOC: **31/12/2016**

## Who

Stakeholders:
- ANSPs
- Airport Operators
- Airspace users
- Network Manager

## Where

Applicability Area
25 PCP airports
23 non-PCP Airports

## Status

**Late**

Completion rate - end 2018: **55%**

Estimated achievement: **12/2020**

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project
- ICAO Annex 14 - Aerodromes
- ETSI - EN 303 212 - Airport Collaborative Decision Making (A-CDM); Community Specification - Ver. 1.1.1 - OJ 2010C168/04 / 06/2010
- EUROCAE ED-141, ED-145 & ED-146

## Benefits

### Capacity
Improved through optimal use of facilities and services, better use of airport and ATFM slots.

### Cost Efficiency
Increased airport revenue through additional flights and passengers.

### Operational Efficiency
Improved system efficiency and predictability. Significant decrease in fuel burn through better timed operations.

### Environment
Reduced noise and emissions due to limiting engine ground running time due to better timed operations.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Define and agree performance objectives and KPIs at local level, specific to ANSP** | 31/01/2013 |
| **ASP02** | **Define and implement local ANS procedures for information sharing via Letters of Agreement (LoAs) and/or Memorandum of Understanding (MoU)** | 31/01/2013 |
| **ASP03** | **Define and implement local procedures for turnaround processes** | 31/12/2016 |
| **ASP04** | **Continually review and measure airport performance** | 31/01/2013 |
| **ASP05** | **Define and implement variable taxi-time and pre-departure sequencing procedure** | 31/12/2016 |
| **ASP06** | **Define and implement procedures for CDM in adverse conditions, including the de-icing** | 31/12/2016 |

## Airport Operators Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Define and agree performance objectives and KPIs at local level specific to airport operations** | 31/01/2013 |
| **APO02** | **Define and implement local airport operations procedures for information sharing via Letters of Agreement (LoAs) and/or Memorandum of Understanding (MoU)** | 31/01/2013 |
| **APO03** | **Define and implement local procedures for turnaround processes in accordance with CDM manual guidelines (baseline CDM)** | 31/12/2016 |
| **APO04** | **Continually review and measure airport performance** | 31/01/2013 |
| **APO05** | **Define and implement the exchange of messages, Flight Update Message (FUM) and Departure Planning Information (DPI) between NMOC and the airport** | 31/01/2014 |
| **APO06** | **Define and implement procedures for CDM in adverse conditions including the de-icing** | 31/12/2016 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Define and agree performance objectives and KPIs at local level, specific to aircraft operators** | 31/01/2013 |
| **USE02** | **Define and implement local aircraft operators procedures for information sharing through LoAs and/or MoU** | 31/01/2013 |
| **USE03** | **Define and implement local procedures for turnaround processes** | 31/12/2016 |
| **USE04** | **Continually review and measure airport performance** | 31/01/2013 |
| **USE05** | **Define and implement procedures for CDM in adverse conditions including the de-icing** | 31/12/2016 |
| **USE06** | **Define and agree performance objectives and KPIs at local level, specific to aircraft operators** | 31/01/2013 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Define and implement the exchange of messages, Flight Update Message (FUM) and Departure Planning Information (DPI) between NMOC and the airport** | Finalised |

## Changes to the Objective since previous edition:

- LLBG added to Applicability Area.
- LIME and LIRN taken out of Applicability Area

# AOP10 – Time-Based Separation

Time-based separation (TBS) consists in the separation of aircraft in sequence on the approach to a runway using time intervals instead of distances. It may be applied during final approach by allowing equivalent distance information to be displayed to the controller taking account of prevailing wind conditions. Radar separation minima and wake turbulence separation (WBS) parameters shall be integrated to provide guidance to the air traffic controller to enable time-based spacing of aircraft during final approach that considers the effect of headwind.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #64 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | High Performing Airport Operations | | |
| **Essential Operational Change / PCP:** | S-AF2.3 Time-Based Separation for Final Approach | | |
| **DP Families:** | 2.3.1 Time Based Separation (TBS) | | |
| **OI Steps & *Enablers*:** | AO-0303 | | |
| **Dependencies:** | ATC07.1, ATC15.1, ATC15.2, AOP12 | | |
| **ICAO ASBUs:** | B1-RSEQ, B2-WAKE | | |
| **Network Strategy Plan:** | SO6/5 | | |
| **Operating Environment:** | Airport, Terminal | | |
| **EATMN Systems:** | FDPS/SDPS & HMI, MET | | |

## When

FOC: **31/12/2023**

## Who

Stakeholders:
- Regulators
- ANSPs
- Airspace users

## Where

Applicability Area
16 PCP Airports

## Status

Not available

Completion rate - end 2018: **6%**

Estimated achievement: **Not available**

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Benefits

### Capacity
Improved aircraft landing rates leading to increased airport throughput. Reduction of holding times and stack entry to touchdown times leading to reduced delays.

### Environment
Reduced emissions due to reduced holding times and stack entry to touchdown times.

### Safety
More consistent separation delivery on final approach.

## Regulators Lines of Action

| | | |
|---|---|---|
| **REG01** | **Publish TBS operational procedures in national aeronautical information publications** | 31/12/2023 |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Ensure AMAN system is compatible with TBS support tool** | 31/12/2023 |
| **ASP02** | **Modify controller working position (CWP) to integrate TBS support tool with safety nets** | 31/12/2023 |
| **ASP03** | **Local MET info with actual glide-slope wind conditions to be provided into TBS Support tool** | 31/12/2023 |
| **ASP04** | **TBS support tool to provide automatic monitoring and alerting of non-conformant behaviours, infringements, wrong aircraft** | 31/12/2023 |
| **ASP05** | **Implement procedures for TBS operations** | 31/12/2023 |
| **ASP06** | **Train controllers (tower and approach) on TBS operations** | 31/12/2023 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Train flight crews on TBS operations** | 31/12/2023 |

## Changes to the Objective since previous edition:

- Nil

# AOP11 – Initial Airport Operations Plan

The airport operations plan (AOP) is a single, common and collaboratively agreed rolling plan available to all airport stakeholders whose purpose is to provide common situational awareness and to form the basis upon which stakeholder decisions relating to process optimization can be made.

It reflects the operational status of the airport and therefore facilitates demand and capacity balancing (DCB). It connects the relevant stakeholders, notably the airspace users' flight operations centre (FOC). It contains data and information relating to the different status of planning phases and is in the format of a rolling plan, which evolves over time.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #21 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | High Performing Airport Operations | | |
| **Essential Operational Change / PCP:** | S-AF2.1 DMAN synchronised with predeparture sequencing<br>S-AF4.2 Collaborative NOP | | |
| **DP Families:** | 2.1.4 Initial Airport Operations Plan (AOP) | | |
| **OI Steps & *Enablers*:** | AO-0801-A | | |
| **Dependencies:** | AOP05, FCM05 | | |
| **ICAO ASBUs:** | B1-ACDM | | |
| **Network Strategy Plan:** | SO6/2 | | |
| **Operating Environment:** | Airport | | |
| **EATMN Systems:** | Airport Operations Centre Support Tools | | |

## When

FOC: **31/12/2021**

## Who

Stakeholders:
- ANSPs
- Airport Operators
- Airspace users

## Where

Applicability Area
24 PCP Airports
14 non-PCP airports

## Status

**On time**

Completion rate - end 2018: **11%**

Estimated achievement: **12/2021**

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Benefits

### Capacity
Improved through optimal use of facilities and services, better use of airport and ATFM slots.

### Operational Efficiency
Improved system efficiency and predictability. Significant decrease in fuel burn through better timed operations. Lower airspace user operating cost due to improved punctuality.

### Environment
Reduced noise and emissions due to limiting engine ground running time due to better timed operations.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Provide the required information to the AOP**<br>- Provide and maintain AOP elements under the ANSP's responsibility. This information may include available airspace capacity, other cfactors (e.g. adjacent airports, military training areas, etc.). | 31/12/2021 |

## Airport Operators Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Set up the and manage Airport Operational Plan** | 31/12/2021 |
| **APO02** | **Provide the required information to the AOP**<br>- Provide and maintain and AOP elements under the airport operator's responsibility. This information includes (but is not limited to):<br>• Possible airport configurations;<br>• Airport usage and any restriction rule, unforeseen / temporary aerodrome constraints,<br>• Information sharing between airport partners,<br>• Operational capacity of airport resources,<br>• Airport resources availability and allocation plan.<br>- This SLoA also covers other stakeholders active in the airport environment (e.g. ground handling agents) which may feed the AOP according with the local agreements. | 31/12/2021 |
| **APO03** | **Train all relevant personnel** | 31/12/2021 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Provide the required information to the AOP**<br>- Update the AOP information under the airspace users' responsibility, notably information relating to the planning of business trajectories and about the in/outbound flights connected by a turn-round process. | 31/12/2021 |

## Changes to the Objective since previous edition:

LLBG added to Applicability Area.

# AOP12 – Improve Runway and Airfield Safety with Conflicting ATC Clearances (CATC) detection and Conformance Monitoring Alerts for Controllers (CMAC)

This objective consists of the detection and alerting of conflicting ATC clearances (CATC) to aircraft and vehicles and non-conformance to procedures and clearances (CMAC) for traffic on the movement area.

CMAC alerts controllers when aircraft and vehicles deviate from ATC instructions, procedures. The detection of conflicting ATC clearances provides an early prediction of situations that if not corrected would end up in hazardous situations that would be detected in turn by the runway monitoring and conflict alerting (RMCA). The controller shall input all clearances given to aircraft or vehicles into the ATC system using an electronic clearance input (ECI) means such as the electronic flight strip (EFS).

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #02 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | High Performing Airport Operations | | |
| **Essential Operational Change / PCP:** | S-AF2.1 - DMAN synchronised with pre-departure sequencing<br>S-AF2.5 - Airport Safety Nets | | |
| **DP Families:** | 2.1.2 Electronic Flight Strips (EFS)<br>2.5.1 Airport Safety Nets associated with A-SMGCS level 2 | | |
| **OI Steps & *Enablers*:** | AO-0104-A | | |
| **Dependencies:** | AOP04.1, AOP04.2, AOP13 | | |
| **ICAO ASBUs:** | B2-SURF | | |
| **Network Strategy Plan:** | SO6/6 | | |
| **Operating Environments:** | Airport | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## When

FOC: **31/12/2020**

## Who

Stakeholders:
- ANSPs
- Airport Operators
- Airspace users

## Where

Applicability Area
26 PCP airports

## Status **Planned delay**

Completion rate - end 2018: **16%**

Estimated achievement: **12/2023**

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Benefits

### Safety

Improved runway and airfield safety by providing early detection of hazardous situations that may potentially put the vehicles and aircraft at risk of collision. Improved situational awareness of all actors.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Install required 'Airport Safety Nets'**<br>- Deploy appropriate systems and associated procedures allowing the detection and alerting of conflicting ATC clearances to mobiles and detection of non-conformance to procedures or clearances for traffic on runways, taxiways and in the apron/stand/gate area. | 31/12/2020 |
| **ASP02** | **Train aerodrome control staff on the functionality of 'Airport Safety Nets'**<br>- Train aerodrome controllers on the 'Airport Safety Nets' systems and procedures (including phraseology) in accordance with agreed training requirements. | 31/12/2020 |
| **ASP03** | **Implement digital systems such as electronic flight strips (EFS)** | 31/12/2020 |

## Airport Operators Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Train all relevant staff on the functionality of 'Airport Safety Nets'**<br>- Train all relevant staff (e.g. vehicle drivers) on the 'Airport Safety Nets' systems and procedures (including phraseology) in accordance with agreed training requirements. | 31/12/2020 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Train pilots on the functionality of 'Airport Safety Nets'**<br>- Train pilots on the 'Airport Safety Nets' systems and procedures (including phraseology) in accordance with agreed training requirements. | 31/12/2020 |

NOTE: The actions listed above should be addressed to air navigation service providers as well as to airport operators. This is due to the fact that some major European hub airports operate their own ground control units for specific areas of responsibility at the airport. However from a MP Level 3 perspective, the airport operators providing air traffic control services qualify as ANSPs and are therefore covered by the ASP SLoAs.

## Changes to the Objective since previous edition:

- Status changed from ‘Planned delay’ to ‘On time’.
- UBBB added to Applicability Area

# AOP13 - Automated Assistance to Controller for Surface Movement Planning and Routing

The A-SMGCS Routing service provides the generation of taxi routes, with the corresponding estimated taxi times for planning considerations. This function calculates the most operationally relevant route which permits the aircraft to go from stand to runway, from runway to stand or any other surface movement.

Taxi routes may be modified by the air traffic controller before being assigned to aircraft and vehicles. The controller working position allows the controller to manage surface route modification and creation.

Traffic will be controlled through the use of appropriate procedures allowing the issuance of information and clearances to traffic.

The A-SMGCS Routing Service should provide to external systems the estimated taxi-out time (EXOT) for aircraft as long as they are before pushback, if benefit provided compared to already existing A-CDM.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #22, #53 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | High Performing Airport Operations | | |
| **Essential Operational Change / PCP:** | S-AF2.4 Automated assistance to controller for surface movement planning and routing | | |
| **DP Families:** | 2.4.1 A-SMGCS Routing and Planning Functions | | |
| **OI Steps & *Enablers*:** | AO-0205, TS-0202 | | |
| **Dependencies:** | AOP04.1, AOP04.2, AOP12 | | |
| **ICAO ASBUs:** | B1-ACDM, B1-RSEQ, B2-SURF | | |
| **Network Strategy Plan:** | SO6/6 | | |
| **Operating Environment:** | Airport | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## When

FOC: **31/12/2023**

## Who

Stakeholders:
- Regulators
- ANSPs

## Where

Applicability Area
25 PCP airports

## Status

Not available

Completion rate - end 2018: **0%**

Estimated achievement: **Not available**

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Benefits

### Safety
Improved through increased controllers' situational awareness for all ground movements and potential conflicts resolution.

### Capacity
Increased availability of taxiway resources and reduced total taxi time by ground movements. Improved traffic flow on the aerodrome's manoeuvering area.

### Operational Efficiency
Reduced fuel consumption due to reduced taxi time and reduced number of stops while taxiing.

### Environment
Reduced environmental impact by reducing fuel consumption and then CO2 emissions.

## Regulators Lines of Action:

| | | |
|---|---|---|
| **REG01** | **Coordination and final official approval of procedures by the local regulator is required** | 31/12/2023 |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Upgrade ATS systems to support automated assistance to air traffic controllers for surface movement planning and routing** | 31/12/2023 |
| **ASP02** | **Ensure the planning and routing function is used to optimise pre-departure sequencing** | 31/12/2023 |
| **ASP03** | **Implement operational procedures implementing automated assistance to air traffic controllers for surface movement planning and routing** | 31/12/2023 |
| **ASP04** | **Develop a safety assessment of the changes imposed by the implementation of automated assistance to air traffic controllers for surface movement planning and routing** | 31/12/2023 |
| **ASP05** | **Train all operational personnel concerned in the use of automated assistance for surface movement planning and routing** | 31/12/2023 |

NOTE: The actions listed above should be addressed to air navigation service providers as well as to airport operators. This is due to the fact that some major European hub airports operate their own ground control units for specific areas of responsibility at the airport. However from a MP Level 3 perspective, the airport operators providing air traffic control services qualify as ANSPs and are therefore covered by the ASP SLoAs.

## Changes to the Objective since previous edition:

- Nil.

# AOP14 – Remote Tower Services [Local]

The remote tower concept enables air traffic control services (ATS) and aerodrome flight information services (AFIS) to be provided at aerodromes where such services are either currently unavailable, or where it is difficult or too expensive to implement and staff a conventional manned facility.

This Objective proposes to remotely provide ATC services and AFIS for one aerodrome handling low to medium traffic volumes or two low-density aerodromes. The basic configuration, which does not include augmentation features, is considered suitable for ATC and AFIS provision at low density airfields. However, the level and flexibility of service provision can be enhanced through the use of augmentation technology, such as an ATC surveillance display, surveillance and visual tracking, infra-red cameras etc.

This Objective also covers the possibility to apply the remote tower concept as a contingency solution in facility known as Remote Contingency Tower (RCT).

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #12, #71 #52, #13 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Advanced Air Traffic Services | | |
| **Operational Change:** | Remote Tower | | |
| **OI Steps & *Enablers*:** | SDM-0201, SDM-0204, SDM-0205 | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B1-RATS | | |
| **Operating Environment:** | Airport | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## When

FOC: **n/a**

## Who

Stakeholders:
- Regulators
- ANSPs
- Airport Operators

## Where

Applicability Area
Low to medium complexity aerodromes, subject to local needs

## Status

Not available

Completion rate - end 2018: **Implemented in 3 locations**

**Planned / ongoing in 16 locations**

## Applicable regulations & standards

- ED Decision 2015/014/R adopting Guidance Material on the implementation of the remote tower concept for single mode of operation
- EASA's Guidance Material on the implementation of the remote tower concept for single mode of operation
- ED Decision 2015/015/R - Requirements on Air Traffic Controller licensing regarding remote tower operations

## Benefits

### Cost Efficiency

Cost reduction for ATS by optimisation of ATCOs. Remote ATS facilities will be cheaper to maintain, able to operate for longer periods and enable lower staffing costs. It will also significantly reduce the requirement to maintain tower buildings and infrastructure.

### Operational Efficiency

Improve the uniformity of service provision at low to medium density and remote aerodromes and increase the availability of the service (for example allowing ATS to be provided at an aerodrome which previously was unable to financially support a service). Cost benefits of RCT due to customer retention and reduced economic loss during contingency events.

## Regulators Lines of Action:

| | | |
|---|---|---|
| **REG01** | **Supervise compliance with regulatory provisions** | n/a |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Develop, and deliver as necessary, a safety assessment of the changes imposed by the implementation of remote tower** | n/a |
| **ASP02** | **Define and implement the system improvements allowing for the implementation of remote tower**<br>- A number of system improvements should be implemented in order to display to ATCO/AFISO in the remote tower centre an "out of the window like" (OTW) image of the airport and its vicinity and to increase ATCO/AFISO situational awareness.<br>- In addition, all the tools and facilities available to a tower controller will also need to be remotely controlled, including, inter alia, ground-ground and ground-air communications, traffic light controls and aerodrome lighting controls. | n/a |
| **ASP03** | **Define and implement procedures and processes in support of network and local dimension imposed by the implementation of remote tower** | n/a |
| **ASP04** | **Train all operational and technical personnel concerned** | n/a |
| **ASP05** | **Implement remotely provided air traffic service for contingency situations** | n/a |

## Airport Operator Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Define and implement local airport procedures and processes for the implementation of remote tower concept** | n/a |
| **APO02** | **Train all applicable personnel** | n/a |

## Changes to the Objective since previous edition:

- Nil.

# AOP15 – Safety Nets for vehicle drivers [Local]

The functionality should be used by those vehicle drivers allowed to operate in the maneuvering area of an aerodrome. The system consists of the following improvements:

- Provision of an Airport Moving Map in the vehicle, together with the display of the surrounding traffic,
- Provision of alerts to vehicle drivers to warn them of situations that if not corrected could end up in hazardous situations.

The alerts are provided to the vehicle drivers in the form of an aural and/or visual alert with two levels of alert severity depending on the severity of situations:

- Caution alert for the less critical situations; and
- Warning alert for the most critical situations

In implementation of this functionality, the frequency load of 1030/1090 MHz should be considered. Increased situational awareness is essential for operations at airports especially in adverse weather conditions or other similar operating situations. Situational Awareness is important for vehicle drivers as they need to operate within the maneuvering area regardless of weather conditions.

| **SESAR Solutions:** | #04 | **AAS Milestone:** | Nil |
|---|---|---|---|
| **SESAR Key Feature:** | High Performing Airport Operations | | |
| **Operational Change:** | Airport Safety Nets Vehicles | | |
| **OI Steps & *Enablers*:** | AO-0105, AO-0204 | | |
| **Dependencies:** | AOP04.1 | | |
| **ICAO ASBUs:** | B2-SURF | | |
| **Operating Environment:** | Airport | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## When

FOC: **n/a**

## Who

Stakeholders:
- Regulators
- International Organisations
- Airport Operators

## Where

Applicability Area
Subject to local needs

## Status

Not available

Completion rate - end 2018: **n/a**

## Applicable regulations & standards

N/A

## Benefits

Safety

This improved situational awareness combined with an alerting/warning system in case potential hazardous situations are detected, will not only improve safety for the vehicles operating in the maneuvering area but also provide a safety enhancement for the aircraft operations, both on taxiways and runways, at the airport.

## Regulators Lines of Action:

| | | |
|---|---|---|
| **REG01** | **Promulgate the procedures for use of "Onboard Ground Vehicle System" and SNET** | n/a |

## International Organisations Lines of Action:

| | | |
|---|---|---|
| **INT01** | **Develop standard for interface between A-SMGCS and On Board Vehicle System** | n/a |

## Airport Operator Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Install "Onboard Ground Vehicle System" to process and display the own position and surrounding traffic**<br>- The processing and display in an "On-board Vehicle System" of the own position and surrounding traffic may be provided by the central server making use A-SMGCS system or autonomously by Onboard Ground Vehicle system. | n/a |
| **APO02** | **Install function in "Onboard Ground Vehicle System", to provide SNET alerts to vehicle drivers** | n/a |
| **APO03** | **Develop the procedures for use of "Onboard Ground Vehicle System" and SNET** | n/a |
| **APO04** | **Develop safety assessment of the changes imposed by "Onboard Ground Vehicle System" and SNET** | n/a |
| **APO05** | **Train all relevant staff in the use of "Onboard Ground Vehicle System" and SNET** | n/a |

## Changes to the Objective since previous edition:

- New Objective

# AOP16 – Guidance assistance through airfield ground lighting (AGL) [Local]

The Objective is intended for controllers, flight crews and vehicle drivers and corresponds to the A-SMGCS Guidance function foreseen in ICAO's A-SMGCS Manual (Doc. 9830). It links aerodrome lighting infrastructure with the taxi route management system (Routing & Planning), thus providing an unambiguous route for the taxiing aircraft/vehicle to follow

To achieve this, taxiway centre line lights are automatically and progressively activated (switched on to green), either in segments of several lights or individually, along the route cleared by the controller. If this cleared route includes a limit and if a physical stop bar exists at this point, this stop bar is also automatically activated (switched on to red) when the mobile nears it. The implementation strongly relies on the surface movement surveillance system to provide accurate aircraft position data.

The automation might also include the management of priorities at intersections, based on pre-defined criteria (e.g. aerodrome rules, speed or target times). However, controllers are able to override the guidance decisions, which shows activated lights on the HMI,

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #47 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | High Performing Airport Operations | | |
| **Operational Change:** | Ground Situational Awareness | | |
| **OI Steps & *Enablers*:** | AO-0222-A | | |
| **Dependencies:** | AOP13 | | |
| **ICAO ASBUs:** | B1-RSEQ, B2-SURF | | |
| **Operating Environment:** | Airport | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## When

FOC: **n/a**

## Who

Stakeholders:
- International Organisations
- ANSPs
- Airport Operators
- Airspace Users

## Where

Applicability Area
Subject to local needs

## Status

Not available

Completion rate - end 2018: **n/a**

## Applicable regulations & standards

N/A

## Benefits

### Safety

Increase of situational awareness from pilots perspectives. Reduction of unplanned / unwanted taxi route deviations. Significantly lower runway incursion risk.

### Capacity

Reduction of controller workload (radio communication / instructions) will have a positive impact on the capacity of the airport's ground movement system in particular at the aerodromes with multiple complex taxiways system and large maneuvering area

### Operational Efficiency

Significant reduction in taxi time in both good and low visibility conditions. The reduction is strongly dependent of local conditions and will therefore differ per airport. The variability of taxi times (for the same combination of used parking position and runway) might be reduced,

### Operational Efficiency

Fewer speed changes as also reduce the number of stops along routes between runway and parking position (and vice versa). This reduces the fuel burn for taxiing both in good and low visibility conditions, although the benefits have been shown to be larger during low visibility.

## International Organisations Lines of Action:

| | | |
|---|---|---|
| **INT01** | **Develop the procedures and phraseology for taxi guidance by AGL** | **n/a** |
| **INT02** | **Integrate taxi guidance by AGL in MASPS for the A-SMGCS** | **n/a** |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Upgrade CWP/HMI to display and manage lights and routes** | **n/a** |
| **ASP02** | **Develop and implement procedures for use of taxi guidance by AGL** | **n/a** |
| **ASP03** | **Develop safety assessment of the changes imposed by taxi guidance by AGL** | **n/a** |
| **ASP04** | **Train all relevant staff in the taxi guidance by AGL** | **n/a** |
| **ASP05** | **Upgrade A-SMGCS to send taxi instructions as commands to the AGL system** | **n/a** |

## Airport Operator Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Upgrade AGL system to enable the selective switching of the lamps** | **n/a** |
| **APO02** | **Upgrade A-SMGCS to send taxi instructions as commands to the AGL system** | **n/a** |
| **APO03** | **Develop and implement procedures for use of taxi guidance by AGL** | **n/a** |
| **APO04** | **Train all relevant staff in the taxi guidance by AGL** | **n/a** |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Develop and implement procedures for use of taxi guidance by AGL** | **n/a** |
| **USE02** | **Train all relevant staff in the taxi guidance by AGL** | **n/a** |

## Changes to the Objective since previous edition:

- New Objective

# AOP17 – Provision/integration of departure planning information to NMOC [Local]

The Network integration of departure estimates from medium and small sized airports via the exchange of Departure Planning Information (DPI), specifically ATC-DPI and CNL-DPI messages is needed to enhance the network benefit and improve the flow management process. This functionality aims to improve integration of departure estimates from medium or small-size airports when serving a complex airspace with dense traffic through improved availability of aircraft pre-departure information to the ATM Network, through the provision of accurate pre-departure information to the NM.

The objective also supports further integration of airports into the Network by addressing the reception from the NM of estimated landing times.

This objective should be considered as not applicable for the airports that already deployed A-CDM or planned to deploy A-CDM in near future

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #61 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | High Performing Airport Operations | | |
| **Operational Change:** | Collaborative airport | | |
| **OI Steps & *Enablers*:** | DCB-0304 | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B1-ACDM, B1-NOPS | | |
| **Operating Environment:** | Airport, Network | | |
| **EATMN Systems:** | FDPS & HMI, ATFCM | | |

## When

FOC: **n/a**

## Who

Stakeholders:
- ANSPs
- Network Manager

## Where

Applicability Area
Subject to local needs

## Status

Not available

Completion rate - end 2018: **n/a**

## Applicable regulations & standards

N/A

## Benefits

### Safety

There will be an overall minor improvement in the safety of operations through the provision of timely and accurate information that is widely shared amongst all partners in the ATM business.

### Capacity

Improved availability of more accurate departure data will improve the performance of network management, thereby enabling the improvement of capacity through better confidence in NMOC traffic load predictions.

### Operational Efficiency

The improved data will increase predictability within the NMOC systems for demand on a sector, leading to:
- Better decision making concerning when to open or close a sector;
- Fewer unnecessary regulations leading to a reduction of ATFM delays;
- Fewer overloads as sudden increases in demand will be rare.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Upgrade the local ATC system so as to provide departure planning information**<br><br>- TWR tools and systems (e.g. Advanced Tower tools, Electronic flight strip) are upgraded as necessary so with the capability of providing departure planning information (ATC-DPI and CNL-DPI messages) to NM. | n/a |
| **ASP02** | **Upgrade the local system to support reception of estimated landing time from NM**<br><br>The upgrade of TWR systems should allow the reception/ presentation of estimated landing time (ELDT) from NM. ELDT may be received via AFTN using the FUM messages or via dedicated NM B2B web services. | n/a |
| **ASP03** | **Develop the procedures for information exchanges with the NM** | n/a |
| **ASP04** | **Train all relevant staff in the information exchanges with NM** | n/a |
| **ASP05** | **Develop local safety case** | n/a |
| **ASP06** | **Provide DPI message to NM** | n/a |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Integrate Departure Planning Information (DPI) in NM systems** | n/a |

## Changes to the Objective since previous edition:

- New Objective

# AOP18 – Runway Status Lights [Local]

Runway Status Lights (RWSL) system is an automatic independent system based on aerodrome surveillance data that can be used on airports to increase safety by preventing runway incursions. The RWSL will provide an independent system that uses A-SMGCS surveillance data to dynamically switch on and off additional and dedicated airfield lights on RWY and on the runway entry TWY.

It will directly inform the flight crews / vehicle drivers about the instantaneous runway usage. Runway status lights switched "on" is an indication that the runway is unsafe for entering (for line-up or crossing) or for taking-off.

The system is meant to be compatible with airport operations and independent of ATC clearances, even if TWR will have access to the status of the Runway Entrance Lights (EHL) and Take-off Hold Lights (THL), with no change in their operating methods, except in case of flight crew request or failure of the system.

The purpose of the RWSL system is to act as a safety net for flight crew and vehicle drivers, thus reducing the number of runway incursions without interfering with normal runway operations.

It is recommended to implement RWSL at medium to highly utilized airports with complex runway and taxiway lay-out.

| **SESAR Solutions:** | #01 | **AAS Milestone:** | Nil |
|---|---|---|---|
| **SESAR Key Feature:** | High Performing Airport Operations | | |
| **Operational Change:** | Enhanced Airport Safety Nets | | |
| **OI Steps & *Enablers*:** | AO-0209 | | |
| **Dependencies:** | AOP04.1 | | |
| **ICAO ASBUs:** | B2-SURF | | |
| **Operating Environment:** | Airport | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## When

FOC: **n/a**

## Who

Stakeholders:
- Regulators
- International Organisations
- ANSPs
- Airport Operators
- Airspace Users

## Where

Applicability Area
Subject to local needs

## Status

Not available

Completion rate - end 2018: **n/a**

## Applicable regulations & standards

ICAO Annex 14 (Aerodromes), Volume I

## Benefits

Safety
Less severe and less frequent runway incursions due to an increase of runway usage awareness through accurate and timely indication of runway occupancy.

## Regulators Lines of Action:

| | | |
|---|---|---|
| **REG01** | **Promulgate the procedures for use of RWSL** | n/a |

## International Organisations Lines of Action:

| | | |
|---|---|---|
| **INT01** | **Develop the standards for operational use of RWSL** | n/a |
| **INT02** | **Develop the standards for RWSL design and approval** | n/a |
| **INT03** | **Develop standard interfaces and information exchanges of RWSL Management Tool** | n/a |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Install RWSL management tool** | n/a |
| **ASP02** | **Upgrade TWR CWP to interface with RWSL management tool** | n/a |
| **ASP03** | **Develop and implement procedures for the use of RWSL** | n/a |
| **ASP04** | **Develop safety assessment of the changes imposed by RWSL** | n/a |
| **ASP05** | **Train all relevant staff in the use of RWSL** | n/a |

## Airport Operator Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Upgrade Airfield Ground Lighting system to provide the RWSL** | n/a |
| **APO02** | **Install RWSL management tool** | n/a |
| **APO03** | **Develop and implement procedures for the use of RWSL** | n/a |
| **APO04** | **Develop safety assessment of the changes imposed by RWSL** | n/a |
| **APO05** | **Train all relevant staff in the use of RWSL** | n/a |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Develop the procedures for use of RWSL** | n/a |
| **USE02** | **Train all relevant staff in the use of RWSL** | n/a |

## Changes to the Objective since previous edition:

- New Objective

# ENV02 – Airport Collaborative Environmental Management [Local]

Collaborative environmental management (CEM) consists in the establishment of formal working partnership arrangements between ANSP, airport and aircraft operators at individual airports to enable:

- the minimisation of noise and atmospheric emissions in particular $CO_2$ and NOx (including fuel burn);
- introduction of new operational changes such as airspace design, different approach or departure procedures including CDO and PBN implementation, new airport infrastructure compliance with airport related legislation and environmental certification requirements and
- the management of aircraft and airfield de-icing resulting from combined aircraft operations at the terminal airspace and ground.

These formal working arrangements will enable understanding and awareness of interdependencies and facilitate jointly agreed solutions for environmental improvements.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | High Performing Airport Operations | | |
| **OI Steps & *Enablers*:** | AO-0703, AO-0705, AO-0706 | | |
| **Dependencies:** | No dependencies | | |
| **Operating Environment:** | Airport | | |
| **EATMN Systems:** | No impact on EATMN systems | | |

## When

FOC: **n/a**

## Who

Stakeholders:
- ANSPs
- Airport Operators
- Airspace users
- EUROCONTROL

## Where

Applicability Area
Subject to local needs

## Status

Not available

Completion rate - end 2018: **Implemented in 43 airports**

**Planned / ongoing in 7 airports**

## Applicable regulations & standards

- Regulation (EU) 598/2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC
- EC Directive 2002/49/EC, on the assessment and management of environmental noise
- EC Directive 2008/50/EC, on ambient air quality and cleaner air
- ICAO Annex 16; Vol. I-Aircraft Noise & Vol. II-Aircraft engine emissions

## Benefits

### Environment

Reduction of noise, fuel burn and CO. Contributing to cost savings for airlines and $CO_2$ reductions for airports.

### Operational Efficiency

Reduction of noise, fuel burn and CO. Contributing to cost savings for airlines and $CO_2$ reductions for airports.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Participate actively in formal working partnership arrangements with the airport and aircraft operators to manage and control environmental impacts of air traffic procedures in and around the airport** | n/a |
| **ASP02** | **Train controllers in the environmental impacts of aircraft operations** | n/a |

## Airport Operators Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Initiate and participate actively in the formal working partnership arrangements with the ANSP and Aircraft Operators to minimise the environmental impact of air traffic procedures** | n/a |
| **APO02** | **Ensure appropriate and relevant performance information availability at Airports** | n/a |
| **APO03** | **Ensure appropriate Airport policy and procedures and, if required, relevant infrastructures needed to manage and mitigate pollution due to de-icing activities** | n/a |
| **APO04** | **Train airport operational staff in the environmental impacts of aircraft operations** | n/a |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Participate actively in the formal working partnership arrangements with the ANSP and Airport to manage and control the environmental impact of aircraft operations** | n/a |

## EUROCONTROL Lines of Action:

| | | |
|---|---|---|
| **AGY01** | **Provide assistance and guidelines to assist airports in setting up formal partnership arrangements between ATSP, airport and aircraft operators for achieving control of environmental impact mitigation** | Finalised |

## Changes to the Objective since previous edition:

- LLBG added to Applicability Area.

# NAV11 – Precision approach procedures using GBAS CAT II/III based on GPS L1 [Local]

GBAS has limited (GBAS Local Object Consideration Areas) or no protection areas, usually located outside aircraft movement areas. This allows the reduction of runway occupancy times in LVP, reducing spacing between arrival aircraft. Use of GBAS Cat II/III eliminates ILS critical zones, enables flexible approaches, offers PA where ILS cannot due to geography and signal stability (immune to signal bends inherent in ILS), complements ILS at airports with multiple RWYs during LVP, the rationalization of some ILS thus reducing operation and maintenance costs and optimizing spectrum; offers PA at aerodromes without SBAS coverage or where PA performances cannot be achieved with SBAS. GBAS CATII/II improves resilience of airport capacity with fewer flight cancellations due to LVP in force. GBAS CATII/III will enable runway ends which are not ILS CATII/III equipped to be used for CATII/III operations as long as the runway is CATII/III qualified.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #55 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | High Performing Airport Operations | | |
| **Operational Change:** | LVPs using GBAS | | |
| **OI Steps & *Enablers*:** | AO-0505-A | | |
| **Dependencies:** | No Dependences | | |
| **ICAO ASBUs:** | B1 APTA | | |
| **Operating Environment:** | Airport | | |
| **EATMN Systems:** | NAV | | |

## When

FOC: **n/a**

## Who

Stakeholders:
- Regulators
- International Organisations
- ANSPs
- Airspace Users

## Where

Applicability Area
Subject to local needs

## Status

**New**
**Initial Objective**

Completion rate - end 2018: **n/a**

## Applicable regulations & standards

N/A

## Benefits

### Safety

Approach, landing and guided-take-off operations using GBAS CAT III L1 (GAST-D) are as safe as those using ILS CAT III assuming the identified safety requirements are met. GBAS improves safety in the segment of avoiding a scenario of false LOC or Glide beam capture.

### Capacity

Limited or no protection areas, located outside aircraft movement area reduce RWY occupancy times in LVP. RWY throughput gain depends on WTC separation and other additional spacing needs.

### Operational Efficiency

Fewer flights cancelled or diverted saving the Airspace User (Main and Regional airliners) associated costs. BA see minimal benefits as they fly infrequently to capacity constrained airports during LVP. Avoiding the loss of RWY capacity will reduce the level of delay and avoid the associated costs.

### Cost Efficiency

One GBAS station provides PAs for multiple RWY ends as well as multiple PA per RWY end. The GBAS station maintenance and inspection costs are less, in the long term, than the ILS costs.

### Environment

Saving of jet fuel due to the resilience of the system capacity even in LVP. Reduction in CO2 emissions due to fuel saving. Local air quality benefits by having less aircraft queuing for departure conditions.

## Regulatory Lines of Action:

| | | |
|---|---|---|
| **REG01** | **Apply EASA material to local national regulatory activities** | **n/a** |

## International Organisations Lines of Action:

| | | |
|---|---|---|
| **INT01** | **Develop material for certification of GBAS ground facilities**<br>Publish EASA material for GBAS CAT II/III ground facilities approval/certification | **n/a** |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Install GBAS CAT II/III ground equipment** | **n/a** |
| **ASP02** | **Design and Publish GBAS CAT II/III precision approach procedures** | **n/a** |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Equip aircraft with systems approved for GBAS CAT II/III** | **n/a** |
| **USE02** | **Get airworthiness certification and operational approval** | **n/a** |

## Industry Lines of Action:

| | |
|---|---|
| **IND01** | **Get certification for GBAS CAT II/III ground facilities** |

## Changes to the Objective since previous edition:

- New Objective. Status Initial. Scope Local.

# SAF11 – Improve Runway Safety by Preventing Runway Excursions

According to ICAO, runway excursions are a persistent problem and their numbers have not decreased in more than 20 years.

The 'European Action Plan for the Prevention of Runway Excursions (EAPPRE)' contains practical recommendations with guidance materials. It considers all practicable means available ranging from the design of aircraft, airspace, procedures and technologies to relevant training of operational staff.

Central to the recommendations contained in this action plan is the uniform and consistent application of ICAO provisions.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | High Performing Airport Operations | | |
| **Relate OI Steps & *Enablers*:** | *PRO-006a* | | |
| **Dependencies:** | No dependencies | | |
| **Operating Environment:** | Airport | | |
| **EATMN Systems:** | AIS, MET, NAV, SUR | | |

## Applicable regulations & standards

- ICAO Annex 3 Meteorological Services for International Air Navigation
- ICAO Annex 6 Operation of Aircraft
- ICAO Annex 11 Air Traffic Services
- ICAO Annex 13 Aircraft Accident and Incident Investigation
- ICAO Annex 14 Aerodromes
- ICAO Annex 15 Aeronautical Information Services

## When

FOC: **31/01/2018**

## Who

Stakeholders:
- Regulators
- ANSPs
- Airport Operators
- Airspace users
- Network Manager

## Where

Applicability Area
All ECAC+ States except Malta and Morocco.

## Status

**Late**

Completion rate - end 2018: **66%**

Estimated achievement: **12/2019**

## Benefits

Safety
Significant improvement, through reduced risk of incidents and accidents on runways.

## Regulators Lines of Action:

| | | |
|---|---|---|
| **REG01** | **Implement the appropriate parts of the 'European Action Plan for the Prevention of Runway Excursions (EAPPRE)'**<br>- Disseminate documentation for the EAPPRE.<br>- Establish oversight activities arrangements and monitoring/reporting mechanism.<br>- Implement the applicable regulatory and oversight measures of the EAPPRE. | 31/01/2018 |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Implement the appropriate parts of the EAPPRE**<br>- Participate in the local runway safety team and follow the appropriate recommendations of the EAPPRE. Recommendations address all topics related to runway operations: safety information sharing, training of ATCOs and other relevant staff, operational procedures in particular related to approach and departure, systems and infrastructure. | 31/12/2014 |
| **ASP02** | **Implement the appropriate parts of the EAPPRE with regards to AIS**<br>- Review processes on the provision of information such as weather, wind and runway surface conditions.<br>- Ensure that pilots in command/ flight crews are informed of the take-off run available (TORA) or the landing distance available (LDA) if these differ from the published data. | 31/12/2014 |
| **ASP03** | **Implement the appropriate parts of the EAPPRE with regards to MET**<br>- Review processes on the provision of information such as weather, wind and runway surface conditions.<br>- Ensure that pilots in command/ flight crews are informed of the take-off run available (TORA) or the landing distance available (LDA) if these differ from the published data. | 31/12/2014 |

## Airport Operators Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Implement the appropriate parts of the EAPPRE**<br>- Operate a Local Runway Safety Team and follow the appropriate recommendations of the EAPPRE.<br>Recommendations address all topics related to runway operations: safety information sharing, training of relevant staff and infrastructure (runway maintenance, navaids, markings, etc).<br>- If relevant, implement SLoAs ASP02 and ASP03 as listed in the ANSPs section above. | 31/12/2014 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Implement the appropriate parts of the EAPPRE**<br>- Participate in the local runway safety team and follow the appropriate recommendations of the EAPPRE. Recommendations address all topics related to runway operations: safety information sharing, training of crews, disseminating cross-wind aircraft limitations, on-board systems and operational procedures in the different phases of flight. | 31/01/2018 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Maintain the EAPPRE** | 31/01/2018 |
| **NM02** | **Implement the appropriate parts of the EAPPRE**<br>- Participate in safety information sharing networks and exchange relevant information. | 31/01/2018 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+. Israel added to Applicability Area.
- Status changed from "Planned delay" to "Late"

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## Enabling Aviation Infrastructure

| | | <15 15 16 17 18 19 20 21 22 23 24 ≥25 | AAS TP |
|---|---|---|---|
| COM10 | Migrate from AFTN to AMHS | | - |
| COM11.1 | Voice over IP (VoIP) in En-Route | | AM-1.3 |
| COM11.2 | Voice over IP (VoIP) in Airport/Terminal | | - |
| COM12 | NewPENS | | - |
| | | | |
| FCM08 | Extended Flight Plan | | AM-1.4 |
| | | | |
| INF07 | Electronic Terrain and Obstacle Data (eTOD) | | - |
| INF08.1 | Initial SWIM – Yellow TI Profile | | AM-1.5 |
| INF08.2 | Initial SWIM – Blue TI Profile | | AM-9.1 |
| INF09 | Digital Integrated Briefing | Local | - |
| | | | |
| ITY-ACID | Aircraft Identification | | - |
| ITY-ADQ | Ensure Quality of Aeronautical Data and Aeronautical Information | | - |
| ITY-AGDL | Initial ATC Air-Ground Data Link Services | | AM-1.1 |
| ITY-AGVCS2 | 8,33 kHz Air-Ground Voice Channel Spacing below FL195 | | - |
| ITY-FMTP | Common Flight Message Transfer Protocol | | AM-1.3 |
| ITY-SPI | Surveillance Performance and Interoperability | | - |

◇ Indicates the existence of intermediate regulatory/contractual milestones.

The objective codes in the MP Level 3 appearing in this section refer to:

- COM – Communications
- FCM – Flow and Capacity Management
- INF – Information Management
- ITY – Interoperability

A full definition of all acronyms can be found in Annex 1-Definitions and Terminology.

# COM10 – Migrate from AFTN to AMHS

AFTN / CIDIN technology is now becoming obsolescent, and is not sufficiently flexible to support future messaging requirements.

This objective is about enabling EATM Network-wide support of a specific profile of the Extended level of service of the ATSMHS (ATS Message Handling Service), as defined by ICAO. An initial transition step supporting migration to the Basic ATSMHS level of service is foreseen: existing AFTN and CIDIN users and systems will transition to more modern technology, using the ATSMHS application. Thus, the AFTN telegraphic style of working will be replaced by a store-and-forward message handling system based on international standards and providing enhanced functionality.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Enabling Aviation Infrastructure | | |
| **Essential Operational Change:** | Predecessor of 'CNS Rationalisation' (EOC) | | |
| **OI Steps & *Enablers*:** | *CTE-C06c* | | |
| **Dependencies:** | No dependencies | | |
| **Operating Environment:** | Airport, Terminal, En-Route, Network | | |
| **EATMN Systems:** | COM | | |

## When

FOC: **31/12/2018**

## Who

Stakeholders:
- ANSPs
- Industry
- EUROCONTROL

## Where

Applicability Area
All ECAC+ States.

## Status

**Late**

Completion rate - end 2018: **55%**

Estimated achievement: **12/2019**

## Applicable regulations & standards

- EUROCONTROL Specification on the ATS Message Handling System (AMHS) - Edition 2.0 (recognised as Community Specification)

## Benefits

### Cost Efficiency

Use of COTS messaging systems will de-facto reduce the cost of messaging services and support any kind of message format including the exchange of new binary data leading to lower ANS provision costs.

### Safety

Benefits resulting from the application of a harmonised set of safety requirements.

### Security

AMHS security services may help to protect against safety hazards such as accidental or deliberate message corruption and can provide protection against undetected misdelivery.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Implement AMHS capability (Basic ATSMHS) and gateway facilities to AFTN** | 31/12/2011 |
| **ASP02** | **Implement regional boundary gateways** | 31/12/2011 |
| **ASP03** | **Enhance AMHS capability (Extended ATSMHS)** | 31/12/2018 |
| **ASP04** | **Ensure the conformity of AMHS systems and associated procedures** | 31/12/2018 |
| **ASP05** | **Organise personnel awareness and training** | 31/12/2018 |
| **ASP06** | **Participate in ATS Messaging Management Centre (AMC) activities for ATS messaging management** | 31/12/2018 |

## Industry Lines of Action:

| | | |
|---|---|---|
| **IND01** | **Ensure the conformity of AMHS systems** | 31/12/2018 |

## EUROCONTROL Lines of Action:

| | | |
|---|---|---|
| **AGY01** | **Provide AMC (ATS Messaging Management Centre) service** | 31/12/2018 |
| **AGY02** | **Implement AMHS capability (Basic ATSMHS) and gateway facilities to AFTN** | Finalised |
| **AGY03** | **Enhance AMHS capability (Extended ATSMHS)** | 31/12/2018 |
| **AGY04** | **Develop further relevant elements of the Extended ATSMHS in AMHS Community Specification (CS)** | 31/12/2018 |
| **AGY05** | **Implement AMHS-CS compliance testing methodology and tools** | 31/12/2018 |
| **AGY06** | **Support personnel training** | 31/12/2018 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+
- Israel and Morocco added to Applicability Area.

# COM11.1 – Voice over Internet Protocol (VoIP) in En-Route

This Implementation Objective aims at an efficient use of voice over Internet protocol (VoIP) by harmonised and coordinated implementation for ground/ground and ground part of ground/air aeronautical communications, ensuring network benefits from VoIP implementation. The initiative covers inter centre (encompassing all type of ATM Units) voice communication and the links with the ground radio stations. Inter-centre voice communications are currently mainly performed via analogue and digital circuits. This legacy ATM voice services will soon no longer be supported by the European telecommunication service providers, making the use of new technology necessary.
COM11.1 is applicable to 'En-Route' and 'Network' Operating Environments.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | 1.3 |
| **SESAR Key Feature:** | Enabling Aviation Infrastructure | | |
| **DP Families:** | 3.1.4 Management of Dynamic Airspace Configurations<br>3.2.1 Upgrade of systems (NM, ANSPs, AUs) to support DCT and FRA | | |
| **OI Steps & *Enablers*:** | *CTE-C05a, CTE-C05b* | | |
| **Dependencies:** | No dependencies | | |
| **Network Strategy Plan:** | SO8/4 | | |
| **Operating Environment:** | En-Route, Network | | |
| **EATMN Systems:** | COM | | |

## When

FOC: **31/12/2021**

## Who

Stakeholders:
- ANSPs

## Where

Applicability Area
All ECAC+ States.

## Status

Completion rate - end 2018: N/A – New Objective **n/a**

Estimated achievement: **n/a**

## Applicable regulations & standards

- ICAO - Doc 9896 ed.2 - Manual for the ATN using IPS Standards and Protocols
- EUROCAE - ED-136 - VoIP ATM System Operational and Technical Requirements
- EUROCAE - ED-137B - Interoperability Standards for VoIP ATM Components (Volumes 1 to 5)
- EUROCAE - ED-137C - Interoperability Standards for VoIP ATM Components (Volume 1)
- EUROCAE - ED-138 - Network Requirements and Performances for VoIP ATM Systems (Parts 1 and 2)

## Benefits

Safety
Maintained or improved by providing enhanced signalisation functions. Improved by providing a more resilient infrastructure.

Capacity
Maintained or improved by providing enhanced signalisation functions.

Cost Efficiency
Reduced costs by enabling flexible and dynamic use of ANSP resources, leading to long term savings

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Develop safety assessment for the changes**<br>- Develop safety assessment of the changes, notably upgrades of voice communication systems to support VoIP both for inter-centre telephony and AG radio communication.<br>- Deliver safety assessment to the NSA, if new standards are applicable or if the severity class of identified risks is 1 or 2. | 31/12/2021 |
| **ASP03** | **Upgrade and put into service voice communication systems to support VoIP inter-centre telephony**<br>- The upgraded voice communication systems and their HMI shall enable inter-centre communication using VoIP telephony at ATS units providing services en-route. | 31/12/2021 |
| **ASP04** | **Upgrade and put into service voice communication systems to support VoIP links to the ground radio stations**<br>- The upgraded voice communication systems shall enable the operators to perform AG radio communication using VoIP links between VCS and ground radio stations, for services provided en-route. | 31/12/2021 |

## Changes to the Objective since previous edition:

- New Objective addressing the En-route part of the former Objective COM11 Voice over Internet Protocol
- New FOC date of 31/12/2021
- Israel and Morocco added to Applicability Area.
- Scope changed from ECAC to ECAC+

# COM11.2 – Voice over Internet Protocol (VoIP) in Airport/Terminal

This Implementation Objective aims at an efficient use of voice over Internet protocol (VoIP) by harmonised and coordinated implementation for ground/ground and ground part of ground/air aeronautical communications, ensuring network benefits from VoIP implementation. The initiative covers inter centre (encompassing all type of ATM Units) voice communication and the links with the ground radio stations. Inter-centre voice communications are currently mainly performed via analogue and digital circuits. This legacy ATM voice services will soon no longer be supported by the European telecommunication service providers, making the use of new technology necessary.
COM11.1 is applicable to 'Airport' and 'Terminal' Operating Environments.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Enabling Aviation Infrastructure | | |
| **OI Steps & *Enablers*:** | *CTE-C05a, CTE-C05b* | | |
| **Dependencies:** | No dependencies | | |
| **Network Strategy Plan:** | SO8/4 | | |
| **Operating Environment:** | Airport, Terminal | | |
| **EATMN Systems:** | COM | | |

## When

FOC: **31/12/2023**

## Who

Stakeholders:
- ANSPs

## Where

Applicability Area
All ECAC+ States, except Morocco.

## Status

N/A – New Objective

Completion rate - end 2018: **n/a**

Estimated achievement: **n/a**

## Applicable regulations & standards

- ICAO - Doc 9896 ed.2 - Manual for the ATN using IPS Standards and Protocols
- EUROCAE - ED-136 - Voice over Internet Protocol (VoIP) ATM System Operational and Technical Requirements
- EUROCAE - ED-137B - Interoperability Standards for VoIP ATM Components (Volumes 1 to 5)
- EUROCAE - ED-137C - Interoperability Standards for VoIP ATM Components (Volume 1)
- EUROCAE - ED-138 - Network Requirements and Performances for VoIP ATM Systems (Parts 1 and 2)

## Benefits

Safety
Maintained or improved by providing enhanced signalisation functions. Improved by providing a more resilient infrastructure.

Capacity
Maintained or improved by providing enhanced signalisation functions.

Cost Efficiency
Reduced costs by enabling flexible and dynamic use of ANSP resources, leading to long term savings

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Develop safety assessment for the changes**<br>- Develop safety assessment of the changes, notably upgrades of voice communication systems to support VoIP both for inter-centre telephony and AG radio communication.<br>- Deliver safety assessment to the NSA, if new standards are applicable or if the severity class of identified risks is 1 or 2. | 31/12/2023 |
| **ASP03** | **Upgrade and put into service voice communication systems to support VoIP inter-centre telephony**<br>- The upgraded voice communication systems and their HMI shall enable inter-centre communication using VoIP telephony at ATS units providing services in Airport and Terminal environments. | 31/12/2023 |
| **ASP04** | **Upgrade and put into service voice communication systems to support VoIP links to the ground radio stations**<br>- The upgraded voice communication systems shall enable the operators to perform AG radio communication using VoIP links between VCS and ground radio stations, for services provided in Airport and Terminal environments. | 31/12/2023 |

## Changes to the Objective since previous edition:

- New Objective addressing the Airport and Terminal part of the former Objective COM11 Voice over Internet Protocol
- New FOC date of 31/12/2023
- Israel added to Applicability Area.
- Scope changed from ECAC to ECAC+

# COM12 – NewPENS

PENS (Pan-European Network Service) is an international ground/ground communications infrastructure jointly implemented by EUROCONTROL and European ANSPs in order to meet existing and future ATM communication requirements.
NewPENS builds on PENS and aims at providing a new framework and governance to reap the benefits of a single IP backbone for all ATM services. It will support SESAR requirements and the PCP functionalities, in particular, the blue SWIM Technical Infrastructure Profile which includes the exchange of flight object (FO) information. ANSPs implementing the exchange of FO information will therefore have to become NewPENS users.
The aim of NewPENS is to support all ATM services, not only for ANSPs and NM, but also military, airport and aircraft operators. It is up to these stakeholders, depending on their requirements, to join NewPENS or use public Internet network.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Enabling Aviation Infrastructure | | |
| **Essential Operational Change / PCP:** | Enabler for AF5 Initial System Wide Information Management (SWIM) | | |
| **DP Families:** | 5.1.2 NewPENS: New Pan-European Network Service<br>5.2.1 Stakeholders Internet Protocol Compliance | | |
| **OI Steps & *Enablers*:** | *CTE-C06b* | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B1-SWIM | | |
| **Network Strategy Plan:** | SO2/3, SO2/4 , SO8/3, SO8/4 | | |
| **Operating Environment:** | Airport, Terminal, En-Route, Network | | |
| **EATMN Systems:** | COM | | |

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Benefits

Cost Efficiency
Significant cost savings for the international communications of all connected stakeholders compared to:
- Keeping the inter-stakeholder connections separate from the network.
- Continuing to run all international communications on bilateral international links.

Security
NewPENS shall be compliant with the Security levels requested by the applications it will support, including SWIM.

## When

FOC
- 33 ANSPs: **31/12/2020**
- Other stakeholders: **31/12/2024**

## Who

Stakeholders:
- ANSPs
- Airport Operators
- Airspace users
- Network Manager

## Where

Applicability Area
**- Area 1** (ANSPs signatories of the NewPENS Common Procurement Agreement): 33 ANSPs
**- Area 2** (Other stakeholders): Stakeholders from all ECAC+ States not part of Area 1.Except Morocco.

## Status

**On time**

Completion rate - end 2018: **0%**

Estimated achievement: **12/2023**

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Provide NewPENS connectivity infrastructure**<br>- Adapt communications systems and infrastructure to enable connectivity between NewPENS and the ANSP's network. | Area 1: 31/12/2020<br>Area 2: 31/12/2024 |
| **ASP02** | **Migrate to NewPENS**<br>- Migrate the selected services and applications to NewPENS. This shall include, when and where applicable, the exchange of flight object (FO) information. | Area 1: 31/12/2020<br>Area 2: 31/12/2024 |

## Airport Operators Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Migrate to NewPENS, if deemed beneficial**<br>- According to local needs and requirements, migrate to NewPENS for communications with ANSPs and NM (e.g. CDM, messages). | 31/12/2024 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Migrate to NewPENS, if deemed beneficial**<br>- According to local needs and requirements, migrate to NewPENS for communications with ANSPs and NM (e.g. CDM, messages). | 31/12/2024 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Adapt NM systems to allow stakeholders have access to existing data centres via NewPENS** | 31/12/2024 |
| **NM02** | **Migrate to NewPENS**<br>- Migrate the selected services and applications to NewPENS including exchange of FO information. | 31/12/2024 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+
- Israel added to Applicability Area.

# FCM08 – Extended Flight Plan

The extended flight plan (e-FPL) will include the planned 4D trajectory of the flight as well as flight performance data in addition to ICAO 2012 FPL data, supporting the collaborative flight planning. It is one of the system requirements supporting the initial trajectory information.

This objective addresses the message exchange between NM systems, ANSPs' ATM system and AU's flight plan filing systems. The first phase will address the exchanges between AUs and NM. The subsequent phase, addressing he transmission of e-FPL data to ANSPs will be implemented when transition to FF-ICE (Flight & Flow Information for a Collaborative Environment) is achieved.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #37 | **AAS Milestone:** | 1.4 |
| **SESAR Key Feature:** | Enabling Aviation Infrastructure | | |
| **Essential Operational Change / PCP:** | S-AF4.2 Collaborative NOP<br>S-AF4.4 Automated Support for Traffic Complexity Assessment | | |
| **DP Families:** | 4.2.3 Interface ATM systems to NM systems | | |
| **OI Steps & *Enablers*:** | AUO-0203 | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B1-FICE | | |
| **Network Strategy Plan:** | SO5/1, SO5/6 | | |
| **Operating Environment:** | Airport, Terminal, En-Route, Network | | |
| **EATMN Systems:** | FDPS/SDPS & HMI | | |

## When

FOC: **31/12/2021**

## Who

Stakeholders:
- ANSPs
- Network Manager
- Airspace Users

## Where

Applicability Area
All ECAC+ States. Except Morocco.

## Status

**Risk of delay**

Completion rate - end 2018: **0%**

Estimated achievement: **Not available**

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project

## Benefits

Operational Efficiency
Executed trajectory closer to Airspace User's preferences. Enhanced tactical flow management allows improved operational efficiency through better predictability.

Safety
Increased safety due to better traffic predictability. Reduction of over-delivery risk.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Upgrade the ground systems and develop the associated procedures**<br>- Upgrade the ground systems with the capability to receive and process e-FPL information via FF-ICE/1 (Flight & Flow Information for a Collaborative Environment) and develop the associated procedures. | 31/12/2021 |
| **ASP02** | **Develop, and deliver as necessary, a safety assessment** | 31/12/2021 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Upgrade the flight planning systems**<br>- Upgrade the flight planning systems with the capability to exchange extended flight plan data with the NM and develop the associated procedures. | 31/12/2021 |
| **USE02** | **Train the personnel** | 31/12/2021 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Upgrade the NM systems and develop the associated procedures related to e-FPL** | 31/12/2021 |
| **NM02** | **Upgrade the NM systems and develop the associated procedures related to FF-ICE/1** | 31/12/2021 |

## Changes to the Objective since previous edition:

- Israel added to Applicability Area.
- Scope changed from ECAC to ECAC+
- Status changed from “Not Available” to “Risk of delay”

# INF07 - Electronic Terrain and Obstacle Data (eTOD)

ICAO Annex 15 requires the States to provide TOD for their own territory and to announce it in the national AIPs. States need to assess the national regulations and policies in order to evaluate their suitability in relation to eTOD requirements of ICAO Annex 15.
States also need to create capabilities and processes for the origination, collection, exchange, management and distribution of eTOD information as digital datasets, ensuring the provision of up-to-date data meeting the operational requirements and in compliance with the requirements of Regulation (EC) No 73/2010 on aeronautical data quality.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Enabling Aviation Infrastructure | | |
| **Operational Change:** | Information reference and exchange models | | |
| **DP Families:** | 1.2.2 Geographical database for procedure design | | |
| **OI Steps & *Enablers*:** | *AIMS-16* | | |
| **Dependencies:** | ITY-ADQ | | |
| **Network Strategy Plan:** | SO2/5 | | |
| **Operating Environment:** | Airport, Terminal | | |
| **EATMN Systems:** | AIS | | |

## Applicable regulations & standards

- Annex 15 - Aeronautical Information Services
- Annex 14 - Aerodromes Volume I Aerodrome Design and Operations
- Annex 4 - Aeronautical Charts
- Regulation (EC) 73/2010 on aeronautical data quality
- Regulation (EU) 139/2014 on administrative procedures related to aerodromes
- EUROCAE - ED 98 & ED119

## When

FOC: **31/05/2018**

## Who

Stakeholders:
- Regulators
- ANSPs
- Airport Operators

## Where

Applicability Area
All ECAC+ States except MUAC.

## Status

**Late**

Completion rate - end 2018: **10%**

Estimated achievement: **12/2020**

## Benefits

Safety
The availability of quality-assured electronic terrain and obstacle data from the State's authoritative sources will significantly improve situational awareness with respect to terrain or obstacle hazards, separation assurance and the visualization of approaches in challenging terrain environments, and thereby contribute to increased safety levels and performance in airborne and ground-based systems (e.g. EGPWS, MSAW, APM, SVS, A-SMGCS and Instrument Procedure Design).

## Regulators Lines of Action:

| | | |
|---|---|---|
| **REG01** | **Establish National TOD policy** | 30/11/2015 |
| **REG02** | **Establish TOD regulatory framework** | 31/12/2017 |
| **REG03** | **Establish oversight of TOD implementation** | 31/12/2017 |
| **REG04** | **Verify the regulatory compliance of TOD implementation** | 31/05/2018 |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Plan the required activities for the collection, management and provision of TOD in accordance with national TOD policy** | 30/11/2015 |
| **ASP02** | **Implement the collection, management and provision of TOD in accordance with the national TOD policy and regulatory framework** | 31/05/2018 |

## Airport Operators Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Plan the required activities for the collection, management and provision of TOD in accordance with national TOD policy** | 30/11/2015 |
| **APO02** | **Implement the collection, management and provision of TOD in accordance with the national TOD policy and regulatory framework** | 31/05/2018 |

## Changes to the Objective since previous edition:

- Israel added to Applicability Area.
- Scope changed from ECAC to ECAC+
- Status changed from “Planned delay” to “Late”

# INF08.1 - Information Exchanges using the SWIM Yellow TI Profile

SWIM comprises standards, infrastructure and governance enabling the management of information and its exchange between operational stakeholders via interoperable services.

Initial system wide information management (iSWIM) is the first element towards SWIM and supports the information exchange based on services that are in conformance with the applicable foundational SWIM specifications. These information services will be delivered over IP-based networks supported through Common Infrastructure Components (i.e. SWIM Registry and Public Key Infrastructure (PKI)).

This objective is limited to the deployment of information services allowing the information exchanges identified in the Annex of the PCP Regulation No 716/2014, and adhering to the SWIM specifications (Information services description, Information definition, Technical infrastructure - Yellow Profile).

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #35, #46 | **AAS Milestone:** | 1.5 |
| **SESAR Key Feature:** | Enabling Aviation Infrastructure | | |
| **Essential Operational Change / PCP:** | AF5 Initial SWIM | | |
| **DP Families:** | 5.1.3, 5.1.4, 5.2.1, 5.2.2, 5.2.3, 5.3.1, 5.4.1, 5.5.1, 5.6.1 | | |
| **OI Steps & *Enablers*:** | IS-0901-A, MET-0101 | | |
| **Dependencies:** | COM12 | | |
| **ICAO ASBUs:** | B1-DATM, B1-SWIM | | |
| **Network Strategy Plan:** | SO2/4, SO2/5, SO5/2, SO5/5 | | |
| **Operating Environment:** | Airport, Terminal, En-Route, Network | | |
| **EATMN Systems:** | AIS, MET, ASM/ATFCM, FDPS/SDPS & HMI | | |

## When

FOC: **31/12/2024**

*(Only for EU States + Norway and Switzerland)*

## Who

Stakeholders:
- ANSPs
- Military Authorities
- Airport Operators
- Airspace Users
- Network Manager

## Where

Applicability Area
All ECAC+ States. Except Morocco.

## Status

Not available

Completion rate - end 2018: **0%**

Estimated achievement: **n/a**

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project
- EUROCONTROL Specification for SWIM Service Description
- EUROCONTROL Specification for SWIM Information Definition
- EUROCONTROL Specification for SWIM Technical Infrastructure (TI) Yellow Profile

## Benefits

The benefits are dependent upon the applications that will be run over the SWIM infrastructure and supporting:
- Aeronautical information exchange
- Meteorological information exchange
- Cooperative network information exchange
- Flight information exchange

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Implement Aeronautical information exchanges** | 31/12/2024 |
| **ASP02** | **Implement Meteorological information exchanges** | 31/12/2024 |
| **ASP03** | **Implement Cooperative Network information exchanges** | 31/12/2024 |
| **ASP04** | **Implement Flight Information exchanges** | 31/12/2024 |

## Airport Operators Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Implement Aeronautical information exchanges** | 31/12/2024 |
| **APO02** | **Implement Meteorological information exchanges** | 31/12/2024 |
| **APO03** | **Implement Cooperative Network information exchanges** | 31/12/2024 |
| **APO04** | **Implement Flight Information exchanges** | 31/12/2024 |

## Military Lines of Action:

| | | |
|---|---|---|
| **MIL01** | **Implement Aeronautical information exchanges** | 31/12/2024 |
| **MIL02** | **Implement Meteorological information exchanges** | 31/12/2024 |
| **MIL03** | **Implement Cooperative Network information exchanges** | 31/12/2024 |
| **MIL04** | **Implement Flight Information exchanges** | 31/12/2024 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Implement Aeronautical information exchanges** | 31/12/2024 |
| **USE02** | **Implement Meteorological information exchanges** | 31/12/2024 |
| **USE03** | **Implement Cooperative Network information exchanges** | 31/12/2024 |
| **USE04** | **Implement Flight Information exchanges** | 31/12/2024 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Implement Aeronautical information exchanges** | 31/12/2024 |
| **NM02** | **Implement Meteorological information exchanges** | 31/12/2024 |
| **NM03** | **Implement Cooperative Network information exchanges** | 31/12/2024 |
| **NM04** | **Implement Flight Information exchanges** | 31/12/2024 |

## Changes to the Objective since previous edition:

- Israel added to Applicability Area.
- Scope changed from ECAC to ECAC+

# INF08.2 - Information Exchanges using the SWIM Blue TI Profile

This objective addresses the exchange of flight information related to the flight object using the blue SWIM technical infrastructure (TI) profile as defined in the PCP Regulation.

System wide information management (SWIM) concerns the development of services for information exchange. SWIM comprises standards, infrastructure and governance enabling the management of information and its exchange between operational stakeholders via interoperable services. Initial system wide information management (iSWIM) supports information exchanges that are built on standards and delivered through an internet protocol (IP)-based network by SWIM enabled systems.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | #28, #46 | **AAS Milestone:** | 9.1 |
| **SESAR Key Feature:** | Enabling Aviation Infrastructure | | |
| **Essential Operational Change / PCP:** | AF5 Initial SWIM | | |
| **DP Families:** | 5.1.3, 5.1.4, 5.2.1, 5.2.2, 5.2.3, 5.6.2 | | |
| **OI Steps & *Enablers*:** | IS-0901-A, CM-0201-A | | |
| **Dependencies:** | COM12, INF08.1 | | |
| **ICAO ASBUs:** | B1-DATM, B1-SWIM | | |
| **Network Strategy Plan:** | SO5/2, SO5/5 | | |
| **Operating Environment:** | Airport, Terminal, En-Route, Network | | |
| **EATMN Systems:** | AIS, ASM/ATFCM, FDPS/SDPS & HMI | | |

## When

FOC: **31/12/2024**

## Who

Stakeholders:
- ANSPs
- Network Manager

## Where

Applicability Area
All EU+ States

## Status

'Initial' objective

Completion rate - end 2018: **n/a**

Estimated achievement: **n/a**

## Applicable regulations & standards

- Regulation (EU) 716/2014 - Establishment of the Pilot Common Project
- EUROCONTROL Specification for SWIM Service Description
- EUROCONTROL Specification for SWIM Information Definition

## Benefits

The benefits are dependent upon the applications that will be run over the SWIM infrastructure and supporting:
- Aeronautical information exchange
- Meteorological information exchange
- Cooperative network information exchange
- Flight information exchange

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Implement the appropriate infrastructure components in accordance with the SWIM TI Blue Profile** | 31/12/2024 |
| **ASP02** | **Implement Flight information exchanges** | 31/12/2024 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Implement the appropriate infrastructure components in accordance with the SWIM TI Blue Profile** | 31/12/2024 |
| **NM02** | **Implement Flight information exchanges** | 31/12/2024 |

NOTE: This objective provides advance notice to stakeholders. Some aspects of the objective require further validation.

## Changes to the Objective since previous edition:

- Nil.

# INF09 – Digital Integrated Briefing [Local]

This objective provides digital AIS data, in particular Digital NOTAM (encoded as "events" in AIXM format), and digital MET data (METAR, TAF, SIGMET in the ICAO iWXXM format) to pilots and dispatchers in the form of digital briefing products and services, which are merged (joint) with the geographical and planned flight trajectory information, and presented (visualised) in a graphical way.
The digital integrated briefing is currently targeted for ground use (FOC/WOC, pre-flight briefing rooms and ARO offices). Some enablers (Digital NOTAM and digital MET data) support the use in the cockpit, in all phases of flight, while enablers for transmission into the cockpit are not yet mature (see IS-0206 Digital Integrated Briefing during flight execution phase).

| | | | |
|---|---|---|---|
| **SESAR Solution:** | #34 | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Enabling Aviation Infrastructure | | |
| **Operational Change:** | Digital integrated briefing | | |
| **OI Steps & *Enablers*:** | *IS-0205* | | |
| **Dependencies:** | INF08.1 SWIM | | |
| **ICAO ASBU:** | B1-DATM, B1-SWIM | | |
| **Network Strategy Plan:** | SO2/5 | | |
| **Operating Environment:** | Airport, Network | | |
| **EATMN Systems:** | AIS | | |

## Applicable regulations & standards

- Annex 15 - Aeronautical Information Services
- Annex 3 - Meteorological Service for International Air Navigation
- ICAO PANS-AIM
- Regulation (EC) 73/2010 on aeronautical data quality (ADQ)

## When

FOC: **n/a**

## Who

Stakeholders:
- Network Manager
- ANSPs
- International Organisations

## Where

Applicability Area **n/a**
Subject to local need.

## Status

**New**
**Initial Objective**

Completion rate - end 2018: **n/a**

Estimated achievement: **n/a**

## Benefits

Safety
The graphical presentation of digital NOTAM data should facilitate the task of finding the relevant information (geospatial and temporal filtering) and understanding the AIS and MET information relevant for a specific flight. INF09 leads to a reduction in the number of incidents that are sometimes due to the lack of informational awareness, such as airspace infringements, attempts to use a closed RWY or RWY excursions, attempts to use a closed airport surface, temporary changes in operational procedures, etc.

Operational Efficiency
The graphical presentation of digital information, a better filtering and a more logical organisation of the pre-flight information bulletins improve pilot and dispatcher awareness, improve briefing efficiency and reduces the risk of information being misunderstood or missed.

## International Organisations Lines of Action:

| | | |
|---|---|---|
| **INT01** | **Develop the standards for the use of digital NOTAM**<br>Develop a Global Specification for the provision of Digital NOTAM including harmonised coding rules, in accordance to the ISO/IEC process and in accordance with existing SWIM specifications. | n/a |
| **INT02** | **Develop regulatory material for the use of digital NOTAM**<br>Develop and publish Technical requirements and operational procedures for aeronautical information services and aeronautical information management. | n/a |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Update the systems to receive and distribute AIS and MET information electronically**<br>Update the systems to:<br>a) exchange AIS information using the AIXM format for digital data and electronic form for AIP and NOTAM.<br>b) exchange MET information METAR, TAF, SIGMET in the ICAO iWXXM format. | n/a |
| **ASP02** | **Provide airspace users with pre-flight digital integrated briefing**<br>Generate pre-flight briefing information/data, based on digital AIS and digital NOTAM data, and provide it to airspace users. | n/a |
| **ASP03** | **Develop a local safety assessment** | n/a |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM01** | **Generate and provide pre-flight briefings based on digital data**<br>Generate and provide pre-flight briefing information/data, based on digital AIS and digital NOTAM data in accordance with the applicable SWIM specifications. | n/a |

## Changes to the Objective since previous edition:

-New Objective. Status Initial. Scope Local.

# ITY-ACID - Aircraft Identification

The scope of this implementation objective is limited to the milestone of 2 January 2020 as identified in the Regulation (EU) No 1206/2011 (the ACID IR). This regulation requires that air navigation service providers, in all Member States, have the capability to establish individual aircraft identification using the downlinked aircraft identification feature, for all IFR/GAT flights. This may require a.o. the deployment of modern surveillance technologies paving the way to the rationalisation of the current infrastructure. The possibility of delayed compliance, under very specific conditions (approach area where air traffic services are provided by military units or under military supervision) is also envisaged.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Enabling Aviation Infrastructure | | |
| **Essential Operational Change / PCP:** | Predecessor of 'CNS Rationalisation' (EOC) | | |
| **OI Steps & *Enablers*:** | *GSURV-0101* | | |
| **Dependencies:** | ITY-SPI | | |
| **Network Strategy Plan:** | SO8/2 | | |
| **Operating Environment:** | Airport, Terminal, En-Route, Network | | |
| **EATMN Systems:** | FDPS/SDPS & HMI, SUR | | |

## When

FOC: **02/01/2020**

Deferred compliance subject to conditions and only for services provided by military: **02/01/2025**

## Who

Stakeholders:
- ANSPs
- Airspace Users

## Where

Applicability Area
All ECAC+ States, except Morocco and Ukraine.

## Status

**Risk of delay**

Completion rate - end 2018: **20%**

Estimated achievement: **01/2020**

## Applicable regulations & standards

- Regulation (EU) 1206/2011 on aircraft identification for surveillance
- Regulation (EU) 1207/2011 on performance and interoperability of surveillance, as amended by Regulation (EU) 1028/2014
- ICAO Annex 2 - Rules of the Air
- ICAO Annex 10 - Surveillance Radar and Collision Avoidance Systems
- EASA CS-ACNS, initial issue

## Benefits

Safety
Enhanced safety levels by ensuring that unambiguous individual aircraft identification is achieved, maintained and shared accurately throughout EATMN airspace.

Capacity
Avoidance of delays and of reduction in network capacity due to shortage of SSR transponder codes or by increased controller workload caused by code changes.

Operational Efficiency
The use of downlinked aircraft identification represents the most efficient long term solution as primary mean of identification, as shown in the impact assessment of Regulation (EU) No 1206/2011.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Ensure the capability of the cooperative surveillance chain, to use the downlinked aircraft identification**<br>- The deployment and the use of this capability will have an impact on the surveillance systems as well as on flight data processing systems, surveillance data processing systems, human machine interface systems and ground-to-ground communication systems used for the distribution of surveillance data. | 02/01/2020 |
| **ASP02** | **Organise personnel training and awareness** | 02/01/2020 |
| **ASP03** | **Develop, and deliver as necessary, a safety assessment of the changes imposed by the implementation of the capability allowing the establishment of the individual aircraft identification using the downlinked aircraft identification feature**<br>- Derogation: For the **specific case** of approach areas where **ATS are provided by military units** or under military supervision and when procurement constraints prevent the capability of the cooperative surveillance chain, to use the downlinked aircraft identification, States shall communicate to the Commission by 31 December 2017 at the latest, the date of compliance with downlinked aircraft identification that shall not be later than **2 January 2025**. Following consultation with the NM, and not later than 31 December 2018, the Commission may review the exemptions that could have a significant impact on the EATMN. | 02/01/2020 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Organise personnel training and awareness** | 02/01/2020 |

## Changes to the Objective since previous edition:

- Israel and Turkey added to Applicability Area.
- Scope changed from ECAC to ECAC+
- Status changed from “On time” to “Risk of delay”

# ITY-ADQ - Ensure Quality of Aeronautical Data and Aeronautical Information

This objective is derived from Regulation (EU) No 73/2010 on the quality of aeronautical data and aeronautical information in terms of accuracy, resolution and integrity. It applies to systems, their constituents and procedures involved in the origination, production, storage, handling, processing, transfer and distribution of aeronautical data and aeronautical information.

It applies to the integrated aeronautical information package (IAIP) (with the exception of aeronautical information circulars), electronic obstacle and electronic terrain data or elements thereof, and aerodrome mapping data.

| | | | |
|---|---|---|---|
| **SESAR Focus Area:** | Nil | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Enabling Aviation Infrastructure | | |
| **Essential Operational Change / PCP:** | Prerequisite for:<br>- S-AF1.2 - Enhanced Terminal Airspace using RNP-based Operations<br>- AF5 - Initial SWIM | | |
| **DP Families:** | 1.2.2 Geographical database for procedure design | | |
| **OI Steps & *Enablers*:** | IS-0202, IS-0204 | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B0-DATM | | |
| **Network Strategy Plan:** | SO2/5 | | |
| **Operating Environment:** | Airport, Terminal, En-Route, Network | | |
| **EATMN Systems:** | AIS | | |

## Applicable regulations & standards

- Regulation (EU) 73/2010 on the quality of aeronautical data and aeronautical information ('the ADQ Regulation')
- Regulation (EU) 1029/2014 amending Regulation (EU) 73/2010
- ICAO Annex 15

## When

FOC: **30/06/2017**

See intermediate milestones in the SLoAs list in the second page.

## Who

Stakeholders:
- Regulators
- ANSPs
- Airport Operators
- Industry

## Where

Applicability Area
All EU+ States, plus Israel and Turkey, except Georgia and MUAC

## Status

**Late**

Completion rate - end 2018: **6%**

Estimated achievement: **12/2021**

## Benefits

Safety
Improved consistency, reliability and integrity of aeronautical data and aeronautical information.

Security
Enhanced security due to the implementation of security requirements.

## Regulators Lines of Action:

| | | |
|---|---|---|
| **REG01** | **Verify the compliance with data quality requirements and supervise safety assessments** | 30/06/2013 |
| **REG02** | **Verify the establishment of formal arrangements** | 30/06/2013 |
| **REG04** | **Verify that all parties comply with all data requirements** | 30/06/2017 |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Implement data quality and process requirements** | 30/06/2013 |
| **ASP02** | **Establish formal arrangements** | 30/06/2013 |
| **ASP03** | **Establish consistency mechanisms and implement timeliness requirements** | 30/06/2013 |
| **ASP04** | **Implement personnel and performance requirements** | 30/06/2013 |
| **ASP05** | **Implement a quality management system and fulfil safety and security objectives** | 30/06/2013 |
| **ASP06** | **Implement the common dataset and digital exchange format** | 30/06/2014 |
| **ASP07** | **Implement all data requirements** | 30/06/2017 |

## Airport Operators Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Implement data quality and process requirements** | 30/06/2013 |
| **APO02** | **Implement personnel and performance requirements** | 30/06/2013 |
| **APO03** | **Implement a quality management system and fulfil safety and security objectives** | 30/06/2013 |
| **APO04** | **Implement the common dataset and digital exchange format requirements** | 30/06/2014 |
| **APO05** | **Implement all data quality requirements** | 30/06/2017 |

## Industry Lines of Action:

| | | |
|---|---|---|
| **IND01** | **Implement data quality and process requirements** | 30/06/2013 |
| **IND02** | **Implement personnel and performance requirements** | 30/06/2013 |
| **IND03** | **Implement a quality management system and fulfil safety and security objectives** | 30/06/2013 |
| **IND04** | **Implement the common dataset and digital exchange format requirements** | 30/06/2014 |
| **IND05** | **Implement all data quality requirements** | 30/06/2017 |

## Changes to the Objective since previous edition:

- Israel, Morocco and Turkey added to Applicability Area.

# ITY-AGDL - Initial ATC Air-Ground Data Link Services

The early introduction of data link services to complement voice controller pilot communications in the en-route phase is foreseen by the European Air Traffic Management Master Plan. This implementation objective requires the interoperable implementation of the first set of en-route non time-critical air-ground data link services DLIC, ACL, ACM and AMC above FL285 (Regulation (EU) 2015/310).

| | | | |
|---|---|---|---|
| **SESAR Solution:** | Nil. | **AAS Milestone:** | 1.1 |
| **SESAR Key Feature:** | Enabling Aviation Infrastructure | | |
| **Essential Operational Change / PCP:** | - A/G datalink<br>- Pre-requisite for S-AF 6.1 Initial trajectory information sharing (i4D) (PCP) | | |
| **DP Families:** | 6.1.1 ATN B1 based services in ATSP domain<br>6.1.3 A/G and G/G Multi Frequency DL Network in defined European Service Areas<br>6.1.4 ATN B1 capability in Multi Frequency environment in Aircraft Domain | | |
| **OI Steps & *Enablers*:** | AUO-0301 | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B0-TBO | | |
| **Network Strategy Plan:** | SO4/1, SO8/3 | | |
| **Operating Environment:** | En-Route, Network | | |
| **EATMN Systems:** | FDPS/SDPS & HMI, COM | | |

## When

FOC (ATS): **05/02/2018**

FOC (AUs): **05/02/2020**

*(Only for EU States + Norway and Switzerland)*

## Who

Stakeholders:
- Regulators
- ANSPs
- Airspace Users
- Military

## Where

Applicability Area

All ECAC+ States except Georgia, Israel, Luxembourg Netherlands

## Status

**Late**

Completion rate - end 2018: **37%**

Estimated achievement: **12/2021**

## Applicable regulations & standards

- Regulation (EU) 2015/310 on data link services
- ICAO - Annex 10 - Aeronautical Telecommunications, Volume III COM Systems, Part 1 Digital Data COM Systems - Edition 2.0
- EUROCAE Documents ED-120, ED-111.
- ETSI EN 303 214 V1.2.1 Data Link Services (DLS) System

## Benefits

Safety

Through the delivery of standard and unambiguous messages (significant error and fatigue reduction), provision of a communications backup and the possibility of immediate message retrieval.

Capacity

Through both reduction of voice congestion and increase in controller and sector productivity. Capacity gain is expected from 3.4% (if 25% of flights is equipped) up to 11% (if 75% of flights is equipped). This will lead to reduction of delays.

## Regulators Lines of Action:

| | | |
|---|---|---|
| **REG03** | **Ensure the publication of relevant information in the national AIP** | 05/02/2018 |
| **REG04** | **Ensure ATN/VDL-2 availability, security policy and address management procedures** | 05/02/2018 |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Ensure the conformity of communications, flight data and initial flight plan processing systems and associated procedures** | 05/02/2018 |
| **ASP02** | **Organise personnel awareness and training** | 05/02/2018 |
| **ASP03** | **Ensure ground communication systems comply with air-ground communication requirements**<br>- Ensure the COM service provider (CSP) has deployed and made available ground communication systems which allow ATN/VDL-2 or alternative communication technology. | 05/02/2018 |
| **ASP04** | **Deploy communication infrastructure to handle air-ground data link services** | 05/02/2018 |
| **ASP05** | **Implement Logon Forward process** | 05/02/2018 |
| **ASP06** | **Implement Next Authority Notified process** | 05/02/2018 |

## Military Lines of Action:

| | | |
|---|---|---|
| **MIL01** | **Equip transport-type State aircraft** | 01/01/2019 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Equip aircraft with data link equipment supporting the identified services** | 05/02/2020 |
| **USE02** | **Specify relevant operational procedures** | 05/02/2020 |
| **USE03** | **Arrange air-ground ATS data link service provision**<br>- Make appropriate arrangements with CSPs serving all relevant ATS units. | 05/02/2020 |
| **USE04** | **Organise personnel awareness and training** | 05/02/2020 |

## Changes to the Objective since previous edition:

- Scope changed from ECAC to ECAC+. Morocco added to Applicability Area.
- Status changed from “Planned delay” to “Late”

# ITY-AGVCS2 - 8,33 kHz Air-Ground Voice Channel Spacing below FL195

This objective is derived from Regulation (EU) No 1079/2012 on the coordinated introduction of air-ground voice communications based on 8,33 kHz channel spacing. It applies to all radios operating in the VHF band allocated to the aeronautical mobile route service and all flights operating as general air traffic.
All frequency assignments need to be converted to 8,33 kHz except those used for emergency, search and rescue, VHF digital link (VDL), ACARS and those where offset carrier operation within a 25 kHz channel spacing is utilised.
States can grant exemptions on some requirements based on Article 14 of the Regulation.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Enabling Aviation Infrastructure | | |
| **OI Steps & *Enablers*:** | *CTE-C01a* | | |
| **Dependencies:** | No dependencies | | |
| **Network Strategy Plan:** | SO8/1 | | |
| **Operating Environment:** | Airport, Terminal, En-Route, Network | | |
| **EATMN Systems:** | COM | | |

## Applicable regulations & standards

- Regulation (EU) No 1079/2012 laying down requirements for voice channels spacing
- ICAO Annex 10, Volume III - Aeronautical Telecommunications

## Benefits

Operational Efficiency
Optimisation of the use of the bandwidth, which is a prerequisite to a number of crucial operational improvements that will deliver benefits such as reduced delays and increased capacity. Such benefits will be postponed or even impossible if the additional frequencies required are not readily available.

## When

Radio equipment: **31/12/2017**
Freq. converted: **31/12/2018**
State aircraft: **31/12/2020**

## Who

Stakeholders:
- Regulators
- ANSPs
- Airport Operators
- Military
- Airspace Users
- Network Manager

## Where

Applicability Area
All EU+ States except Georgia and Moldova

## Status

**Late**

Completion rate - end 2018: **20%**

Estimated achievement: **12/2023**

## Regulators Lines of Action:

| | | |
|---|---|---|
| **REG01** | **Ensure radios have 8,33 kHz channel spacing capability** | 31/12/2017 |
| **REG02** | **Ensure the achievement of the interim target for 8,33 kHz frequency conversions** | Finalised |
| **REG03** | **Ensure compliance with the requirements on 8,33 kHz frequency conversions** | 31/12/2018 |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Ensure conformity of voice communications systems and associated procedures** | 31/12/2018 |
| **ASP02** | **Convert 25 kHz frequencies to 8,33 kHz to achieve the interim target** | Finalised |
| **ASP03** | **Convert all 25 kHz frequencies to 8,33 kHz** | 31/12/2018 |
| **ASP04** | **Develop safety assessment** | 31/12/2018 |
| **ASP05** | **Organise personnel training and awareness** | 31/12/2018 |

## Military Lines of Action:

| | | |
|---|---|---|
| **MIL01** | **Equip State aircraft with radio equipment with 8,33 kHz channel spacing capability** | 31/12/2020 |
| **MIL02** | **Organise personnel training and awareness of military aircrew** | 31/12/2020 |

## Airport Operators  Lines of Action:

| | | |
|---|---|---|
| **APO01** | **Convert all 25 kHz frequencies to 8,33 kHz** | 31/12/2018 |
| **APO02** | **Accommodate non-equipped vehicles** | 31/12/2017 |
| **APO03** | **Organise personnel training and awareness** | 31/12/2018 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE01** | **Equip aircraft with radio equipment with 8,33 kHz channel spacing capability** | 31/12/2017 |
| **USE02** | **Organise personnel training and awareness** | 31/12/2017 |

## Network Manager Lines of Action:

| | | |
|---|---|---|
| **NM03** | **Ensure the centralised flight planning processing and distribution service complies with the Regulation** | Finalised |

## Changes to the Objective since previous edition:

- Status changed from ‘Planned delay’ to ‘Late’.

# ITY-FMTP – Common Flight Message Transfer Protocol

This objective describes the requirements for the application of a flight message transfer protocol (FMTP) for information exchanges between flight data processing systems for the purpose of notification, coordination and transfer of flights between air traffic control units and for the purposes of civil-military coordination.
It is derived from Regulation (EC) No 633/2007 (including the transitional arrangements of Reg. (EU) No 283/2011) and is implemented according to Reg. (EC) No 1032/2006.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | 1.3 |
| **SESAR Key Feature:** | Enabling Aviation Infrastructure | | |
| **Essential Operational Change / PCP:** | - IP Network<br>- Pre-requisite for SWIM-related operational changes and PCP AF5 (Initial SWIM) | | |
| **OI Steps & *Enablers*:** | *CTE-C06* | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B0-FICE, B1-FICE | | |
| **Network Strategy Plan:** | SO8/3 | | |
| **Operating Environment:** | Airport, Terminal, En-Route, Network | | |
| **EATMN Systems:** | COM | | |

## When

FOC: **31/12/2014**

## Who

Stakeholders:
- ANSPs
- Military

## Where

Applicability Area
All ECAC+ States.

## Status

**Late**

Completion rate - end 2018: **76%**

Estimated achievement: **12/2019**

## Applicable regulations & standards

- Regulation (EC) 633/2007 laying down requirements for the application of a flight message transfer protocol (FMTP)
- Regulation (EU) 283/2011 amending Regulation (EC) 633/2007
- EUROCONTROL - SPEC 100 - Specification of Interoperability and Performance Requirements for the Flight Message Transfer Protocol (FMTP) - Edition 2.0 - OJ 2007/C 188/03 / 06/2007

## Benefits

Cost Efficiency
More cost efficient as X.25 maintenance costs are increasing while TCP/IP costs are lower.

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Upgrade and put into service communication systems to support information exchange via FMTP between FDPS(s) for the purpose of notification, coordination and transfer of the flights between ATC units** | 31/12/2014 |
| **ASP02** | **Develop safety assessment for the changes** | 31/12/2014 |
| **ASP03** | **Train technical staff**<br>- Train technical staff to supervise and maintain communication systems which support information exchange via FMTP between FDPS(s). | 31/12/2014 |

## Military Lines of Action:

| | | |
|---|---|---|
| **MIL01** | **Upgrade and put into service communication systems to support information exchange via FMTP between FDPS(s) for the purpose of notification, coordination, transfer of the flights and civil-military coordination between ATS units and controlling military units** | 31/12/2014 |

## Changes to the Objective since previous edition:

- Israel and Morocco added to Applicability Area.
- Scope changed from ECAC to ECAC+

# ITY-SPI – Surveillance Performance and Interoperability

Objective derived from Regulation (EC) 1207/2011; its goal is to establish performance, interoperability, spectrum protection and safety requirements for surveillance and implement all necessary facilitating procedures. In addition to the performance and interoperability requirements to be fulfilled by the ANSPs, aircraft operators need to ensure that all aircraft operating IFR/GAT in the EU comply with the applicable ADS-B Out, Mode S elementary and enhanced surveillance requirements. With these requirements the Regulation also ensures that airborne installations are "future proof", i.e. they will be able to support all surveillance techniques currently used or planned.

| | | | |
|---|---|---|---|
| **SESAR Solutions:** | Nil | **AAS Milestone:** | Nil |
| **SESAR Key Feature:** | Enabling Aviation Infrastructure | | |
| **Essential Operational Change / PCP:** | Predecessor of 'CNS Rationalisation' (EOC) | | |
| **OI Steps & *Enablers*:** | *GSURV-0101* | | |
| **Dependencies:** | No dependencies | | |
| **ICAO ASBUs:** | B0-ASUR | | |
| **Network Strategy Plan:** | SO8/3, SO8/4 | | |
| **Operating Environment:** | Airport, Terminal, En-Route, Network | | |
| **EATMN Systems:** | FDPS/SDPS & HMI, SUR | | |

## Applicable regulations & standards

- Regulation (EU) 1207/2011 on performance and interoperability of surveillance, as amended by Regulation (EU) 1028/2014 and Regulation (EU) No 2017/386
- ICAO Annex 10 - Surveillance Radar and Collision Avoidance Systems
- EASA - Certification Specifications for Airborne Communications Navigation and Surveillance, initial issue

## Benefits

Safety
Improved safety through the deployment of surveillance solutions in non-radar areas.

Capacity
Capacity increase through the deployment of surveillance solutions in areas where currently procedural separation is applied.

Operational Efficiency
The application of surveillance based separation instead of procedural separation will allow the airspace users to fly more efficient trajectories.

## When

FOC: **07/06/2020**

See intermediate milestones in the SLoAs list in the second page.

## Who

Stakeholders:
- Regulators
- ANSPs
- Military
- Airspace Users

## Where

Applicability Area
All ECAC+ States. Except: Armenia, Georgia, Turkey, Ukraine.

## Status

Risk of delay

Completion rate - end 2018: **39%**

Estimated achievement: **06/2020**

## Regulators Lines of Action:

| | | |
|---|---|---|
| **REG01** | **Conduct safety oversight for the existing surveillance chain** | By 05/02/2015 |

## ANSPs Lines of Action:

| | | |
|---|---|---|
| **ASP01** | **Ensure interoperability of surveillance data** | By 12/12/2013 |
| **ASP02** | **Conduct Safety Assessment for the existing surveillance chain** | By 05/02/2015 |
| **ASP03** | **Conduct Safety Assessment for changes introduced to the surveillance infrastructure** | By 12/12/2013 |
| **ASP04** | **Ensure the training of personnel** | By 12/12/2013 |

## Military Lines of Action:

| | | |
|---|---|---|
| **MIL01** | **Carriage and operation of Mode S Elementary Surveillance avionics** | By 07/06/2020 |
| **MIL02** | **Carriage and operation of Mode S Enhanced Surveillance and ADS-B Out avionics** | By 07/06/2020 |
| **MIL03** | **Ensure the training of personnel** | By 07/06/2020 |

## Airspace Users Lines of Action:

| | | |
|---|---|---|
| **USE04** | **Carriage and operation of Mode S Elementary Surveillance avionics** | By 07/06/2020 |
| **USE05** | **Carriage and operation of ADS-B Out avionics** | By 07/06/2020 |
| **USE06** | **Carriage and operation of Mode S Enhanced Surveillance avionics** | By 07/06/2020 |
| **USE07** | **Ensure the training of personnel** | By 07/06/2020 |

## Changes to the Objective since previous edition:

- Israel and Morocco added to Applicability Area.

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# Outline Descriptions in the MPL3 Plan 2019

| OD-01 | Extended projected profile (EPP) availability on the ground using ADS-C |
|---|---|

## 1 What

| | |
|---|---|
| **Description** | 'EPP availability on ground' helps overcome today's limited data connection between the FMS on-board an aircraft and ground ATC system. It is a first step towards a full ground-air trajectory synchronization required for the implementation of the targeted TBO.<br>The initial trajectory information sharing is based on the aircraft automatically downlinking trajectory information directly from the FMS to the ground ATC systems via an updated standard for the ADS-C i.e. ATN Baseline 2 that supports all aircraft operations. It allows the i4D FMS to downlink the extended projected profile (EPP), containing an updated FMS route prediction, to ATC unit which has subscribed to the needed service contract (e.g. Extended Projected Profile & Speed Schedule Profile contracts). EPP includes, for example, the predicted aircraft weight, as well as the predicted horizontal and vertical speeds on up to 128 future waypoints along the route.<br>The ground ATC systems will enable controllers to display the downlinked route on CWP and will also automatically check whether the downlinked route conforms to what was expected on the ground; controllers will receive a warning in case a discrepancy is identified. |

## 2 Who, When and Where

| | | | |
|---|---|---|---|
| **Stakeholders impacted** | | ANSPs, Airspace Users, Network Manager, Military | |
| **Operating environments** | | En-route and TMA | |
| **Geographical scope** | | ECAC+ | |
| **Timescales** | | IOC =2020 FOC=2025 | |
| **Systems impacted** | **Airborne** | [Y] | Adapt aircraft systems to receive and process a ground initiated ADS-C Contract Request for EPP data. The avionic system shall, at the minimum, implement all EPP Data Operational Requirements listed in Annex B of ED-228A. |
| | **Ground** | [Y] | Adapt ANSP/NM ATM systems to process the air derived flight data provided by EPP.<br>The new capabilities of the ATM system are:<br>a) establishing and operating the appropriate ADS-C contract;<br>b) processing and integration of EPP information in the ATM system; and<br>c) exchanging EPP enhanced ground trajectory with other ATSUs and NM. |
| **Synchronisation** | | Synchronisation is needed at local and European level. Implementation should be coordinated amongst all stakeholders to ensure interoperability of the new airborne equipment with the existing ground systems.<br>EPP implementation should be coordinated with neighbouring stakeholders to achieve a synchronized implementation, avoiding geographical "holes" in the communication with aircraft.<br>Coordination with major European airlines regarding airborne capabilities to enable downlink of EPP data from the aircraft systems is needed to ensure that the target equipage rate of at least 20% of aircraft operating within ECAC countries can be achieved.<br>EEP implementation must also support interoperability needs of military/state transport-type aircraft deemed to be ADS-C EPP capable. | |

## 3 Links and dependencies

| | |
|---|---|
| **SESAR Key Features** | EAI-Enabling Aviation Infrastructure |
| **Essential Operational Changes** | TBO - Initial trajectory information sharing (i4D). |
| **PCP** | AF6.1 |
| **SESAR Solutions** | #115-Extended Projected Profile (EPP) availability on ground |

| | |
|---|---|
| **OI Steps / *Enablers*** | IS-0303-A - Downlink of on-board 4D trajectory data to enhance ATM ground system performance: initial and time based implementation.<br>• *ER APP ATC 100 — 4D Trajectory Management by Synchronization of Air and Ground Trajectories through EPP*<br>• *ER APP ATC 119 — Air/Ground Datalink Communication/Protocols for i4D and Controlled Time of Arrival*<br>• *ER APP ATC 149a — Air-Ground Datalink Exchange to Support i4D - Extended Projected Profile (EPP)*<br>• *A/C-37a — Downlink of trajectory data according to contract terms (ADS-C) compliant to ATN baseline 2 (FANS 3/C)* |
| **DP Families** | 6.1.2 ATN B2 based services in ATSP domain<br>6.1.5 ATN B2 in Aircraft domain |
| **MP Level 3 dependencies** | • INF08.2 needs to be implemented, at the same time, as pre-requisites due to the dependency laid down in the requirements of the PCP regulation for inter-ATSU and ATSU-NM communication.<br>• ITY-AGDL is a prerequisite, providing the physical and logical network infrastructure for ATN Air/Ground communication. |
| **ICAO ASBUs** | B1-TBO |
| **Network Strategy Plan** | SO 4/7 Optimise Network operations. |
| **EPAS** | RMT.0682 - Implementation of the regulatory needs of the SESAR common projects |
| **EASCG RDP** | None |

# 4 Standardisation & regulatory aspects

| | | |
|---|---|---|
| **Applicable legislation** | REGULATION (EU) No 716/2014 of 27 June 2014 on the establishment of the Pilot Common Project supporting the implementation of the European Air Traffic Management Master Plan. | |
| **Standardisation & regulatory issues** | The concept of operation and standard operating procedures of EPP usage still needs to be validated at SJU level. | |
| | **Ref.** | • ED-228A Safety and Performance Requirements Standard for Baseline 2 ATS Data Communications (Baseline 2 SPR Standard);<br>• ED-229A Interoperability Requirements Standard for Baseline 2 ATS Data Communications (Baseline 2 Interop Standard). |

| OD-02 | FRA ensuring connectivity with TMA |
|---|---|

## 1 What

| | |
|---|---|
| **Description** | Free route airspace (FRA) is a specified airspace within which users may freely plan a route between a defined entry point and a defined exit point, with the possibility to route via intermediate (published or unpublished) waypoints, without reference to the ATS route network, subject to airspace availability.<br>This outline description aims at deployment of FRA in lower airspace down to TMA boundaries within the ICAO EUR region.<br>The FRA concept brings significant flight efficiency benefits and a choice of user preferred routes to airspace users. As a step to full trajectory based operations the FRA concept brings increased flight predictability, reduced uncertainty for the Network which in turn can lead to potential capacity increases for ATM which will also benefit the user. |

## 2 Who, When and Where

| | | | |
|---|---|---|---|
| **Stakeholders impacted** | | ANSPs, Airspace Users, Network Manager | |
| **Operating environments** | | En-route, TMA, Network | |
| **Geographical scope** | | ECAC | |
| **Timescales** | | IOC=2020 FOC=2025 | |
| **Systems impacted** | **Airborne** | N | |
| | **Ground** | Y | Adapt as necessary the AO flight Planning system to support free routing.<br>Adapt NM systems (IFPS and Airspace Management tools) to support FRA.<br>Upgrade FDP and CWP to support FRA, if required. |
| **Synchronisation** | | [Explain whether synchronisation is needed (or not) both at local/regional and European level] | |

## 3 Links and dependencies

| | |
|---|---|
| **SESAR Key Features** | OANS - Advanced Air Traffic Services Optimised ATM Network Services |
| **Essential Operational Changes** | S-AF3.2 Free Route |
| **PCP** | None |
| **SESAR Solutions** | #33<br>#66<br>PJ.06-01 |
| **OI Steps / *Enablers*** | [AOM-0401]-Multiple Route Options & Airspace Organisation Scenarios<br>[AOM-0402]-Further Improvements to Route Network and Airspace incl. Cross-Border Sectorisation and Further Routing Options<br>[AOM-0501]-Free Routing for Flights both in cruise and vertically evolving within low to medium complexity environments<br>[AOM-0505]-Free Routing for Flights both in cruise and vertically evolving within high - complexity environments in Upper En Route airspace<br>[CM-0102-A]-Dynamic Sectorisation based on complexity<br>*[PRO-148]-ASM Procedures for identifying and promulgating 'Free Route' areas*<br>*[PRO-085]-ATC procedures to cover issues such as hand-off, transfer of control, and for defining trajectory changes*<br>*necessitated by changes in airspace availability, weather constraints and other non-nominal events*<br>*[AAMS-16a]-Airspace management functions equipped with tools able to deal with free-routing*<br>*[ER APP ATC 78]-Update FDP to support 4D trajectory direct segments in free routing airspace beyond local AoR*<br>*[ER APP ATC 15]-Flight Data Processing: support Dynamic Sectorisation and Dynamic* |

| | |
|---|---|
| | *Constraint Management.*<br>*[AOC-ATM-10]-Modification of AOC/WOC-ATM trajectory management system (or new systems) to allow quality of*<br>*service requested by NOP for pre-flight trajectory with dynamic routing*<br>*[NIMS-29]-Network DCB sub-system enhanced for Network Operations Plan (NOP) preparation and dissemination* |
| **DP Families** | 3.2.1 Upgrade of ATM systems to support Direct Routing and Free Routing<br>3.2.4 Implement Free Route Airspace |
| **MP Level 3 dependencies** | ATC 12.1 (MTCD), ITY-COTR (OLDI) , ATC17 (SYSCO)<br>and ATC02.8 (APW) |
| **ICAO ASBUs** | B1-FRTO |
| **Network Strategy Plan** | SO3/1, SO3/4 |
| **EPAS** | None |
| **EASCG RDP** | None |

# 4 Standardisation & regulatory aspects

| | | |
|---|---|---|
| **Applicable legislation** | None | |
| **Standardisation & regulatory issues** | [Standardisation & regulatory issues] | |
| | **Ref.** | - EUROCONTROL - European Route Network Improvement Plan (ERNIP) Part 1 - European Airspace Design Methodology<br>- EUROCONTROL - European Route Network Improvement Plan (ERNIP) Part 3 - Airspace Management Handbook -Guidelines for Airspace Management |

| OD-03 | ATS datalink using Iris precursor |
|---|---|

## 1 What

| | |
|---|---|
| **Description** | Communication services in terms of datalink systems and services are required in support of i4D and Aeronautical information data sharing.<br>The Iris Precursor service deploys an aviation communications service based on the existing Inmarsat SwiftBroadband (SBB) service. This would augment existing VHF Datalink (VDL) capability in Europe to improve current Link2000+ and planned I4D ATS datalink services delivery through increased reliability and capacity, and help establish satellite communications as a key component in the future ATM communications landscape. The Iris Precursor service establishes the necessary communication infrastructure to support interoperable Oceanic and Continental i4D operations. |

## 2 Who, When and Where

| | | | |
|---|---|---|---|
| **Stakeholders impacted** | | ANSPs, Airspace Users, Datalink Service Providers | |
| **Operating environments** | | Unassigned | |
| **Geographical scope** | | ECAC+ | |
| **Timescales** | | IOC 2020 / FOC 2025 | |
| **Systems impacted** | **Airborne** | Y | The solution requires an upgrade of the aircraft avionics. ATSU and SATCOM system with Precursor capability to be embedded on Aircraft. |
| | **Ground** | Y | ATN network already in place or implementation in progress over Europe. Adaptation to Inmarsat network to enable ATN traffic over SBB and to connect to existing ATN network. |
| **Synchronisation** | | Synchronisation not required for operational introduction. | |

## 3 Links and dependencies

| | |
|---|---|
| **SESAR Key Features** | Enabling Aviation Infrastructure |
| **Essential Operational Changes** | CNS infrastructure and services |
| **PCP** | None |
| **SESAR Solutions** | Solution # 109- ATS datalink using Iris precursor |
| **OI Steps / *Enablers*** | *CTE-C02f: Future Satcom for ATM : Precursor /INMARSAT SBB - class B Satcom.* |
| **DP Families** | None |
| **MP Level 3 dependencies** | None |
| **ICAO ASBUs** | B1-TBO Improved Traffic Synchronization and Initial Trajectory-based Operation? (*Note that SDM DP , Family 6.1.2 – ATN B2 based services in ATSP domain, refers to this ICAO ASBU*. |
| **Network Strategy Plan** | tbd |
| **EPAS** | tbd |
| **EASCG RDP** | tbd |

## 4 Standardisation & regulatory aspects

| | | |
|---|---|---|
| **Applicable legislation** | None | |
| **Standardisation & regulatory issues** | ICAO | |
| | Ref. | - CP/WG-T : Update SATCOM SARPS |
| | EUROCAE/RTCA | |
| | Ref. | - EUROCAE WG-82 and RTCA SC-222 Class B SATCOM MASPS |
| | Ref. | - EUROCAE WG-82 and RTCA SC-222 Class B SATCOM MOPS |

| OD-04 | Composite surveillance (ADS-B/WAM) |
|---|---|

## 1 What

| | |
|---|---|
| **Description** | The operational change is a addressing a surveillance system that exploits the similarities between the two surveillance techniques (ADS-B and WAM) and combines them into a single system. The term composite is used to signify that various system components and data items are shared whilst ensuring that the required degree of channel autonomy/independence is retained. ADS-B information received by WAM system is evaluated and if matching with WAM information extracted by others methods, then it´s used in the WAM output. Information is then periodically re-evaluated. |

## 2 Who, When and Where

| | | | |
|---|---|---|---|
| **Stakeholders impacted** | | ANSPs, Airports, ATM system manufacturers, Regulators | |
| **Operating environments** | | En-route, TMA, Airport | |
| **Geographical scope** | | ECAC | |
| **Timescales** | | IOC 2020 / FOC 2025 | |
| **Systems impacted** | **Airborne** | N | In order to support operations in radar airspace and for airport surveillance, the aircraft systems are assumed compliant with the EU Regulation 1207/2011 (Surveillance Performance and Interoperability Implementing Rule - SPI IR) as amended. |
| | **Ground** | Y | The Ground system will have to be upgraded in terms of composite WAM-ADSB functionality , including sensors, SDPD and ASTERIX interfaces. |
| **Synchronisation** | | N | |

## 3 Links and dependencies

| | |
|---|---|
| **SESAR Key Features** | Enabling Aviation Infrastructure |
| **Essential Operational Changes** | CNS Infrastructure and Services |
| **PCP** | No |
| **SESAR Solutions** | Solution #114 - Composite surveillance (ADS-B/WAM) |
| **OI Steps / *Enablers*** | *CTE-S06: Composite Surveillance*<br>*CTE-S05: Gradual rationalisation of conventional surveillance infrastructure (ADS-B/WAM vs SSR and MSPSR vs PSR)*<br>*CTE-S03a: ADS-B station for NRA surveillance*<br>*CTE-S03b: ADS-B station for RAD and APT surveillance*<br>*CTE-S04a — Wide Area Multilateration (WAM)* |
| **DP Families** | No |
| **MP Level 3 dependencies** | ITY-SPI |
| **ICAO ASBUs** | B0-ASUR |
| **Network Strategy Plan** | SO8/3 - Modernise the CNS infrastructures, and adapt the associated procedures.<br>SO8/4 - Assess and initiate the implementation of rationalised and cost-efficient CNS systems/infrastructures/procedures in particular through FAB initiatives. |
| **EPAS** | RMT.0679 - Revision of surveillance performance and interoperability<br>RMT.0519 - Maintaining the Certification Specifications for airborne communications, navigation and surveillance (CS-ACNS) |
| **EASCG RDP** | |

# 4 Standardisation & regulatory aspects

| | | |
|---|---|---|
| **Applicable legislation** | Implementing Regulation (EU) No 1207/2011 laying down requirements for the performance and the interoperability of surveillance for the single European sky as amended | |
| **Standardisation & regulatory issues** | EASA CS-ACNS | |
| | **Ref.** | - EUROCAE Technical Specifications for ADS-B Ground system (ED-129B)<br>- EUROCAE Technical Specification for Wide Area Multilateration (WAM) systems (ED142A) |

| OD-05 | Virtual centre concept, CWP and service interface definition |
|---|---|

## 1 What

| | |
|---|---|
| **Description** | Virtualisation of service provision makes the most efficient use of ATM data processing resources, but it can only deliver value if it is accessed as a service irrespective of its geographical location.<br>The virtualisation is also an essential element to decouple the current ANS provision from the supporting infrastructure and should allow for reduction in the number of deployment locations for new infrastructure related implementations.<br>The ability to provide ATS from a remote location is relevant in all operating environments (e.g. Remote TWR in airport environment), however this outline description focuses on En-Route and TMA environment.<br>Virtual centre (VC) concept provides an operating environment in which different ATSU, either within the same ANSP or across different ANSPs, will appear as a single unit and will be subject to operational and technical interoperability. It includes development of the ATSU architecture, from a service-oriented approach, with a focus on the technical services and common interfaces.<br>VC concept allows a geographical sector to be managed from any ATCU subject to the availability of services crucial for the provision of ATC, namely, CNS, MET, AIS and all FPL data.<br>The main enablers of VC are:<br>• a standardised/common CWP for the controllers based on standardised "plug-in" applications;<br>• ATM data/information service providers operating on standardised systems;<br>• Common standardised interfaces between CWP and data/information providers.<br>Increased automation and virtualisation hold the potential to effectively balance capacity and demand while ensuring higher levels of resilience. With the delivery of services irrespective of the physical infrastructure or the geographical location, the de-fragmentation of European skies can be realized through virtualisation. |

## 2 Who, When and Where

| | | | |
|---|---|---|---|
| **Stakeholders impacted** | | ANSPs, Military, Regulators | |
| **Operating environments** | | En-route and TMA | |
| **Geographical scope** | | ECAC | |
| **Timescales** | | IOC=2024 FOC=2027 | |
| **Systems impacted** | **Airborne** | [N] | Nil |
| | **Ground** | [Y] | CWP HMI;<br>RDP, FDP, VCS to transition to SOA<br>Interface to ATM data/information provider |
| **Synchronisation** | | Interoperability between ATCU CWP and data/information providers | |

## 3 Links and dependencies

| | |
|---|---|
| **SESAR Key Features** | EAI - Enhanced Aviation Infrastructure |
| **Essential Operational Changes** | Virtualisation of service provision |
| **PCP** | None |
| **SESAR Solutions** | PJ.16-03 Work station, service interface definition & virtual centre concept |
| **OI Steps / *Enablers*** | Not available yet. |
| **DP Families** | None |
| **MP Level 3** | The following implementation objectives need to be implemented in support to the VC: |

| | |
|---|---|
| **dependencies** | INF08.1, INF08.2, COM12, COM11.1, ITY-COTR, ATC17. |
| **ICAO ASBUs** | None |
| **Network Strategy Plan** | None |
| **EPAS** | None |
| **EASCG RDP** | None |

## 4 Standardisation & regulatory aspects

| | | |
|---|---|---|
| **Applicable legislation** | In case of cross border virtualisation between different states, common ATCO Licensing scheme. | |
| **Standardisation & regulatory issues** | [Standardisation & regulatory issues] | |
| | **Ref.** | Develop and publish the following standards:<br>- Common controllers CWP;<br>- ATM data/information service providers ;<br>- Interfaces between CWP and data/information providers; |

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# 5. RISK MANAGEMENT

This chapter addresses the most significant risks associated with the timely delivery of the Implementation Objectives of the Master Plan Level 3 and its impact in the delivery of its strategic view. Determining risks does not imply that they will actually materialise, rather that these risks have been identified and are adequately managed.

A risk may be defined as an undesired event or series of events, which reduce confidence in the Master Plan Level 3. Their occurrence may represent a potential obstacle towards delivering the timely and efficient deployment of the Implementation Objectives underpinning the technologies and procedures of the SESAR Baseline and SESAR 1.

The process of identification of risks for the Master Plan Level 3 has been carried out with the intention to be in support to the framework of the overall Master Plan risk management process. For this reason, whenever possible, the Level 3 risks have been linked with those identified at Level 1 as they can be considered as specific cases of Level 1 risks or contributing to them. Also, this chapter focus on critical risks that affect the Implementation Plan as a whole (or a large important part of it) and not on local risks or impacting a specific implementation objective.

The table below contains the identified Level 3 risks along with a description of the risk, its impact or consequences, proposed mitigation actions and the link to the Level 1 risk as presented in Chapter 7 of the Master Plan Executive View (Level 1) – Edition 2015 and its 2019 update.

| Risk | Description | Consequences/Impact | Mitigation/Actions | Level 1 Link | Status |
|---|---|---|---|---|---|
| Delays in the implementation of the SESAR baseline | The implementation operational changes of the SESAR baselines, especially those that are pre-requisites or facilitators for PCP and other SESAR 1 solutions, is delayed | • Performance gains not realised.<br>• Knock-on effect on PCP (and SESAR 1) implementation. | By SJU, EUROCONTROL, SDM, all stakeholders:<br>• Closely monitor SESAR baseline implementation and identify delays in critical elements. Assess impact on dependent implementations;<br>• Align business plans with the timely delivery of the SESAR baseline;<br>• Take advantage of funding opportunities to recover delays in implementation of PCP-related elements;<br>• Take on board military requirements. | MP5-Delays in the implementation of the Pilot Common Project (PCP) | Open |

| Risk | Description | Consequences/Impact | Mitigation/Actions | Level 1 Link | Status |
|---|---|---|---|---|---|
| Delays in data-link implementation | Data-link is an important enabler for a range of SESAR solutions. Delays in implementation and legal issues must be resolved. | • Delay in supporting the evolution of En-route / TMAs and Airport traffic (based on the ATM Master Plan):<br>o For En-route and TMAs 4D Link serving i4D evolving into Full 4D business trajectories and User preferred routes;<br>o At Airports, DL serving e.g. D-TAXI, AOC<br>• Delay in ensuring that "Capacity meets Demand". | By EASA, SJU, SDM, all stakeholders:<br>• ELSA study recommendations;<br>• SDM's DLS Recovery Plan;<br>• Deployment of data-link services as per SDM's Recovery Plan;<br>• Adhere to EC Reg. 2015/310 for implementation: Feb 2018 for the ground and Feb 2020 for the airborne side;<br>• Adhere to PCP Reg. 716/2014 with respect to AF6 (i4D);<br>• Take on board military requirements. | MP5-Delays in the implementation of the Pilot Common Project (PCP) | Open |
| "Two-speed" deployment of Master Plan Level 3 at ECAC level | Unsynchronised deployment of the Master Plan Level 3 between EU and non-EU members States, especially those not having access to EU funding | • Impact on interoperability at ECAC level.<br>• Economies of scale not realised. | By SJU, EUROCONTROL, impacted stakeholders:<br>• Make best use of the EUROCONTROL working arrangements to ensure buy-in from non-EU States in the implementation of the Master Plan Level 3;<br>• Where possible, stakeholders to make use of funding opportunities that EU makes available for non-EU members. | MP6 - Investments to support deployment beyond 2020 are not secured | Open |

| Risk | Description | Consequences/Impact | Mitigation/Actions | Level 1 Link | Status |
|---|---|---|---|---|---|
| Insufficient buy-in for SESAR 1, non-(P)CP operational changes / solutions | Implementing stakeholders focus their investment plans only on the (P)CP delivery leaving aside other SESAR 1 operational changes / solutions | • Not wide deployment of affected solutions.<br>• No/low return on investment on R&D work. | By SJU, EUROCONTROL and all stakeholders:<br>• Implement a governance structure that ensures appropriate involvement of all relevant parties in the decision-making process for the production and endorsement of the Master Plan Level 3.<br>• Implement a robust, clear and transparent process for the selection of Implementation Objectives to be incorporated into the Master Plan Level 3, including clear deployment criteria. | **n/a**<br>(ATM MP Ed. 2015 - MP7 - Governance structure is not capable of ensuring successful deployment). | Open |
| Lack of common strategy and long term planning for CNS at EU level may lead to insufficient investments in that area and may delay the deployment of SESAR | The exact characteristics of ground based infrastructure and its evolution are still unknown. | • Impact on interoperability.<br>• Delays in implementation of concepts depending on infrastructure evolution (e.g. i4D). | By EC, SJU, SDM, all stakeholders:<br>• CNS Rationalisation;<br>• NAV Strategy;<br>• SUR Strategy;<br>• COM Strategy;<br>• Take on board military requirements. | **n/a** | Open |
| Unclear role of the Level 3 Implementation Plan and its scope | The concept of MP Level 3 Plan has significantly evolved since the edition 2016. This edition includes:<br>• Old legacy objectives, mainly related to SESAR 1 baseline objectives. Many of them cover ITY regulations;<br>• Objectives addressing PCP content (DP families);<br>• Local objectives with no deadline and voluntary applicability area. | • Lack of understanding of MP Level 3 plan;<br>• Lack of credibility and sense of need of MP Level 3;<br>• Multiple reporting. | By SJU, EUROCONTROL, all stakeholders:<br>• Set a stable concept of MP Level 3 (definition, criteria to feed the content, etc.) that clarifies the interrelations with other plans/ programmes (MP L2, CPs, DP, ICAO ASBUs...) | **n/a**<br>(ATM MP Ed. 2015 - MP7 - Governance structure is not capable of ensuring successful deployment). | Open |

| Risk | Description | Consequences/Impact | Mitigation/Actions | Level 1 Link | Status |
|---|---|---|---|---|---|
| Missing indications on airspace users intentions/plans to deploy | There are some mechanisms (PRISME fleet…) to survey airborne deployment, but there is no consultation mechanism in L3 Report to collect airlines' plans for deployment. | • New ATM functions are more collaborative and require ground and airborne capabilities. Lack of visibility on airborne deployment plans can affect ANSP's confidence in BCA. | By SJU, airspace users:<br>• Enlarge the L3 Plan and Report consultation to airspace users. | **n/a**<br>(ATM MP Ed. 2015 - MP7 - Governance structure is not capable of ensuring successful deployment). | Open |
| Exaggerated expectations on maturity prevent timely deployment decision | Stakeholders tend to request all industrialisation work done before they consider deployment. In return the industry requests a contract before performing any industrialisation work. Incorporation of an implementation objective into MP Level 3 means that the objective has passed the Industrial Research and Validation phase (i.e. has passed V3) and that stakeholder(s) are basically interested in the deployment. I.e. the industrialisation and all the standardisation work can start at this moment. | Industrialisation will not start without a preceding deployment decision. And the deployment will be postponed from year to year. | MP Level 3 should explicitly include the whole industrialisation phase to expedite the related activities, e.g. standardisation. | **n/a**<br>(ATM MP Ed. 2015 - MP7 - Governance structure is not capable of ensuring successful deployment). | **Closed.** New Implementation Objectives include specific Stakeholder Lines of Action for the finalisation of Standardisation and certification work. |

**Table 1 - Identified Master Plan Level 3 risks**

# Annex 1. Definitions and Terminology

## Implementation Objective Designators

Implementation Objective designators can take two forms:

1) In the form ABCXY where:

- ABC is the acronym of one of the designated ATM areas of work shown in the table below.
- XY is the serial number for the implementation Objective in the area of work it covers.

| | |
|---|---|
| **AOM** = Airspace Organisation and Management<br>**AOP** = Airport Operations<br>**ATC** = Air Traffic Control<br>**COM** = Communications<br>**ENV** = Environment<br>**FCM** = Flow and Capacity Management | **HUM** = Human Factors<br>**INF** = Information Management<br>**ITY** = Interoperability<br>**NAV** = Navigation<br>**SAF** = Safety Management |

**Table 2 - Implementation objective designators**

2) (Only for Objectives related to SES Regulations) In the form XYZ-ABCD where:

- XYZ is the acronym of the SES area covered by the legislation and
- ABCD…, an acronym that stipulates the subject.
  Example: 'Interoperability' & 'Coordination and Transfer' ITY-COTR

## Stakeholder Groups Designators

The following stakeholder group designators are used:

| | |
|---|---|
| **REG** – State Authorities<br>**ASP** – Air Navigation Service Providers (*Civil and Military providing services to GAT*)<br>**APO** – Airport Operators<br>**MIL** – Military Authorities (the MIL SLoAs are actions applicable exclusively to Military Authorities)<br>**USE** – Airspace Users | **INT** – International Organisations and Regional Bodies<br>**IND** – Aeronautics Industry<br>**AGY** - EUROCONTROL Agency (non-Network Manager)<br>**NM** – EUROCONTROL Network Manager |

**Table 3 - Stakeholder group designators**

## Applicability Area(s)

The objective applicability area(s) list the States/Airports having committed to implement the objective and/or being mandated to do so by a Regulation.

The following terms are used to define the Applicability Area of the different Objectives:

- **ECAC**: Refers to the States members of the European Civil Aviation Conference + Maastricht UAC.
- **ECAC +**: Refers to all ECAC states plus the states signed Comprehensive Agreement with EUROCONTROL, i.e. Israel and Morocco.
- **EU +**: Refers to the States members of the European Union (including Maastricht UAC) + the states signatory to the European Common Aviation Area Agreement (ECAA), Albania, Bosnia and Herzegovina, North Macedonia, Georgia, Montenegro, Serbia and Moldova, + NO and CH.
- **EU SES**: Refers to the States members of the European Union (including Maastricht UAC) + Norway and Switzerland who have signed agreements with the EU contractual commitment to implement the SES legislation.
- **EU:** Refers to the States members of the European Union.
- **25 PCP Airports:** Refers to the airports identified in ATM Functionality 2 of the PCP Regulation as the Geographical Scope for all its sub-functionalities except 'Time-Based Separation'.

  The 25 airports are: London-Heathrow, Paris-CDG, London-Gatwick, Paris-Orly, London-Stansted, Milan-Malpensa, Frankfurt International, Madrid-Barajas, Amsterdam Schiphol, Munich Franz Josef Strauss, Rome-Fiumicino, Barcelona El Prat, Zurich Kloten, Düsseldorf International, Brussels National, Oslo Gardermoen, Stockholm-Arlanda, Berlin Brandenburg Airport, Manchester Ringway, Palma De Mallorca Son San Juan, Copenhagen Kastrup, Vienna Schwechat, Dublin, and Nice Cote d'Azur and Istanbul Ataturk Airport.
- **17 PCP Airports:** Refers to the airports identified in ATM Functionality 2 of the PCP Regulation as the Geographical Scope for the sub-functionality 'Time-Based Separation'.

  The 17 airports are: London-Heathrow, London-Gatwick, Paris-Orly, Milan-Malpensa, Frankfurt International, Madrid-Barajas, Amsterdam-Schiphol, Munich Franz Josef Strauss, Rome-Fiumicino, Zurich Kloten, Düsseldorf International, Oslo Gardermoen, Manchester Ringway, Copenhagen Kastrup, Vienna Schwechat, Dublin and Istanbul Ataturk Airport.

## Implementation Objective Deadlines

The following terminology is used to define Implementation objective deadlines:

- **Initial Operational Capability (IOC)** - Indicates the date of the first possible operational deployment.
- **Full Operational Capability (FOC)** - Indicates the date by which full operational capability should be achieved by all involved stakeholders.
- **Timescales (for Objectives related to SES Regulations)** – Indicates the applicability dates of the regulatory requirements.

## (Level 3) Dependencies

This entry in the Objective Deployment Views (DVs) lists the other objectives in the MP Level 3 that enable or impact the implementation of the Objective being described in the DV. Note that the dependencies are not "bi-directional", i.e. Free Route is dependent on the implementation of MTCD, but not vice versa.

## Performance Benefits / Key Performance Areas

The Key Performance Areas used in this document are in line with those defined in Chapter 3 ('Performance View) of the Level 1 of the European ATM Master Plan Edition 2015.

# Annex 2. Applicability to Airports

Several Implementation Objectives are applicable to specific European airports. For the Objectives related to the PCP, the area of applicability fully includes the list of airports as defined in the PCP Regulation. However, the scope of some of the airport Objectives is substantially broader than the PCP as some airports have committed to implementation even if not explicitly targeted by the PCP Regulation. The applicability area for all airport Objectives is consolidates in the following table:

**Legend**:

✓ In the applicability area & completed ○ In the applicability area & not completed yet - Not in the applicability area

PCP – Objective linked to a PCP sub-functionality
PCP-PR – Objective identified as a predecessor for a PCP sub-functionality
PCP-FC – Objective identified as a facilitator for a PCP sub-functionality

## PCP Airports

| State | Airport | ICAO code | AOP04.1 (PCP-PR) | AOP04.2 (PCP-PR) | AOP05 (PCP-PR) | AOP10 (PCP) | AOP11 (PCP) | AOP12 (PCP) | AOP13 (PCP) | ATC07.1 (PCP-FC) | ENV01 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AT | Vienna | LOWW | ✓ | ✓ | ○ | ○ | ○ | ○ | ○ | ○ | ✓ |
| BE | Brussels | EBBR | ✓ | ✓ | ✓ | - | ○ | ✓ | ○ | ○ | ✓ |
| CH | Zurich | LSZH | ✓ | ✓ | ✓ | ○ | ○ | ○ | ○ | ✓ | ○ |
| DE | Berlin Brandenburg | EDDB | ○ | ○ | ○ | - | ○ | ○ | ○ | ○ | - |
| DE | Frankfurt Main | EDDF | ✓ | ○ | ✓ | ○ | ○ | ○ | ○ | ✓ | ✓ |
| DE | Düsseldorf | EDDL | ○ | ○ | ✓ | ○ | ○ | ○ | ○ | ○ | ✓ |
| DE | Munich | EDDM | ✓ | ✓ | ✓ | ○ | ○ | ○ | ○ | ✓ | ✓ |
| DK | Copenhagen | EKCH | ✓ | ✓ | ✓ | ○ | ○ | ○ | ○ | ✓ | ✓ |
| ES | Barcelona | LEBL | ✓ | ○ | ✓ | - | ○ | ○ | ○ | ✓ | ○ |
| ES | Madrid Barajas | LEMD | ✓ | ○ | ✓ | ○ | ○ | ○ | ○ | ✓ | ○ |
| ES | Palma de Mallorca | LEPA | ✓ | ○ | ✓ | - | ○ | ○ | ○ | ✓ | ✓ |
| FR | Nice | LFMN | ✓ | ✓ | ○ | - | ○ | ○ | ○ | ✓ | ✓ |

| State | Airport | ICAO code | AOP04.1 (PCP-PR) | AOP04.2 (PCP-PR) | AOP05 (PCP-PR) | AOP10 (PCP) | AOP11 (PCP) | AOP12 (PCP) | AOP13 (PCP) | ATC07.1 (PCP-FC) | ENV01 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FR | Paris, Charles de Gaulle | LFPG | ✓ | ✓ | ✓ | - | ○ | ○ | ○ | ✓ | ✓ |
| FR | Paris, Orly | LFPO | ✓ | ✓ | ✓ | ○ | ○ | ○ | ○ | ✓ | ✓ |
| IE | Dublin | EIDW | ✓ | ✓ | ✓ | ○ | ○ | ○ | ○ | ✓ | ✓ |
| IT | Milan Malpensa | LIMC | ○ | ○ | ✓ | ○ | ○ | ○ | ○ | - | ✓ |
| IT | Rome Fiumicino | LIRF | ○ | ○ | ✓ | ○ | ○ | ○ | ○ | - | ✓ |
| NL | Amsterdam Schiphol | EHAM | ✓ | ✓ | ✓ | ○ | ○ | ○ | ○ | ✓ | ✓ |
| NO | Oslo Gardermoen | ENGM | ✓ | ✓ | ✓ | ○ | ○ | ○ | ○ | ✓ | ○ |
| SE | Stockholm Arlanda | ESSA | ✓ | ○ | ✓ | - | ○ | ○ | ○ | ✓ | ✓ |
| UK | Manchester | EGCC | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| UK | London Gatwick | EGKK | ✓ | ✓ | ✓ | ○ | ✓ | ✓ | ○ | ✓ | ○ |
| UK | London Heathrow | EGLL | ○ | ○ | ✓ | ✓ | ○ | ✓ | ○ | ✓ | ○ |
| UK | London Stansted | EGSS | ✓ | ✓ | ○ | - | ○ | ○ | ○ | ○ | ○ |

## Non-PCP Airports

| State | Airport | ICAO code | AOP04.1 | AOP04.2 | AOP05 | AOP10 | AOP11 | AOP12 | AOP13 | ATC07.1 | ENV01 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AM | Yerevan | UDYZ | - | - | - | - | - | - | - | - | ✓ |
| AZ | Baku | UBBB | ✓ | ✓ | - | - | - | ✓ | - | - | ✓ |
| BE | Antwerp | EBAW | - | - | - | - | - | - | - | - | ○ |
| BE | Charleroi | EBCI | - | - | - | - | - | - | - | - | ✓ |
| BE | Liege | EBLG | - | - | - | - | - | - | - | - | ✓ |
| BE | Ostende | EBOS | - | - | - | - | - | - | - | - | ○ |
| BA | Sarajevo | LQSA | - | - | - | - | - | - | - | - | ○ |

| State | Airport | ICAO code | AOP04.1 | AOP04.2 | AOP05 | AOP10 | AOP11 | AOP12 | AOP13 | ATC07.1 | ENV01 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BG | Sofia | LBSF | ✓ | - | - | - | - | - | - | - | - |
| CH | Geneva | LSGG | ✓ | ✓ | ✓ | - | ○ | - | - | ○ | ○ |
| CZ | Prague | EKPR | ✓ | ✓ | ✓ | - | - | - | - | ○ | - |
| DE | Hamburg | EDDH | - | - | - | - | ○ | - | - | - | ✓ |
| DE | Cologne-Bonn | EDDK | - | - | - | - | - | - | - | - | ✓ |
| DE | Nurnberg | EDDN | - | - | - | - | ○ | - | - | - | ✓ |
| DE | Stuttgart | EDDS | - | - | - | - | ○ | - | - | - | ✓ |
| DE | Hannover | EDDV | - | - | - | - | ○ | - | - | - | ✓ |
| EE | Tallinn | EETN | ✓ | ✓ | ○ | - | - | - | - | - | ✓ |
| FI | Helsinki | EFHK | ✓ | ✓ | ✓ | - | - | - | - | ✓ | ✓ |
| FR | Toulouse | LFBO | ○ | ○ | - | - | ○ | - | - | - | ✓ |
| FR | Lyon | LFLL | ✓ | ○ | ✓ | - | ✓ | - | - | - | ✓ |
| FR | Marseille | LFML | ○ | ○ | - | - | ○ | - | - | - | ✓ |
| GR | Athens | LGAV | ○ | ○ | ○ | - | - | - | - | - | - |
| GR | Iraklion | LGIR | - | - | ○ | - | - | - | - | - | - |
| GR | Rhodes | LGRP | - | - | ○ | - | - | - | - | - | - |
| GR | Thessaloniki | LGTS | ○ | ○ | - | - | - | - | - | - | - |
| HR | Zagreb | LDZA | ✓ | ○ | ○ | - | ○ | - | - | - | ○ |
| HU | Budapest | LHBP | ✓ | ○ | ○ | - | - | - | - | - | ✓ |
| IL | Tel-Aviv/ Ben-Gurion | LLBG | ✓ | ✓ | ○ | - | ○ | - | - | ○ | ✓ |
| IT | Bergamo Orio al Serio | LIME | - | - | - | - | - | - | - | - | - |
| IT | Milan Linate | LIML | ○ | ○ | ✓ | - | ○ | - | - | - | ✓ |
| IT | Naples | LIRN | - | - | - | - | - | - | - | - | - |
| IT | Venezia | LIPZ | ○ | ○ | ✓ | - | ○ | - | - | - | ✓ |
| LT | Vilnius | EYVI | ✓ | ✓ | ○ | - | - | - | - | - | ✓ |

| State | Airport | ICAO code | AOP04.1 | AOP04.2 | AOP05 | AOP10 | AOP11 | AOP12 | AOP13 | ATC07.1 | ENV01 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LU | Luxembourg | ELLX | ✓ | ○ | - | - | - | - | - | - | ○ |
| LV | Riga | EVRA | ✓ | ✓ | ○ | - | - | - | - | ○ | ○ |
| MA | Casablanca | GMMN | ○ | - | - | - | - | - | - | ○ | ○ |
| MA | Marrakesh | GMMX | ○ | - | - | - | - | - | - | - | - |
| MD | Chișinău | LUKK | ○ | - | - | - | - | - | - | - | - |
| PL | Warsaw | EPWA | ○ | ○ | ○ | - | - | - | - | ○ | ✓ |
| PT | Lisbon | LPPT | ○ | ○ | ○ | - | ○ | - | - | ○ | ✓ |
| RO | Bucharest | LROP | ○ | ○ | - | - | ○ | - | - | ○ | ○ |
| RS | Belgrade | LYBE | - | - | - | - | - | - | - | - | ○ |
| SE | Göteborg | ESGG | - | - | - | - | - | - | - | - | ✓ |
| SE | Malmö-Sturup | ESMS | - | - | - | - | - | - | - | - | ✓ |
| SE | Umea | ESNU | - | - | - | - | - | - | - | - | ✓ |
| SK | Bratislava | LZIB | - | - | - | - | - | - | - | - | ○ |
| TR | Ankara | LTAC | ✓ | ✓ | - | - | - | - | - | - | - |
| TR | Antalya | LTAI | ✓ | ✓ | ○ | - | - | - | - | - | ○ |
| TR | Istanbul Ataturk | LTBA | ✓ | ✓ | ○ | - | - | ○ | ○ | ✓ | ○ |
| UA | Kyiv Boryspil | UKBB | ○ | ○ | ○ | - | - | - | - | ✓ | ✓ |
| UK | Birmingham | EGBB | - | - | ○ | - | - | - | - | - | ✓ |
| UK | London Luton | EGGW | - | - | ○ | - | - | - | - | - | ○ |
| UK | Bristol | EGGD | - | - | - | - | - | - | - | - | ○ |
| UK | London City | EGLC | - | - | - | - | - | - | - | - | - |
| UK | Newcastle | EGNT | - | - | - | - | - | - | - | - | ○ |
| UK | Nottingham East Midlands | EGNX | - | - | - | - | - | - | - | - | ○ |
| UK | Glasgow | EGPF | - | - | - | - | - | - | - | - | ○ |
| UK | Edinburgh | EGPH | ✓ | ✓ | ○ | - | - | - | - | - | ○ |

# Annex 3. Relevant mappings of the Level 3 Plan 2019

The following table indicates the mapping of the Level 3 Plan 2019 to corresponding SESAR Key Features, Major ATM Changes, SESAR 1 Solutions, Deployment Program families, ICAO ASBU and EASA EPAS.

| Key Feature | Level 3 Implementation Objectives | Major ATM changes | SESAR Solution | DP family | ICAO ASBUs | EPAS | AAS TP |
|---|---|---|---|---|---|---|---|
| | AOM13.1 - Harmonise OAT and GAT handling | FRA & A-FUA | - | - | - | - | - |
| | AOM19.1 - ASM tools to support A-FUA | FRA & A-FUA | #31 | 3.1.1 | B1-FRTO<br>B1-NOPS | - | AM-1.8 |
| | AOM19.2 - ASM management of real-time airspace data | FRA & A-FUA | #31 | 3.1.2 | B1-FRTO<br>B1-NOPS | - | AM-1.8 |
| | AOM19.3 - Full rolling ASM/ATFCM process and ASM information sharing | FRA & A-FUA | #31 | 3.1.3 | B1-FRTO<br>B1-NOPS<br>B2-NOPS | - | AM-1.8 |
| | AOM19.4 – Management of Pre-defined Airspace Configurations | FRA & A-FUA | #31 | 3.1.4 | B1-FRTO<br>B1-NOPS | - | - |
|  | FCM03 - Collaborative flight planning | ATFCM | - | 4.2.3 | B0-NOPS | - | AM-1.14 |
| | *FCM04.1 – STAM phase 1 | ATFCM | - | 4.1.1 | - | - | - |
| | FCM04.2 - STAM phase 2 | ATFCM | #17 | 4.1.2 | - | - | AM-1.11 |
| | FCM05 - Interactive rolling NOP | NOP | #20, #21 | 4.2.2<br>4.2.4 | B1-ACDM<br>B1-NOPS | - | AM-1.12 |
| | FCM06 - Traffic Complexity Assessment | ATFCM | #19 | 4.4.2 | B1-NOPS | - | AM-1.13 |
| | FCM07 - Calculated Take-off Time (CTOT) to Target Times for ATFCM Purposes | ATFCM | #18 | 4.3.1<br>4.3.2 | B1-NOPS | - | AM-1.9 |
| | FCM09 - Enhanced ATFM Slot swapping | ATFCM | #56 | - | B1-NOPS | - | - |
| | *AOM21.1 - Direct Routing | Free Route | #32 | 3.2.1<br>3.2.3 | B0-FRTO<br>B1-FRTO | - | - |
| | AOM21.2 - Free Route Airspace | Free route | #33, #66 | 3.2.1<br>3.2.4 | B1-FRTO | - | AM-1.6<br>AM-1.10<br>AM-5.1 |
| | ATC02.8 - Ground based safety nets | ATM Systems | - | 3.2.1 | B0-SNET<br>B1-SNET | - | - |
|  | ATC02.9 – Enhanced STCA for TMAs | ATM Systems | #60 | - | B0-SNET<br>B1-SNET | MST.030 | - |
| | ATC07.1 - Arrival management tools | Enhanced Arrival Sequencing | - | 1.1.1 | B0-RSEQ | - | - |
| | ATC12.1 - MONA, TCT and MTCD | ATM Systems | #27, #104 | 3.2.1 | B1-FRTO | - | AM-1.15<br>AM-5.1 |
| | ATC15.1 – Initial extension of AMAN to En-route | Enhanced Arrival Sequencing | - | 1.1.2 | B1-RSEQ | - | - |

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| | ATC15.2 - Extension of AMAN to En-route | Enhanced Arrival Sequencing | #05 | 1.1.2 | B1-RSEQ | - | AM-1.3 |
| | ATC17 - Electronic Dialog supporting COTR | Free Route | - | 3.2.1 | - | - | AM-1.3 |
| | ATC18 – Multi Sector Planning En-route – 1P2T | Free Route | #63 | - | - | - | AM-4.3<br>AM-5.1 |
| | ATC19 - Enhanced AMAN-DMAN integration | AMAN/DMAN integration including multiple airports | #54 | - | B2-RSEQ | - | - |
| | ATC20- Enhanced STCA with down-linked parameters via Mode S EHS | ATM Systems | #69 | - | B1-SNET | - | - |
| | ENV01 – Continuous Descent Operations | PBN | - | - | B0-CDO<br>B1-CDO | - | - |
| | ENV03 – Continuous Climb Operations | PBN | - | - | B0-CCO | - | - |
| | NAV03.1 – RNAV1 in TMA Operations | PBN | #62 | - | B0-CDO<br>B0-CCO<br>B1-RSEQ | RMT.0639<br>RMT.0445 | - |
| | NAV03.2 – RNP1 in TMA Operations | PBN | #09, #51 | 1.2.3<br>1.2.4 | B1-RSEQ | RMT.0639<br>RMT.0445 | - |
| | NAV10 - RNP Approach Procedures to instrument RWY | PBN | #103 | 1.2.1<br>1.2.2 | B0-APTA | RMT.0639<br>RMT.0445 | - |
| | NAV12 – ATS IFR Routes for Rotorcraft Operations | PBN | #113 | - | B1-APTA | MST.031 | - |
| | AOP04.1 - A-SMGCS Surveillance (former Level 1) | Surface management | #70 | 2.2.1 | B0-SURF | MST.029 | - |
| | AOP04.2 - A-SMGCS RMCA (former Level 2) | Surface management | - | 2.2.1 | B0-SURF | MST.029 | - |
| | AOP05 - Airport CDM | Collaborative Airport | #106 | 2.1.1<br>2.1.3 | B0-ACDM<br>B0-RSEQ | - | - |
| | AOP10 - Time Based Separation | Enhanced operations in the vicinity of the runway | #64 | 2.3.1 | B1-RSEQ<br>B2-WAKE | - | - |
| | AOP11 - Initial Airport Operations Plan | Collaborative Airport | #21 | 2.1.4 | B1-ACDM | - | - |
| | AOP12 - Improve RWY and Airfield safety with CATC detection and CMAC | Surface management | #02 | 2.1.2<br>2.5.1 | B2-SURF | MST.029 | - |
| | AOP13 – Automated assistance to Controller for Surface Movement planning and routing | Surface management | #22<br>#53 | 2.4.1 | B1-ACDM<br>B1-RSEQ<br>B2-SURF | MST.029 | - |
| | AOP14 – Remote Tower Services | Remote Tower | #12, #71, #52, #13 | - | B1-RATS | RMT.0624 | - |

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| | AOP15 - Enhanced traffic situational awareness and airport SNET for the vehicle drivers | Airport Safety Nets Vehicles | #04 | - | B2-SURF | MST.029 | - |
| | AOP16 - Guidance assistance through airfield ground lighting | Ground Situational Awareness | #47 | - | B1-RSEQ<br>B2-DURF | MST.029 | - |
| | AOP17 - Provision/integration of departure planning information to NMOC | Collaborative airport | #61 | - | B1-ACDM<br>B1-NOPS | - | - |
| | AOP18 - Runway Status Lights (RWSL) | Enhanced Airport Safety Nets | #01 | - | B2-SURF | MST.029 | - |
| | ENV02 – Airport Collaborative Environmental Management | Collaborative Airport | - | - | - | - | - |
| | NAV11 - Implement precision approach using GBAS CAT II/III based on GPS L1 | LVPs using GBAS | #55 | - | B1-APTA | - | - |
| | SAF11 - Improve runway safety by preventing runway excursions | Surface management | - | - | - | MST.029<br>RMT.0570<br>RMT.0703 | - |
| | COM10 - Migration from AFTN to AMHS | CNS rationalisation | - | - | - | - | - |
| | COM11.1 - Voice over Internet Protocol (VoIP) in En-Route | CNS rationalisation | - | 3.1.4 | - | - | AM-1.3 |
| | COM11.2 - Voice over Internet Protocol (VoIP) in Airport/Terminal | CNS rationalisation | - | - | - | - | - |
| | COM12 - NewPENS | Pre-SWIM & SWIM | - | 5.1.2<br>5.2.1 | B1-SWIM | - | - |
| | FCM08 – Extended Flight Plan | Pre-SWIM & SWIM | #37 | 4.2.3 | B1-FICE | - | AM-1.4 |
| | INF07 - Electronic Terrain and Obstacle Data (e-TOD) | Pre-SWIM & SWIM | - | 1.2.2 | - | RMT.0703<br>RMT.0722 | - |
| | INF08.1 - Information Exchanges using the SWIM Yellow TI Profile | Pre-SWIM & SWIM | #35, #46 | 5.1.3,<br>5.1.4,<br>5.2.1,<br>5.2.2,<br>5.2.3,<br>5.3.1,<br>5.4.1,<br>5.5.1,<br>5.6.1 | B1-DATM<br>B1-SWIM | - | AM-1.5 |
| | INF08.2 - Information Exchanges using the SWIM Blue TI Profile | Pre-SWIM & SWIM | #28, #46 | 5.1.3,<br>5.1.4,<br>5.2.1,<br>5.2.2,<br>5.2.3,<br>5.6.2 | B1-DATM<br>B1-SWIM | - | AM-9.1 |
| | INF09 - Digital Integrated Briefing | Digital Integrated Briefing | #34 | - | B1-DATM<br>B1-SWIM | - | - |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | ITY-ACID - Aircraft identification | CNS rationalisation | - | - | - | - | - |
| | ITY-ADQ - Ensure quality of aeronautical data and aeronautical information | Pre-SWIM & SWIM | - | 1.2.2 | B0-DATM | RMT.0722<br>RMT.0477 | - |
| | ITY-AGDL - Initial ATC air-ground data link services | Data link | - | 6.1.1<br>6.1.3<br>6.1.4 | B0-TBO | RMT.0524 | AM-1.1 |
| | ITY-AGVCS2 – 8.33 kHz Air-Ground Voice Channel Spacing below FL195 | CNS rationalisation | - | - | - | - | - |
| | ITY-FMTP - Apply a common flight message transfer protocol (FMTP) | Pre-SWIM & SWIM | - | - | B0-FICE<br>B1-FICE | - | AM-1.3 |
| | ITY-SPI - Surveillance performance and interoperability | CNS rationalisation | - | - | B0-ASUR | RMT.0679<br>RMT.0519 | - |

* *AOM21.1 was achieved during 2017 and FCM04.1 was achieved during 2018, therefore they were removed from the Implementation Plan 2018/2019. They are kept in this table for traceability purposes.*

**Table 4 - Links between Implementation Objectives and Deployment Programme Families**

# Annex 4. SESAR 1 Solutions – Overview of the implementation plan in MP Level 3

This table is solution centric, focused on SESAR 1 Solutions. It aims to show implementation plan aspects of each of them. These aspects are derived from SESAR Solutions catalogue and related MPL3 Implementation Objectives. Where more than one MPL3 Implementation Objective supports one Solution the following principles apply:

a) FOC date in the table is the latest FOC date among all Implementation Objectives related to the Solution,

b) Operating environment, stakeholders and performance benefits are summary of all Implementation Objectives related to the Solution.

| SOL No. | SESAR SOLUTION TITLE | ATM MP L3 IMPL. OBJECTIVE | SESAR KEY FEATURE | OPERATNG ENVIRONMENT | | | | STAKEHOLDER | | | | | | PLANNED FOC DATE | | | | | | PLANNED APP. AREA | | | | | PERFORMANCE CONTRIBUTION | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AIRPORT | TERMINAL | EN-ROUTE | NETWORK | ANSP | APO | USE | ECTL NM | INT | NSA/REG | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | ECAC+ | EU+ | EU | Airport | LOCAL | CAP | SAF | ENV | CEF | OEF |
| 01 | Runway status lights | AOP18 | HPAO | | | | | | | | | | | Local STK choice | | | | | | | | | | | | | | | |
| 02 | Airport SNET for ATCO: MONA and CDT for ATC clearances [PCP] | AOP12 | HPAO | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 04 | Enhanced traffic situational awareness and airport SNET for vehicle drivers | AOP15 | HPAO | | | | | | | | | | | Local STK choice | | | | | | | | | | | | | | | |
| 05 | Extended arrival management (AMAN) horizon [PCP] | ATC15.2 | AATS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 06 | Controlled time of arrival (CTA) in medium-density/medium complexity environments | Nil | AATS | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 08 | Arrival management into multiple airports | Nil | AATS | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 09 | Enhanced terminal operations with automatic RNP transition to ILS/GLS [PCP] | NAV03.2 | AATS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | Optimised route network using advanced RNP | Nil | AATS | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 11 | Continuous descent operations (CDO) using point merge | Nil | AATS | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 12 | Single remote TWR operations for medium traffic volumes | AOP14 | HPAO | | | | | | | | | | | Local STK choice | | | | | | | | | | | | | | | |
| 13 | Remotely provided ATS for contingency situation at aerodromes | AOP14 | HPAO | | | | | | | | | | | Local STK choice | | | | | | | | | | | | | | | |
| 17 | Advanced short-term ATFCM measures (STAMs) [PCP] | FCM04.2 | OANS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | Calculated take-off time (CTOT) and target time of arrival (TTA) [PCP] | FCM07 | OANS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | Automated support for traffic complexity detection and resolution [PCP] | FCM06 | OANS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | Initial collaborative network operations plan (NOP) [PCP] | FCM05 | OANS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *21 | *Airport operations plan (AOP) and its seamless integration with NOP [PCP] | AOP11<br>FCM05 | HPAO | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | Automated assistance to ATCO for surface movement planning and routing [PCP] | AOP13 | HPAO | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | D-TAXI service for controller-pilot datalink communications (CPDLC) application | Nil | HPAO | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 27 | Enhanced tactical conflict detection & resolution (CD&R) and MONA for En-route | ATC12.1 | AATS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | Initial ground-ground interoperability | INF08.2 | EAI | | | | | | | | | | | | | | | | | | | | | | | | | | |

| SOL No. | SESAR SOLUTION TITLE | ATM MP L3 IMPL. OBJECTIVE | SESAR KEY FEATURE | OPERATNG ENVIRONMENT | | | | STAKEHOLDER | | | | | | PLANNED FOC DATE | | | | | | PLANNED APP. AREA | | | | | PERFORMANCE CONTRIBUTION | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AIRPORT | TERMINAL | EN-ROUTE | NETWORK | ANSP | APO | USE | ECTL NM | INT | NSA/REG | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | ECAC+ | EU+ | EU | Airport | LOCAL | CAP | SAF | ENV | CEF | OEF |
| 31 | Variable profile military reserved areas and enhanced civil-military collaboration [PCP] | AOM19.1/2 AOM19.3/4 | OANS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | Free Route (FRA) through the use of Direct Routing [PCP] | AOM21.1 | AATS | | | | | | | | | | | Achieved in 2018 | | | | | | | | | | | | | | | |
| 33 | FRA by the use of Free Routing for in cross ACC/FIR borders and within permanently low to medium complexity environments [PCP] | AOM21.2 | AATS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | Digital integrated briefing | INF09 | EAI | | | | | | | | | | | Local STK choice | | | | | | | | | | | | | | | |
| 35 | Meteorological information exchange [PCP] | INF08.1 | EAI | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37 | Extended flight plan [PCP] | FCM08 | EAI | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 | Initial system-wide information management (SWIM) technology solution [PCP] | INF08.1 | EAI | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47 | Guidance assistance through airfield ground lighting | AOP16 | HPAO | | | | | | | | | | | Local STK choice | | | | | | | | | | | | | | | |
| 48 | Virtual block control in low visibility procedures (LVPs) | Nil | HPAO | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 51 | Enhanced terminal operations with LPV procedures [PCP] | NAV03.2 | AATS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52 | Remote tower for two low density aerodromes | AOP14 | HPAO | | | | | | | | | | | Local STK choice | | | | | | | | | | | | | | | |
| 53 | Pre-departure sequencing supported by route planning [PCP] | AOP13-ASP02 | HPAO | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54 | Flow based integration of arrival and departure management | ATC19 | HPAO | | | | | | | | | | | Local STK choice | | | | | | | | | | | | | | | |
| 55 | Precision approaches using GBAS Category II/III | NAV11 | HPAO | | | | | | | | | | | Local STK choice | | | | | | | | | | | | | | | |
| 56 | Enhanced air traffic flow management (ATFM) slot swapping | FCM09 | OANS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57 | User-driven prioritisation process (UDPP) – departure | Nil | OANS | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 60 | Enhanced STCA for TMA specific operations | ATC02.9 | AATS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61 | A low-cost and simple departure data entry panel for the airport ATCO CWP | AOP17 | HPAO | | | | | | | | | | | Local STK choice | | | | | | | | | | | | | | | |
| 62 | Precision area navigation (P-RNAV) in a complex TMA | NAV03.1 | AATS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63 | Multi-Sector Planning | ATC18 | AATS | | | | | | | | | | | Local STK choice | | | | | | | | | | | | | | | |
| 64 | Time-based separation [PCP] | AOP10 | HPAO | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65 | User Preferred Routing [PCP] | AOM21.1 | AATS | | | | | | | | | | | Achieved in 2017 | | | | | | | | | | | | | | | |
| 66 | Automated support for dynamic sectorisation [PCP] | AOM21.2-ASP03 | AATS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67 | AOC data increasing trajectory prediction accuracy | Nil | EAI | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 69 | Enhanced STCA with down-linked parameters | ATC20 | AATS | | | | | | | | | | | Local STK choice | | | | | | | | | | | | | | | |
| 70 | Enhanced ground controller situational awareness in all weather conditions | AOP04.1 | HPAO | | | | | | | | | | | 18 | | | | | | | | | | | | | | | |
| 71 | ATC and AFIS service in a single low density aerodrome from a remote CWP | AOP14 | HPAO | | | | | | | | | | | Local STK choice | | | | | | | | | | | | | | | |
| 100 | ACAS Ground Monitoring and Presentation System | Nil | EAI | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 101 | Extended hybrid surveillance | Nil | EAI | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |

| SOL No. | SESAR SOLUTION TITLE | ATM MP L3 IMPL. OBJECTIVE | SESAR KEY FEATURE | OPERATNG ENVIRONMENT | | | | STAKEHOLDER | | | | | | PLANNED FOC DATE | | | | | | PLANNED APP. AREA | | | | | PERFORMANCE CONTRIBUTION | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AIRPORT | TERMINAL | EN-ROUTE | NETWORK | ANSP | APO | USE | ECTL NM | INT | NSA/REG | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | ECAC+ | EU+ | EU | Airport | LOCAL | CAP | SAF | ENV | CEF | OEF |
| 102 | Aeronautical mobile airport communication system (AeroMACS | Nil | EAI | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 103 | Approach Procedures with vertical guidance [PCP] | NAV10 | AATS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104 | Sector Team Operations - En-route Air Traffic Organiser | ATC12.1 | AATS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105 | Enhanced airborne collision avoidance system (ACAS) operations using the autoflight system | Nil | AATS | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 106 | DMAN Baseline for integrated AMAN DMAN | AOP05 | HPAO | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107 | Point merge in complex terminal airspace | Nil | AATS | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 108 | Arrival Management (AMAN) and Point Merge | Nil | AATS | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 109 | Air traffic services (ATS) datalink using Iris Precursor | Nil | EAI | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 110 | ADS-B surveillance of aircraft in flight and on the surface | Nil | EAI | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 113 | Optimised Low Level IFR routes for rotorcraft | NAV12 | AATS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 114 | Composite Surveillance ADS-B / WAM | Nil | EAI | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 115 | Extended Projected Profile (EPP) availability on ground [PCP] | Nil | EAI | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 116 | De-icing management tool | Nil | HPAO | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 117 | Reduce LVC landing minima using enhanced flight vision systems (EFVS) | Nil | HPAO | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |
| 118 | Basic Extended ATC Planner | Nil | AATS | | | | | | | | | | | Not in Plan yet | | | | | | | | | | | | | | | |

# Annex 5. MPL3 Plan Roadmap with reference to AAS TP

| Key Feature | Major ATM Change | MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ← | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| OANS | FRA & A-FUA | AOM13.1 | Harmonise OAT and GAT handling | Nil | Nil | | | | | | | | | | | | 39% | | | | | | | | | | | | |
| OANS | FRA & A-FUA | AOM19.1 | ASM Tools to Support AFUA | #31 | AM-1.8 | | | | | | | | | | | | 28% | | | | | | | | | | | | |
| OANS | FRA & A-FUA | AOM19.2 | ASM Management of Real-Time Airspace Data | #31 | AM-1.8 | | | | | | | | | | | | 6% | | | | | | | | | | | | |
| OANS | FRA & A-FUA | AOM19.3 | Full Rolling ASM/ATFCM and ASM Information Sharing | #31 | AM-1.8 | | | | | | | | | | | | 8% | | | | | | | | | | | | |
| OANS | FRA & A-FUA | AOM19.4 | Management of Pre-defined Airspace Configurations | #31 | Nil | | | | | | | | | | | | 6% | | | | | | | | | | | | |
| OANS | FRA & A-FUA | OD-2 | FRA ensuring connectivity with TMA | #66<br>#33<br>PJ.06-01 | AM-1.7 | | | | | | | | | | | | | | | | | | | | | | | | |
| OANS | ATFCM | FCM03 | Collaborative flight planning | Nil | AM1.14 | | | | | | | | | | | | 60% | | | | | | | | | | | | |
| OANS | ATFCM | FCM04.2 | STAM phase 2 | #17 | AM-1.11 | | | | | | | | | | | | 10% | | | | | | | | | | | | |
| OANS | NOP | FCM05 | Interactive rolling NOP | #20, #21 | AM-1.12 | | | | | | | | | | | | 8% | | | | | | | | | | | | |
| OANS | ATFCM | FCM06 | Traffic Complexity Assessment | #19 | AM-1.13 | | | | | | | | | | | | 12% | | | | | | | | | | | | |
| OANS | ATFCM | FCM07 | CTOT to TTA for ATFCM | #18 | AM-1.9 | | | | | | | | | | | | | | | | | | | | | | | | |
| OANS | ATFCM | FCM09 | Enhanced ATFM Slot swap | #56 | Nil | | | | | | | | | | | | | | | | | | | | | | | | |

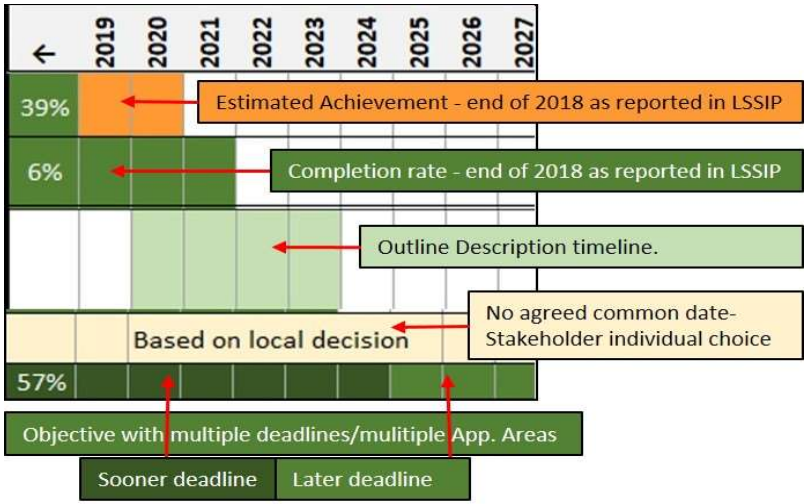
| Key Feature | Major ATM Change | MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ↑ | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| AATS | FRA | AOM21.2 | Free Route Airspace | #33, #66 | AM-1.6<br>AM-1.10<br>AM-5.1 | | | | | | | | | | | | 55% | | | | | | | | | | | | |
| AATS | ATM Systems | ATC02.8 | Ground based safety nets | Nil | Nil | | | | | | | | | | | | 54% | | | | | | | | | | | | |
| AATS | ATM Systems | ATC02.9 | Enhanced STCA for TMAs | #60 | Nil | | | | | | | | | | | | 72% | | | | | | | | | | | | |
| AATS | Enhanced AMAN | ATC07.1 | Arrival management tools | Nil | Nil | | | | | | | | | | | | 64% | | | | | | | | | | | | |
| AATS | ATM Systems | ATC12.1 | MONA, TCT and MTCD | #27, #104 | AM-1.15<br>AM-5.1 | | | | | | | | | | | | 44% | | | | | | | | | | | | |
| AATS | Enhanced AMAN | ATC15.1 | Initial extension of AMAN to En-route | Nil | Nil | | | | | | | | | | | | 48% | | | | | | | | | | | | |
| AATS | Enhanced AMAN | ATC15.2 | AMAN Extended to En-route Airspace | #05 | AM-1.3 | | | | | | | | | | | | 9% | | | | | | | | | | | | |
| AATS | FRA | ATC17 | E. Dialogue, Automat.Assist to ATCO during COTR | Nil | AM-1.3 | | | | | | | | | | | | 26% | | | | | | | | | | | | |
| AATS | FRA | ATC18 | Multi Sector Planning En-route P2T | #63<br>#70W2 | AM-4.3<br>AM-5.1 | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |
| AATS | AMAN /DMAN | ATC19 | Enhanced AMAN/DMAN integration | #54 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |
| AATS | ATM Systems | ATC20 | Enhanced STCA with DAPs via Mode S EHS | #69 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |
| AATS | PBN | ENV01 | Continuous Descent Operations | Nil | Nil | | | | | | | | | | | | 36% | | | | | | | | | | | | |
| AATS | PBN | ENV03 | Continuous Climb Operations | Nil | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |
| AATS | PBN | NAV03.1 | RNAV1 in TMA Operations | #62 | Nil | | | | | | | | | | | | 57% | | | | | | | | | | | | |
| AATS | PBN | NAV03.2 | RNP1 in TMA Operations | #09, #51 | Nil | | | | | | | | | | | | 6% | | | | | | | | | | | | |
| AATS | PBN | NAV10 | RNP App. Procedures to instrument RWY | #103 | Nil | | | | | | | | | | | | 36% | | | | | | | | | | | | |

| Key Feature | Major ATM Change | MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ↑ | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| AATS | PBN | NAV12 | ATS IFR Routes for Rotorcraft Operations | #113 | Nil | | | | | | | | | | | | | | | | | | | | | | | | |
| HPAO | Surface manag. | AOP04.1 | A-SMGCS Surveillance (former Level 1) | #70 | Nil | | | | | | | | | | | | 70% | | | | | | | | | | | | |
| HPAO | Surface manag. | AOP04.2 | A-SMGCS RMCA (former Level 2) | Nil | Nil | | | | | | | | | | | | 52% | | | | | | | | | | | | |
| HPAO | Collabor. Airport | AOP05 | Airport CDM | #106 | Nil | | | | | | | | | | | | 55% | | | | | | | | | | | | |
| HPAO | RWY vicinity | AOP10 | Time Based Separation | #64 | Nil | | | | | | | | | | | | 6% | | | | | | | | | | | | |
| HPAO | Collabor. Airport | AOP11 | Initial Airport Operations Plan | #21 | Nil | | | | | | | | | | | | 11% | | | | | | | | | | | | |
| HPAO | Surface manag. | AOP12 | Improve RWY safety with CATC detection and CMAC | #02 | Nil | | | | | | | | | | | | 16% | | | | | | | | | | | | |
| HPAO | Surface manag. | AOP13 | Auto. Assist. ATCO for Surface plan. and routing | #22 #53 | Nil | | | | | | | | | | | | 0% | | | | | | | | | | | | |
| HPAO | Remote Tower | AOP14 | Remote Tower Services | #12 #71 #52 #13 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |
| HPAO | Airport SNET Vehicles | AOP15 | Traffic sit. awareness and SNET for the vehicle drivers | #04 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |
| HPAO | Ground Sit.Awar. | AOP16 | Guidance assistance through AGL | #47 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |
| HPAO | Collabor. Airport | AOP17 | Provision/integration of DEP planning info to NMOC | #61 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |
| HPAO | Enhance Airport SNET | AOP18 | Runway Status Lights (RWSL) | #01 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | | |

| Key Feature | Major ATM Change | MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ↑ | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| HPAO | Collabor. Airport | ENV02 | Airport Collaborative Env. Management | Nil | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | |
| HPAO | LVPs GBAS | NAV11 | PA using GBAS CAT II/III based on GPS L1 | #55 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | |
| HPAO | Surface manag. | SAF11 | Improve RWY safety by preventing RWY excursions | Nil | Nil | | | | | | | | | | | | 66% | | | | | | | | | | | |
| EAI | CNS rational. | COM10 | Migration from AFTN to AMHS | Nil | Nil | | | | | | | | | | | | 55% | | | | | | | | | | | |
| EAI | CNS rational. | COM11.1 | VoIP in En-Route | Nil | AM-1.3 | | | | | | | | | | | | | | | | | | | | | | | |
| EAI | CNS rational. | COM11.2 | VoIP in Airport/Terminal | Nil | Nil | | | | | | | | | | | | | | | | | | | | | | | |
| EAI | P-SWIM & SWIM | COM12 | NewPENS | Nil | Nil | | | | | | | | | | | | 0% | | | | | | | | | | | |
| EAI | P-SWIM & SWIM | FCM08 | Extended Flight Plan | #37 PJ18-02c | AM-1.4 | | | | | | | | | | | | 0% | | | | | | | | | | | |
| EAI | P-SWIM & SWIM | INF07 | Electronic Terrain and Obstacle Data (e-TOD) | Nil | Nil | | | | | | | | | | | | 10% | | | | | | | | | | | |
| EAI | P-SWIM & SWIM | INF08.1 | Information Exchanges using the SWIM Yellow TI Profile | #35, #46 | AM-1.5 | | | | | | | | | | | | 0% | | | | | | | | | | | |
| EAI | P-SWIM & SWIM | INF08.2 | Info. Exchanges using the SWIM Blue TI Profile | #28, #46 PJ.18-02b | AM-9.1 | | | | | | | | | | | | | | | | | | | | | | | |
| EAI | Digital Int.Brief. | INF09 | Digital Integrated Briefing | #34 | Nil | | | | | | | | | | | | | | Based on local decision | | | | | | | | | |
| EAI | CNS rational. | ITY-ACID | Aircraft identification | Nil | Nil | | | | | | | | | | | | 20% | | | | | | | | | | | |
| EAI | P-SWIM & SWIM | ITY-ADQ | Ensure quality of AIM data and inormation | Nil | Nil | | | | | | | | | | | | 6% | | | | | | | | | | | |

| Key Feature | Major ATM Change | MPL3 Objective | Objective Title | SESAR Solution | AAS Milestone | Stakeholder | | | | | | Planned scope | | | | | Planned Implementation-FOC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ANSP | APO | USE | ECTL NM | MIL | NSA/REG | ECAC+ | EU+ | EU | Airport | LOCAL | ↑ | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| EAI | Data link | ITY-AGDL | Initial ATC air-ground data link services | Nil | AM-1.1 | | | | | | | | | | | | 37% | | | | | | | | | | | | |
| EAI | CNS rational. | ITY-AGVCS2 | 8.33 kHz A/G Voice Channel Spacing below FL195 | Nil | Nil | | | | | | | | | | | | 20% | | | | | | | | | | | | |
| EAI | P-SWIM & SWIM | ITY-FMTP | Common flight message transfer protocol (FMTP) | Nil | AM-1.3 | | | | | | | | | | | | 76% | | | | | | | | | | | | |
| EAI | CNS rational. | ITY-SPI | Surveillance performance and interoperability | Nil | Nil | | | | | | | | | | | | 39% | | | | | | | | | | | | |
| | CNS rational. | OD-3 | Iris precursor | #109 | AM-1.16 | | | | | | | | | | | | | | | | | | | | | | | | |
| | CNS rational. | OD-4 | ADS-B/WAM | #114 | AM-1.17 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Data link | OD-1 | EPP/ADS C | #115 | AM-1.2 | | | | | | | | | | | | | | | | | | | | | | | | |
| EAI | Virtualisation | OD-5 | VC concept, CWP and service interface | PJ.16-03 | AM-4.5 | | | | | | | | | | | | | | | | | | | | | | | | |

**Legend:**


2019
2020
2021
2022
2023
2024
2025
2026
2027
39%
Estimated Achievement - end of 2018 as reported in LSSIP
6%
Completion rate - end of 2018 as reported in LSSIP
Outline Description timeline.
Based on local decision
No agreed common date-
Stakeholder individual choice
57%
Objective with multiple deadlines/mulitiple App. Areas
Sooner deadline
Later deadline

# Annex 6. Acronyms and Abbreviation

## A

| | |
|---|---|
| AAB | Agency Advisory Body (EUROCONTROL) |
| ACAS | Airborne Collision Avoidance System |
| ACC | Area Control Centre |
| A-CDM | Airport Collaborative Decision Making |
| ACH | ATC Flight Plan Change |
| ACID | Aircraft Identification |
| ACL | ATC Clearance |
| ACP | Accept (message) |
| ADEXP | ATC Data Exchange Presentation |
| ADQ | Aeronautical Data Quality |
| ADR | Airspace Data Repository |
| ADS | Automatic Dependent Surveillance |
| ADS-B | Automatic Dependent Surveillance – Broadcast |
| ADS-C | Automatic Dependent Surveillance - Contract |
| AFTN | Aeronautical Fixed Telecommunications Network |
| AIC | Aeronautical Information Circular |
| AIM | Aeronautical Information Management |
| AIP | Aeronautical Information Publication |
| AIRAC | Aeronautical Information Regulation and Control |
| AIS | Aeronautical Information Service |
| AIXM | Aeronautical Information Exchange Model |
| AMAN | Arrival Manager |
| AMC | Acceptable Means of Compliance |
| AMC | Airspace Management Cell |
| AMHS | ATS Message Handling Service |
| ANS | Air Navigation Service |
| ANSP | Air Navigation Service Provider |
| AO | Airline Operator |
| AOM | Airspace Organisation and Management |
| AOP | Airport Operations Plan |
| APL | ATC Flight Plan |
| APM | Approach Path Monitor |
| APO | Airport Operations |
| APOC | Airport Operations Centre |
| APP | Approach |
| APV | Approach with Vertical Guidance |
| APW | Airborne Proximity Warning |
| ASM | Airspace Management |
| A-SMCGS | Advanced Surface Movement Control and Guidance System |
| ASP | Air Navigation Service Providers |
| ASTERIX | All Purpose Structured EUROCONTROL Radar Information Exchange |
| ATC | Air Traffic Control |
| ATFCM | Air Traffic Flow and Capacity Management |
| ATFM | Air Traffic Flow Management |
| ATCO | Air Traffic Control Officer |

## B

| | |
|---|---|
| B2B | Business to Business |

## C

| | |
|---|---|
| CAA | Civil Aviation Authority |
| CBA | Cost Benefit Analysis |
| CCO | Continuous Climb Operations |
| CDM | Collaborative Decision Making |
| CDN | Coordination (message) |
| CDO | Continuous Descent Operations |
| CDR | Conditional Route |
| CEM | Collaborative Environmental Management |
| CFIT | Controlled Flight Into Terrain |
| CHMI | Collaboration Human Machine Interface |
| CIAM | Collaboration Interface for Airspace Management |
| CNMF | Central Network Management Function |
| CNR | Management of Common Network Resources Service |
| CNS | Communications, Navigation and Surveillance |
| COD | SSR Code Assignment |
| COF | Change of Frequency (message) |
| COM | Communications |
| CONOPS | Concept of Operations |
| COTS | Connection-mode Transport Service |

| | |
|---|---|
| CPDLC | Controller Pilot Data Link Communications |
| CPR | Correlated Position Reports |
| CRAM | Conditional Route Availability Message |
| CSP | Communications Service Provider |

## D

| | |
|---|---|
| DCT | Direct Routing |
| DDR | Demand Data Repository |
| DLIC | Data Link Initiation Capability |
| DME | Distance Measuring Equipment |
| DP | Deployment Programme |
| DPI | Departure Planning Information |

## E

| | |
|---|---|
| EAD | European Aeronautical Database |
| EAPPRE | European Action Plan on the Prevention of Runway Excursion |
| EASA | European Aviation Safety Agency |
| EATM | European Air Traffic Management |
| EATMN | European Air Traffic Management Network |
| EC | European Commission |
| ECAA | European Common Aviation Area |
| ECAC | European Civil Aviation Conference |
| EGNOS | European Geostationary Navigation Overlay Service |
| EGPWS | Enhanced Ground Proximity Warning System |
| ERNIP | European Route Network Improvement Plan |
| ESSIP | European Single Sky ImPlementation |
| ETFMS | Enhanced Tactical Flow Management System |
| ETSI | European Telecommunications Standards Institute |
| ETSO | European Technical Standard Order EU European Union |
| EUROCAE | European Organisation for Civil Aviation Equipment |

## F

| | |
|---|---|
| FA | Focus Area |
| FAB | Functional Airspace Block |
| FANS | Future Air Navigation Systems (ICAO) |
| FAS | Flight Plan and Airport Slot Consistency Service |
| FCM | Flow and Capacity Management |
| FDP | Flight Data Processing |
| FDPS | Flight Data Processing System |
| FIS | Flight Information Services |
| FL | Flight Level |
| FMS | Flight Management System |
| FMTP | Flight Message Transfer Protocol |
| FOC | Full Operational Capability |
| FPL | Filed Flight Plan |
| FRA | Free Route Airspace |
| FSA | First System Activation |
| FUA | Flexible Use of Airspace |
| FUM | Flight Update Message |

## G

| | |
|---|---|
| GAT | General Air Traffic |
| GBAS | Ground Based Augmentation System |
| GNSS | Global Navigation Satellite System |
| GPS | Global Positioning System |

## H

| | |
|---|---|
| HMI | Human Machine Interface |
| HOP | Hand-Over Proposal (message) |

## I

| | |
|---|---|
| IANS | Institute of Air Navigation Services |
| IATA | International Air Transport Association |
| ICAO | International Civil Aviation Organisation |
| IFPL | Individual Filed Flight Plan |
| IFPS | Initial Flight Plan Processing System |
| IFR | Instrument Flight Rules |
| ILS | Instrument Landing System |
| IND | Aeronautics Industry |
| INF | Information Management |
| INT | International Organisations and Regional Bodies |
| IP | Internet Protocol |
| IR | Implementing Rule |
| ISO | International Standardisation Organisation |

| | |
|---|---|
| ITU | International Telecommunications Union |
| ITY | Interoperability |

## J

| | |
|---|---|
| JU | Joint undertaking |

## K

| | |
|---|---|
| KHz | Kilohertz |
| KPA | Key Performance Area |
| KPI | Key Performance Indicator |

## L

| | |
|---|---|
| LARA | Local and Regional ASM application |
| LoA | Letter of Agreement |
| LPV | Lateral Precision with Vertical Guidance Approach |
| LSSIP | Local Single Sky ImPlementation |

## M

| | |
|---|---|
| MAS | Manual Assumption of Communication (message) |
| MET | Meteorology |
| MHz | Megahertz |
| MIL | Military Authorities |
| MP L3 | Master Plan Level 3 |
| Mode S | SSR Selective Interrogation Mode |
| MONA | Monitoring Aids |
| MoU | Memorandum of Understanding |
| MSAW | Minimum Safe Altitude Warning |
| MTCD | Medium Term Conflict Detection |
| MTOW | Maximum Take-Off Weight |
| MUAC | Maastricht Upper Area Control (Centre) |

## N

| | |
|---|---|
| N/A | Not applicable |
| NATO | North Atlantic Treaty Organisation |
| NAV | Navigation |
| NETOPS | Network Operations Team |
| NM | Network Manager |
| NMOC | Network Manager Operations Centre |
| NOP | Network Operations Plan |
| NOTAM | Notice to Airmen |
| NPA | Notice of Proposed Amendment |
| NPA | Non Precision Approach |
| NSA | National Supervisory Authority |

## O

| | |
|---|---|
| OAT | Operational Air Traffic |
| OI | Operational improvements |
| OLDI | On Line Data Interchange |
| OPC | Operational Communications |

## P

| | |
|---|---|
| PA | Precision Approach |
| PAC | Preliminary Activation message |
| PANS-OPS | Procedures for Air Navigation Services – Aircraft Operations |
| PBN | Performance Based Navigation |
| PCP | Pilot Common Project |
| PDS | Pre-Departure Sequencing |
| PENS | Pan-European Network Service |
| P-RNAV | Precision RNAV |

## R

| | |
|---|---|
| RAD | Route Availability Document |
| RAP | Referred Activate (message) |
| REG | National Regulatory Authorities/NSAs |
| RF | Radio Frequency |
| RJC | Reject (message) |
| RMCA | Runway Monitoring and Conflict Alerting |
| RNAV | Area Navigation |
| RNP | Required Navigation Performance |
| ROF | Request on Frequency |
| RRV | Referred Revision (message) |
| R/T | Radio Telephony |

## S

| | |
|---|---|
| SAF | Safety |
| SBAS | Satellite Based Augmentation System |
| SBY | Stand-By (message) |
| SDM | SESAR Deployment Manager |
| SDM | SDM Supplementary Data Message |
| SEAS | Single European Airspace System |
| SES | Single European Sky |

| | |
|---|---|
| SESAR | Single European Sky ATM Research |
| SJU | SESAR Joint Undertaking |
| SLoA | Stakeholder Line(s) of Action |
| SSR | Secondary Surveillance Radar |
| STAM | Short-Term ATFCM Measures |
| STCA | Short Term Conflict Alert |
| SUR | Surveillance |
| SVS | Synthetic Vision System |
| SWIM | System-Wide Information Management |

## T

| | |
|---|---|
| TBD | To Be Determined |
| TBO | Time-Based Operations |
| TBS | Time-Based Separation |
| TCAS | Traffic Alert and Collision Avoidance System |
| TCP/IP | Transmission Control Protocol / Internet Protocol |
| TIM | Transfer Phase Initiation Message |
| TOD | Terrain and Obstacle Data |
| TMA | Terminal Control Area |
| TWR | Tower Control Unit |

## U

| | |
|---|---|
| UAC | Upper Area Control (Centre) |
| UDPP | User-Driven Prioritisation Process |
| USE | Airspace Users |
| UUP | Updated Airspace Use Plan |

## V

| | |
|---|---|
| VCS | Voice Communications System |
| VDL | VHF Digital Link |
| VFR | Visual Flight Rules |
| VHF | Very High Frequency |
| VNAV | Vertical Navigation |
| VoIP | Voice over Internet Protocol |

## W

| | |
|---|---|
| WAM | Wide Area Multilateration |