EUROPEAN ATM MASTER PLAN

Digitalising Europe's Aviation Infrastructure

Implementation view

SESAR JOINT UNDERTAKING

founding members

EUROPEAN UNION

EUROCONTROL

Plan 2020

EXECUTIVE SUMMARY

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 a common interest in their operational introduction. Implementation Objectives address validated SESAR Solutions and account for the existing (EU) regulations in ATM.

The vision of the ATM Master Plan 2020 is realised in four progressive phases. This phased approach takes into account the rapid digitalisation of aviation and that the supporting infrastructure needs to evolve accordingly.

The Level 3 of the Master Plan addresses the deployment towards operational implementation, therefore focusing on the plans for 5 to 7 years ahead, as pictured below. In that, it takes full account of SESAR Solutions that have already reached maturity from an R&D perspective, as represented in the V3 phase of the European Operational Concept Validation Methodology (E-OCVM), are in the pipeline for industrialisation and have a standardisation work ongoing, if not yet completed.

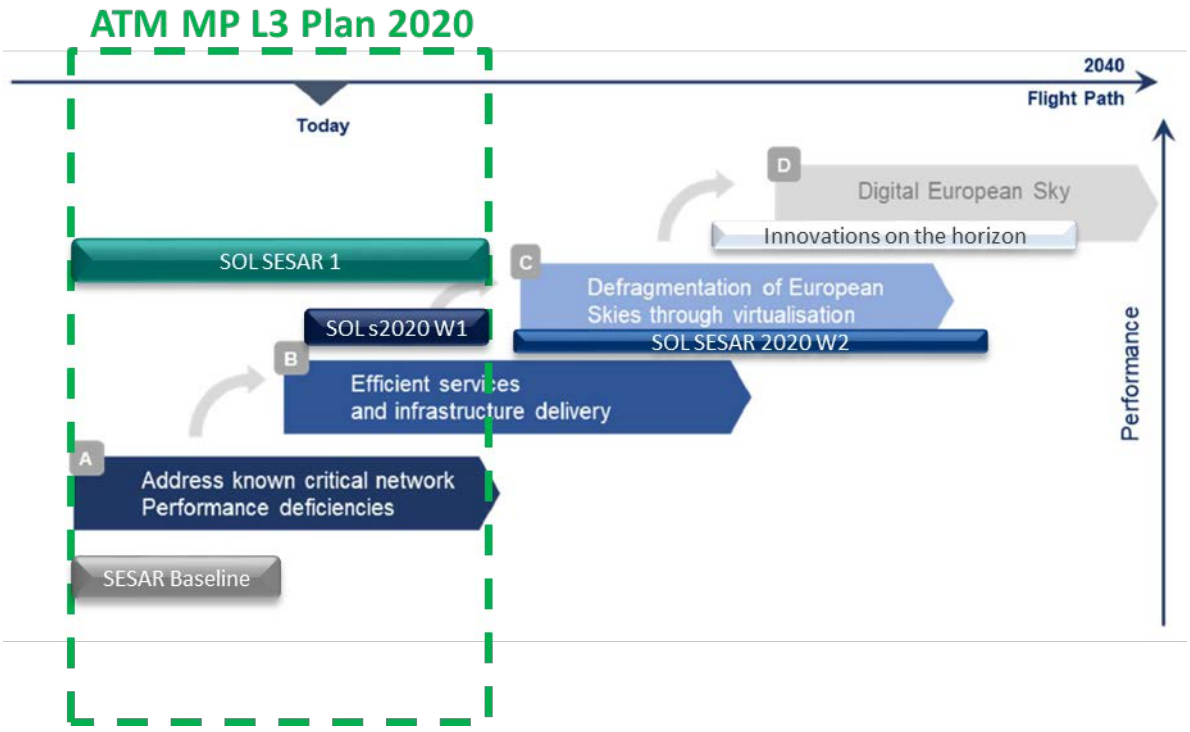

Figure 1 - Focus of the Level 3 Implementation Plan 2020

The evolution of the Implementation Plan for 2020

- The Level 3 as part of the overall Master Plan

As an integral part of the Master Plan, the Level 3 ensures full consistency of its Implementation Objectives with the elements that inform it: Essential Operational Changes, Deployment Scenarios and SESAR Solutions 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.

- ### A SESAR Solution-centric Implementation Plan

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. The Level 3 Implementation Plan edition 2020 focusses on the results of the SESAR 1 Programme, awaiting for the validation results of SESAR 2020 Wave 1 to be available through the SESAR Solution Catalogue and relevant Solution data packs. In this edition of the Plan, the relationship between the SESAR Solutions and the related Implementation Objectives is furthered, allowing for an even clearer link across the three levels of the Master Plan.

- ### SESAR Solutions covered in the Plan

The Implementation Plan naturally incorporates those SESAR Solutions that are subject to regulated implementation through the EU legal framework. Other Solutions 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 SESAR Solutions in deployment are currently 65. Of them, **2** have been already implemented operationally and **63** are addressed in the Level 3 Implementation Plan 2020.

For the remaining 63, **41** Solutions are described in the form of Implementation Objectives (i.e. subject to planning, deployment and operational introduction), and another **22** are monitored for implementation across the ECAC area (ref. The MPL3 Report 2020) but are not yet described in an Implementation Objective.

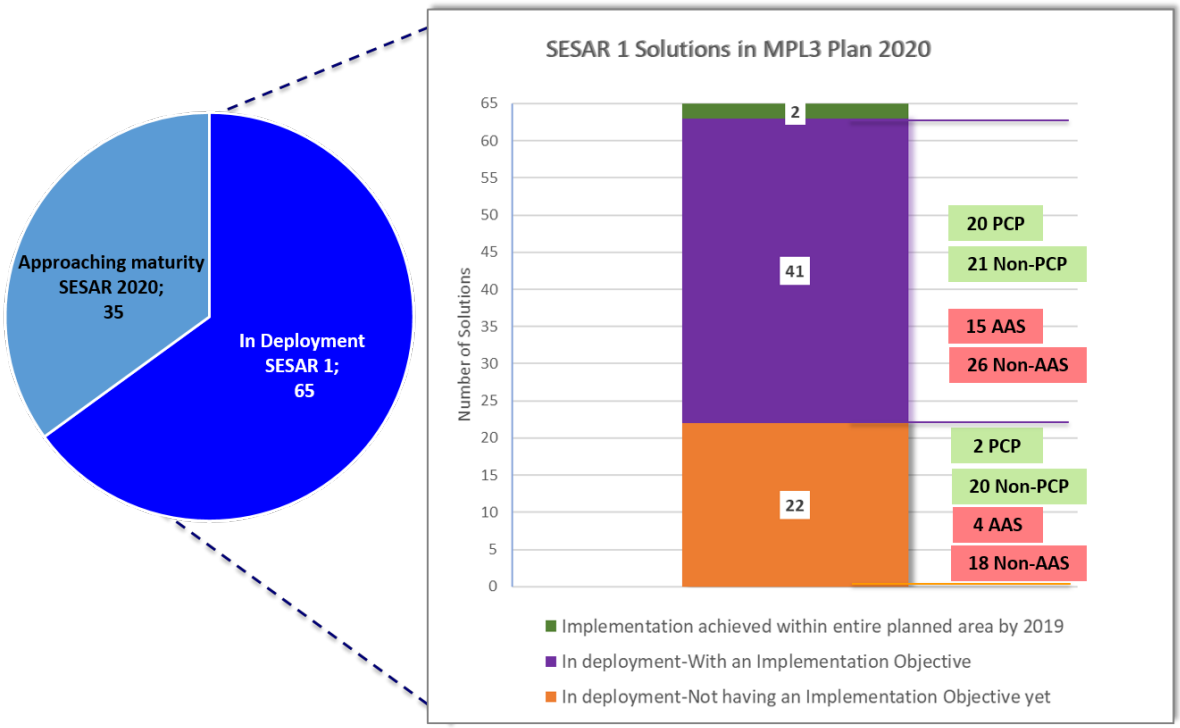

Figure 2 - SESAR Solutions in the L3 Implementation Plan 2020

- Pilot Common Project (PCP) and Airspace Architecture Study (AAS)

This Master Plan Level 3 2020 Implementation Plan is driven by three main objectives: to update and secure the planning of the deployment of the SESAR baseline and the prerequisites of the Pilot Common Project (PCP), to ensure a complete coverage of the ATM functionalities covered by the PCP1, and to address the requirements set up for the short to medium term for the Future Single European Airspace System (SEAS).

This 2020 edition integrates Implementation Objectives covering **20** SESAR Solutions to ensure the adequate coverage of the PCP requirements in relation with SDM's Deployment Programme families.

The plan is enriched with the outcome of the monitoring and reporting activities linked to the execution of the Master Plan in 2019, as detailed in the Master Plan Level 3 Implementation Report. 2020 (reference year 2019).

The Airspace Architecture Study (AAS), developed by the SJU with support from the Network Manager, 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.

Notwithstanding the current COVID-19 crisis and at short-term some relaxation in the request for more capacity in the system, the AAS objective to propose a future European airspace architecture with an associated transition strategy, addressing the limitations of the system, remains applicable.

The Level 3 Implementation Plan 2020 fully addresses the Transition Phase 1 of the AAS, covering the period up to 2025. It does so through Implementation Objectives addressing **15** SESAR Solutions.

- 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 and those States having signed a Comprehensive Agreement with the EUROCONTROL Organisation.

Implementation Objectives that are associated to elements of the ICAO Global Air Navigation Plan (GANP) are always associated to the widest possible geographical scope within the Plan.

- 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 following modifications were made to the content of the MPL3 Plan:

- Creation of a new Implementation Objective (ATC21) addressing SESAR Solution #114 (Composite surveillance (ADS-B/WAM)) and with the status 'Initial', therefore indicating its expected evolution into an 'active' objective in the near future;
- Removal from the plan of Implementation Objective on Extended Flight Plan (FCM08), linked to Solution Sol #37 Extended Flight Plan, as incompatible with the evolution of this subject matter. In the next edition of the Plan, a new objective will be created, addressing the implementation of e-FPL in line with the ICAO FF-ICE (Flight and Flow information for a Collaborative Environment);
- Overall alignment to the new ICAO GANP, SESAR Deployment Programme (SDP), Network Strategy Plan (NSP), European Plan for Aviation Safety and Airspace Architecture Study Transition Plan (AAS-TP).

[1] Extended arrival management and performance-based navigation in the high density terminal manoeuvring areas; airport integration and throughput; flexible airspace management and free route; network collaborative management; initial system wide information management; initial trajectory information sharing.

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 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 Essential Operational Changes, in line with the ATM Master Plan 2020 document.

- CNS - CNS Infrastructure and Services
- iN - ATM Interconnected Network
- dS - Digital AIM and MET Services
- U-s - U-space Services
- vS - Virtualisation of Service Provision
- ATp - Airport and TMA performance
- dA - Fully Dynamic and Optimised Airspace Organisation
- TBO - Trajectory Based Operations
- M³ - Multimodal Mobility and integration of all airspace users

A technical annex complements this document, providing the detailed descriptions, as well as the full set of agreed Stakeholder Lines of Action and the references to required or recommended supporting material for their finalisation.

The number of SESAR Solutions and Implementation Objectives found in the MPL3 Plan 2020 varies significantly amongst the various EOC, as shown in Figure 3.

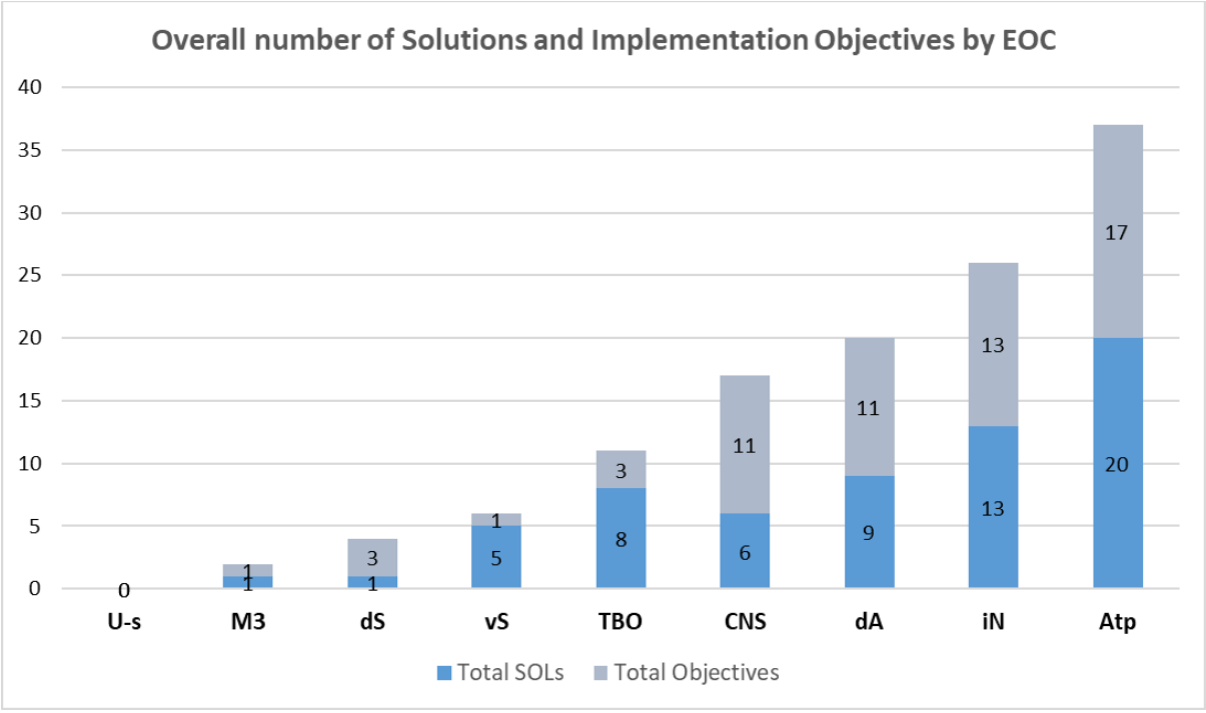

Figure 3 - Overall number of SOLs and Implementation Objectives by EOCs

The performance element

This edition of the MPL3 Plan endeavours to give a better visibility to the contribution of each SESAR Solution and Implementation Objective to performance, and in particular the Key Performance Areas identified in the ATM Master Plan 2020: Capacity, Operational Efficiency, Cost efficiency, Safety, Environment and Security.

Due to the effects that the COVID-19 crisis is having on the world economy and on the aviation industry as a whole, for the short term this imposes to reconsider the path towards achieving the SESAR vision, that remains valid (Re. conclusions of SJU NCP/11 of 29/04/2020). Short term focus should be on cost efficiency, fuel efficiency and efficiency of implementing changes.

In view of the above, the Master Plan Level 3 for 2020 does not propose any new Implementation Objectives, while cost efficiency measures are implemented or being planned for the short term.

Furthermore, under the request of the European Commission, this edition of the Level 3 Plan will not be submitted to the SJU Administrative Board for approval, awaiting the review of the SES performance and charging schemes ahead of the third reference period (RP3).

In the light of this, an effort has been made to ensure that the reader can identify in an easy manner those Solutions/Objectives that contribute, or not, to a specific KPA.

Performance benefits of SESAR Solutions originate from the Solution data packs and other associated information on the SJU website. Performance benefits of Implementation Objectives not related to the SESAR Solutions, originate from internal EUROCONTROL business cases and analyses. Figure 4 below shows the distribution of benefits across the Implementation Plan 2020, per Key Performance Area. Typically, a SESAR Solution would contribute to more than one KPA.

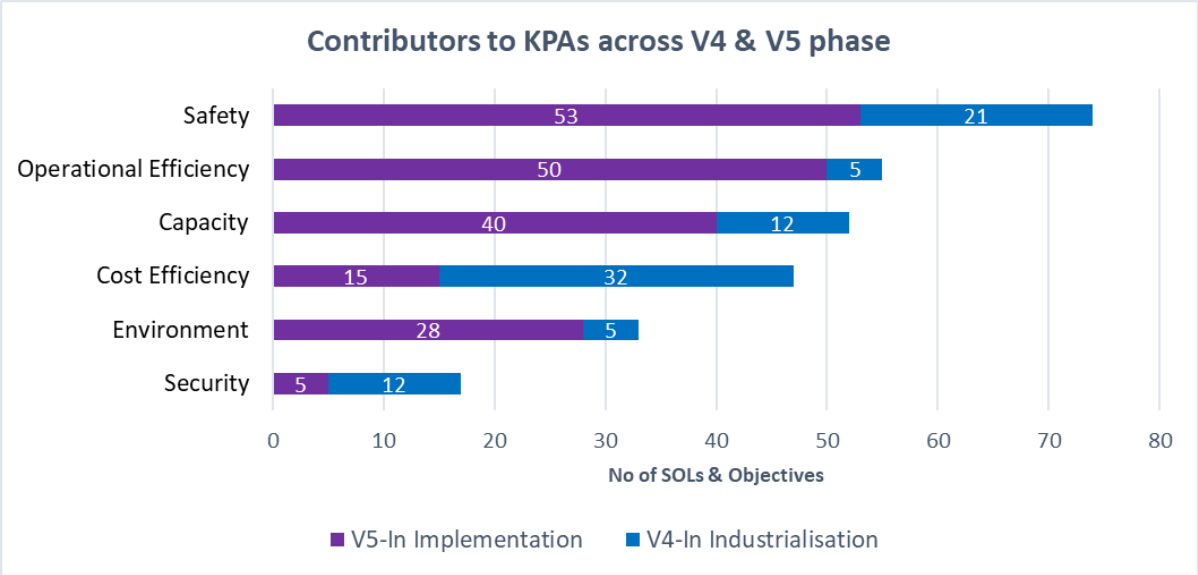

Figure 4 Contributors to KPAs across V4 & V5 phase

The Operational View allows the identification of the individual contribution of each SESAR Solution to the KPAs, while the individual Deployment Views provide a short description of the expected benefits.

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1. INTRODUCTION

1.1. Objective and scope of L3 Plan 2020

The ATM Master Plan Level 3, Implementation Plan, constitutes the "Implementation view" or Level 3 of the European ATM Master Plan (MP). It is based on the ATM MP L1 and L2, SDM Deployment Programme (DP), the Network Strategy Plan, as well as SES Interoperability regulations.

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. It addresses V3 validated SESAR Solutions, PCP AFs and pre-requisites, SESAR Baseline solutions, SES and ICAO requirements. The Implementation Plan is updated every year and covers short to medium term horizon (around 5 years ahead). This planning is without prejudice to reprioritisation actions that may have been put in place by stakeholders in 2020 due to the COVID19 crisis.

This plan focuses primarily on the deployment phase V5, at the solutions that have reached the necessary operational and technical maturity and for which stakeholders have expressed a common agreement/interest in their operational implementation. However, it shows an outlook to the SESAR Solutions in the Industrialisation and Standardisation Phase V4 too.

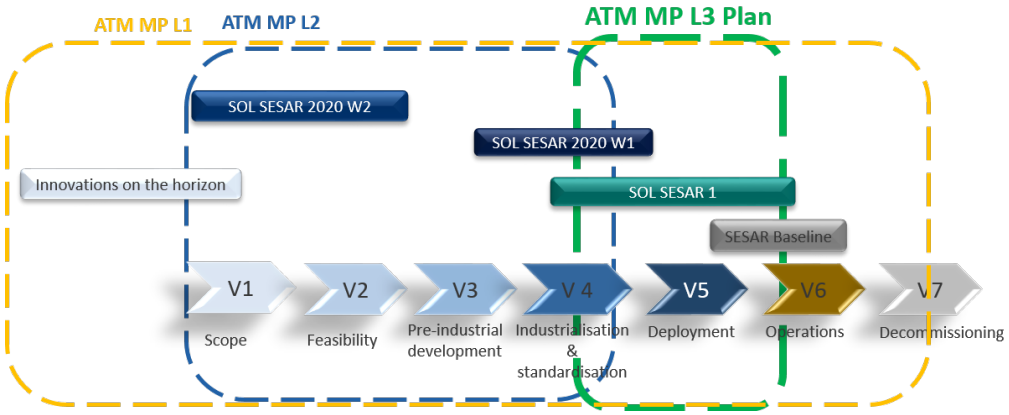


Figure 1.1-1 Focus of the Level 3 Implementation Plan 2020

The ambition of the Master Plan remains to reach all the States within the ECAC area. For this, joint governance of SJU Admin Board (through the Master Planning Committee) and EUROCONTROL Provisional Council is very beneficial. EUROCONTROL provides the working arrangements that serve as vehicle to extend the agreed implementation actions to the whole of ECAC, as well as the method for implementation planning, monitoring and reporting consisting of the implementation objectives and LSSIP mechanism.

The 'Implementation Objectives' represent consolidated implementation actions, addressing operationally and technically mature SESAR solutions for which stakeholders have expressed a common agreement/interest in their operational implementation with.

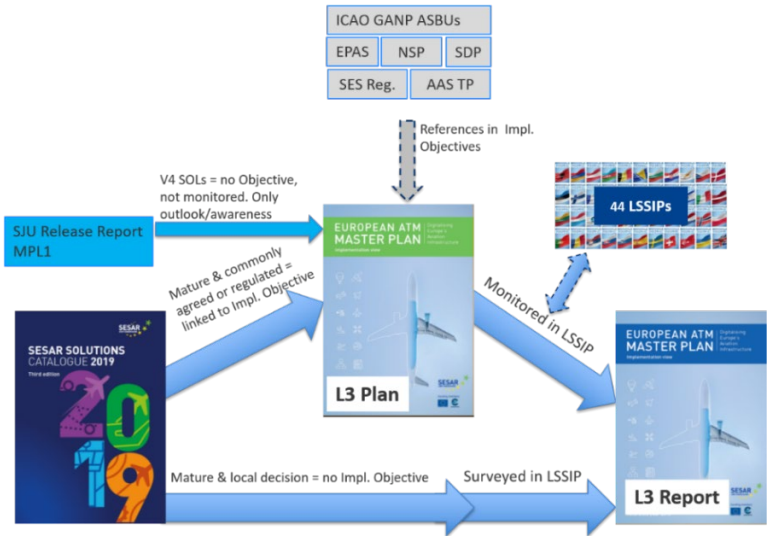


Figure 1.1-2 Mechanism supporting L3 Plan and implementation of Solutions

In terms of implementation planning and monitoring mechanism supporting L3 Plan deployment, an implementation objective may have a different applicability area(s) used in planning, monitoring and reporting via LSSIP mechanism.

An applicability area lists the States/Airports having committed to implement the objective and/or being mandated to do so by a Regulation.

An implementation objective may have a "Local" scope too, i.e. without a predefined Applicability Area and Full Operational Capability (FOC) date. They are subject to local business decisions by any stakeholder concerned.

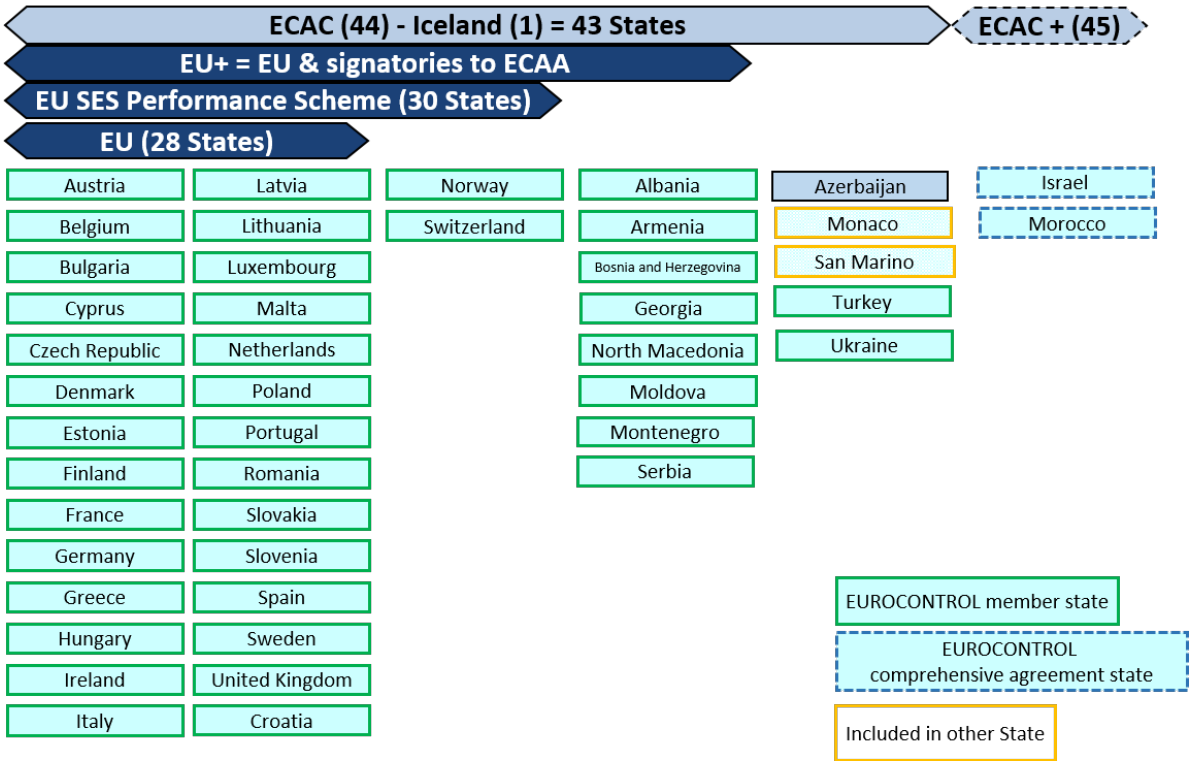


Figure 1.1-3 Scope of planning and monitoring mechanism supporting L3 Plan

1.2. How to read L3 Plan 2020

The main parts of MPL3 Plan 2020 are:

Executive summary – that highlights the most important elements of this Plan

Introduction – sets the scene for a reader by stating scope and objectives of L3 Plan. Highlights the main news in this edition.

Operational view - provides a consolidated view across the Essential Operational Change (EOC) of the SESAR solutions within the EOC, in terms of impacted stakeholders, planned implementation date, performance benefits and an outlook for SESAR solutions in Industrialisation and Standardisation phase.

Deployment view - provides a summary of the main elements (what, who, when, where and all references). It describes the SESAR solutions and related implementation objectives within the EOC, identifying deployment scenarios (DS), describing main actions for the stakeholders and performance benefits, implementation timeframes and reported implementation progress from MPL3 Report.

Annexes - provide support documents for easier reading and understanding of the L3 Plan, mostly mappings between Master Plan elements.

Engineering view *– is not integral part of this document. It is a separate soft copy called '' Technical Annex '' accompanying MPL3 Plan and is available online, on the European ATM Master Plan Portal https://www.eatmportal.eu/working/signin) and EUROCONTROL website https://www.eurocontrol.int/master-plan-architecture-and-monitoring#key-documents . It provides a complete description for each Implementation Objective, including detailed descriptions of stakeholder lines of action (SLoAs) and relevant supporting material.*

1.2.1 The main definitions of the terminology used in L3 Plan 2020

The following stakeholder group designators are used:

REG – State Authorities
ASP – Air Navigation Service Providers (Civil & Military providing services to GAT)
APO – Airport Operators
USE – Airspace Users
INT – International Organisations and Regional Bodies
IND – Aeronautics Industry
AGY - EUROCONTROL Agency (non-Network Manager)
NM – EUROCONTROL Network Manager

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 2020.

The graphical designator indicates the EOC and is fully consistent with the corresponding designator from the Level 1 of the European ATM Master Plan Edition 2020.

The implementation objective designators consists of acronym identifying one of the designated ATM areas of work and a serial number for the objective within the area of work it covers.

AOM = Airspace Organisation and Management
AOP = Airport Operations
ATC = Air Traffic Control
COM = Communications
ENV = Environment
FCM = Flow and Capacity Management
HUM = Human Factors
INF = Information Management
ITY = Interoperability
NAV = Navigation
SAF = Safety Management

The Implementation Objectives (IOs) set out the operational, technical and institutional improvements which contribute to meet 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 outcomes from the Planning and Architecture level (Level 2) in 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. This includes Objectives derived from existing (EU) Regulations in ATM, including the Pilot Common Project (PCP) and the upcoming Common Project 1 (CP1) Regulations.

Implementation Objectives describe Stakeholder Lines of Action (SLoAs) or ANS Providers, National Regulators, Airport Operators, Military Authorities, Airspace Users that address the deployment and operational introduction aspects of the functionalities described in the IO. The industrialisation phase (i.e. the V4 phase in the E-OCVM) is currently not addressed.

Outline Descriptions (ODs) are developed as a working tool to achieve expert-level consensus on the technical and operational content of the targeted implementations, their timescales and the main set of Stakeholder Lines of Action (SLoAs) which would guide the implementers through the deployment phase. ODs can be considered as embryonic Implementation Objectives and allow the experts to investigate different implementing options, while respecting the overall technical requirements expressed in the SESAR Solution.

An implementation objective present in L3 Plan may have one of the following statuses:

Active - objective in the L3 Plan fully ready for implementation and monitored in LSSIP;

Initial - objective introduced in L3 Plan but some elements still require validation/commitment and therefore it is not monitored in LSSIP yet.

An implementation objective present in L3 Plan may have one of the following applicability area(s) defined as follows:

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.

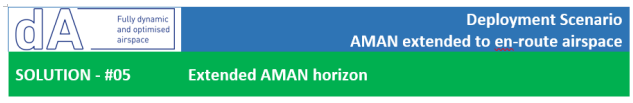
17 PCP Airports: Refers to the airports identified in ATM Functionality 2 of the PCP Regulation as the Geographical Scope for the sub-functionality 'Time-Based Separation'. The 17 airports are: London-Heathrow, London-Gatwick, Paris-Orly, Milan-Malpensa, Frankfurt International, Madrid-Barajas, Amsterdam-Schiphol, Munich Franz Josef Strauss, Rome-Fiumicino, Zurich Kloten, Düsseldorf International, Oslo Gardermoen, Manchester Ringway, Copenhagen Kastrup, Vienna Schwechat, Dublin and Istanbul Ataturk Airport.

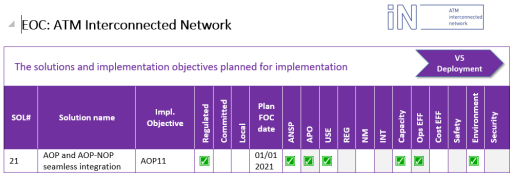
An implementation objective may have a "**Local**" scope too, i.e. without a predefined Applicability Area and Full Operational Capability (FOC) date. They are subject to local business decisions by any stakeholder concerned.

1.3. What is new in this edition

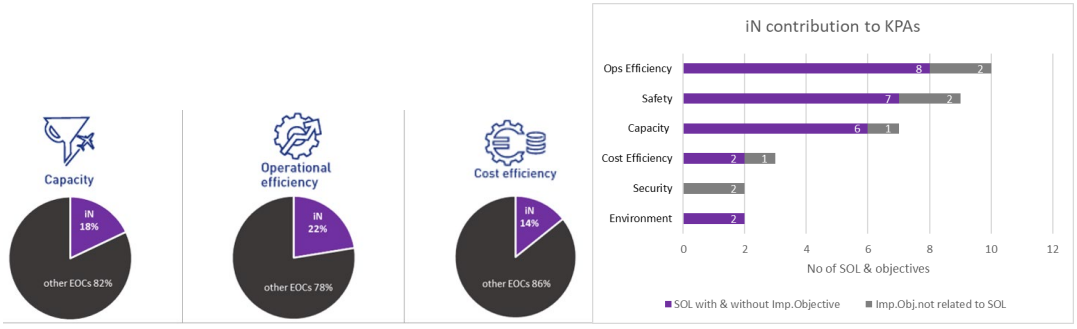
The Implementation Plan 2020 includes a number of changes with regard to the previous edition, that are summarised in the bullet points here below:

- Alignment with the 2020 edition of ATM Master Plan Level 1 (i.e. use of Essential Operational Changes)
- A more SESAR Solutions centric approach– new information structure and display in the document;
- A clear top-down content approach – starting from EOC > DS> SOL to Implementation Objective;



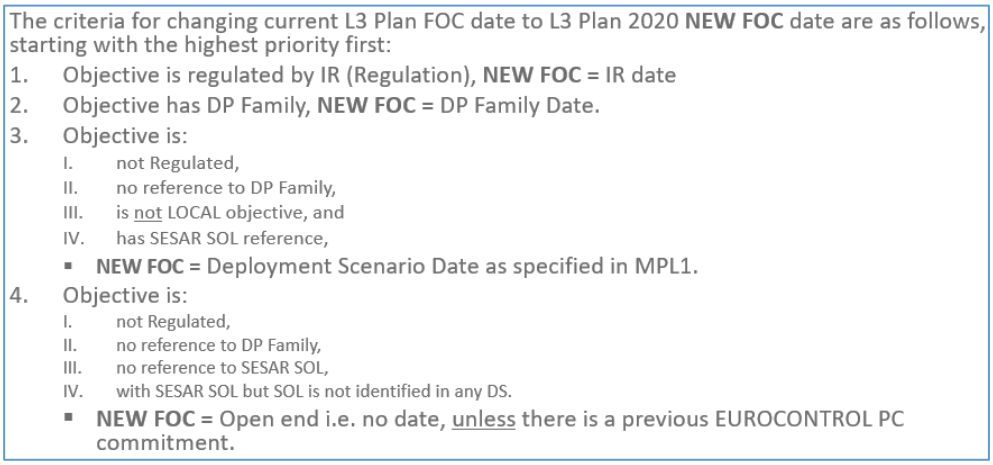


- Introduction of performance elements – identifying planned contributors to the KPAs;



- Integration of V4 activities – all solutions that successfully passed V3 are included in the document;

- Creation of a new Implementation Objective (ATC21) addressing SESAR Solution #114 (Composite surveillance (ADS-B/WAM)) and with the status 'Initial', therefore indicating its expected evolution into an 'active' objective in the near future;
- Removal from the plan of Implementation Objective on Extended Flight Plan (FCM08), linked to solution Sol #37 Extended Flight Plan, as incompatible with the evolution of this subject matter. In the next edition of the Plan, a new objective will be created, addressing the implementation of e-FPL in line with the ICAO FF-ICE (Flight and Flow information for a Collaborative Environment);
- Overall alignment to the new ICAO GANP, SESAR Deployment Programme (SDP), Network Strategy Plan (NSP), European Plan for Aviation Safety and Airspace Architecture Study Transition Plan (AAS-TP).
- Alignment of FOC dates in the Implementation Objetives


The criteria for changing current L3 Plan FOC date to L3 Plan 2020 **NEW FOC** date are as follows, starting with the highest priority first:

1. Objective is regulated by IR (Regulation), **NEW FOC** = IR date
2. Objective has DP Family, **NEW FOC** = DP Family Date.
3. Objective is:
   - I. not Regulated,
   - II. no reference to DP Family,
   - III. is not LOCAL objective, and
   - IV. has SESAR SOL reference,
   - **NEW FOC** = Deployment Scenario Date as specified in MPL1.
4. Objective is:
   - I. not Regulated,
   - II. no reference to DP Family,
   - III. no reference to SESAR SOL,
   - IV. with SESAR SOL but SOL is not identified in any DS.
   - **NEW FOC** = Open end i.e. no date, unless there is a previous EUROCONTROL PC commitment.

Figure 1.3-1 The criteria used for alignment of FOC date

The following table provides a complete list of all Implementation Objectives for which their FOC has been changed in 2020. Only those marked with a (c) represent a substantial change, i.e. modifying the commitment towards their implementation. For the Edition 2020, ten (10) objectives were substantially changed.
Those where the date has been moved by one day for a full alignment with the SESAR Deployment Manager 'Deployment Programme', or those related to 'Initial'(i.e. not committed and not monitored) objectives are rather considered editorial changes and are not subject to an approval process.

Obj. ID	ObjectiveTitle	Old FOC Date	New FOC Date Plan 2020
AOM19.1 (c)	ASM Support Tools to Support Advanced FUA	31/12/2018	01/01/2022
AOM19.2	ASM Management of Real-Time Airspace Data	31/12/2021	01/01/2022
AOM19.3	Full Rolling ASM/ATFCM Process and ASM Information Sharing	31/12/2021	01/01/2022
AOM19.4	Management of Pre-defined Airspace Configurations	31/12/2021	01/01/2022
AOM21.2	Free Route Airspace	31/12/2021	01/01/2022
AOP04.1 (c)	Advanced Surface Movement Guidance and Control System A-SMGCS Surveillance	31/12/2011	01/01/2021
AOP04.2 (c)	Advanced Surface Movement Guidance and Control System (A-SMGCS) Runway Monitoring and Conflict Alerting (RMCA)	31/12/2017	01/01/2021
AOP05 (c)	Airport Collaborative Decision Making	31/12/2016	01/01/2021
AOP10	Time-Based Separation	31/12/2023	01/01/2024
AOP11 (c)	Initial Airport Operations Plan	31/12/2021	01/01/2021
AOP12	Improve Runway and Airfield Safety with Conflicting ATC Clearances (CATC) Detection and Conformance Monitoring Alerts for Controllers (CMAC)	31/12/2020	01/01/2021
AOP13	Automated Assistance to Controller for Surface Movement Planning and Routing	31/12/2023	01/01/2024

Obj. ID	ObjectiveTitle	Old FOC Date	New FOC Date Plan 2020
ATC02.8 (c)	Ground-Based Safety Nets	31/12/2016	01/01/2022
ATC07.1	AMAN Tools and Procedures	31/12/2019	01/01/2020
ATC12.1	Automated Support for Conflict Detection, Resolution Support Information and Conformance Monitoring	31/12/2021	01/01/2022
ATC15.2	Arrival Management Extended to En-route Airspace	31/12/2023	01/01/2024
ATC17 (c)	Electronic Dialogue as Automated Assistance to Controller during Coordination and Transfer	31/12/2018	01/01/2022
COM11.1	Voice over Internet Protocol (VoIP) in En-Route	31/12/2021	01/01/2022
COM12 (c)	New Pan-European Network Service (NewPENS)	33 ANSPs: 31-12-2020 Other STKs: 31-12-2024	01/01/2025
FCM03 (c)	Collaborative Flight Planning	31/12/2017	01/01/2022
FCM04.2	Short Term ATFCM Measures (STAM) - Phase 2	31/12/2021	01/01/2022
FCM05	Interactive Rolling NOP	31/12/2021	01/01/2022
FCM06	Traffic Complexity Assessment	31/12/2021	01/01/2022
FCM07	CTOT to TTA for ATFCM purposes	31/12/2021	01/01/2022
INF07 (c)	Electronic Terrain and Obstacle Data (eTOD)	31/05/2018	01/01/2019
INF08.1	Information Exchanges using the SWIM Yellow TI Profile	31/12/2024	01/01/2025
INF08.2	Information Exchanges using the SWIM Blue TI Profile	Nil (initial)	01/01/2027

2. OPERATIONAL VIEW

This chapter shows an overview of the implementation initiatives, which support the SESAR vision and the performance ambitions. They are identified as the SESAR solutions and implementation objectives already planned for deployment by the stakeholders concerned. It also lists SESAR solutions that have successfully passed V3 phase and are available for the industrialisation/standardisation in the phase V4.

The information in this chapter is grouped per nine Essential Operational Changes (EOCs) as follows:

-  - CNS Infrastructure and Services
-  - ATM Interconnected Network
-  - Digital AIM and MET Services
-  - Airport and TMA performance
-  - Fully Dynamic and Optimised Airspace Organisation
-  - Trajectory Based Operations
-  - Multimodal Mobility and integration of all airspace users
-  - U-space Services
-  - Virtualisation of Service Provision

The EOCs are the nine essential game changers triggering structural evolutions of the European ATM. They will be required to deliver the SESAR vision, the defragmentation of European skies through virtualisation, and will enable the delivery of the SES objective of implementing more sustainable and better performing aviation. Some EOCs are closely linked in terms of delivering enroute performance and have driven the definition of the target architecture, while others bring essential changes to other parts of the system.

Full description of each EOC is found at ATM Master Plan Executive View (Level 1), Edition 2020 chapter 4.2 Essential operational changes, and is not repeated in this document.

In this Plan, within each EOC, the SESAR solutions having an implementation objective are classified, through the objectives, as being ''Regulated'', ''Committed'' or '' Local''. These terms have the following meaning in the context of the implementation plan decision making:

- Regulated: There is a law act (usually EU IR) obliging the stakeholders concerned to implement specified functionality by predefined date within the predefined applicability area;
- Committed: The stakeholders committed through EUROCONTROL Provisional Council to implement a functionality by agreed date within agreed applicability area in a coordinated manner, while there is no law act regulating these two elements.
- Local: There is no commonly agreed pan-European implementation plan. An individual stakeholder decides if and when to implement a functionality.

The classification on regulated, committed or local is without prejudice to the existing SES regulatory framework in ATM (e.g. common requirements, safety, conformity assessment, etc.). Any implementation including purely local ones has to be performed taking fully into account the entire regulatory framework.

Some of the implementation objectives originate from SESAR definition phase or support specific SES regulation and do not have a SESAR solution associated to them. However, they do contribute to the achievement of SESAR vision and performance ambitions. Thus, this Plan lists them within EOCs as well.

In addition, there are some SESAR Solutions, which have not yet evolved into implementation objectives. Their implementation situation and plans are captured through a specific questionnaire included in the EUROCONTROL LSSIP process. They are listed in this document too.

The mapping of the solutions and EOCs is taken from the ATM Master Plan Executive View (Level 1), Edition 2020.

The number of SESAR solutions and implementation objectives found in the MPL3 Plan 2020 varies significantly amongst the various EOC, as shown in Figure 1.

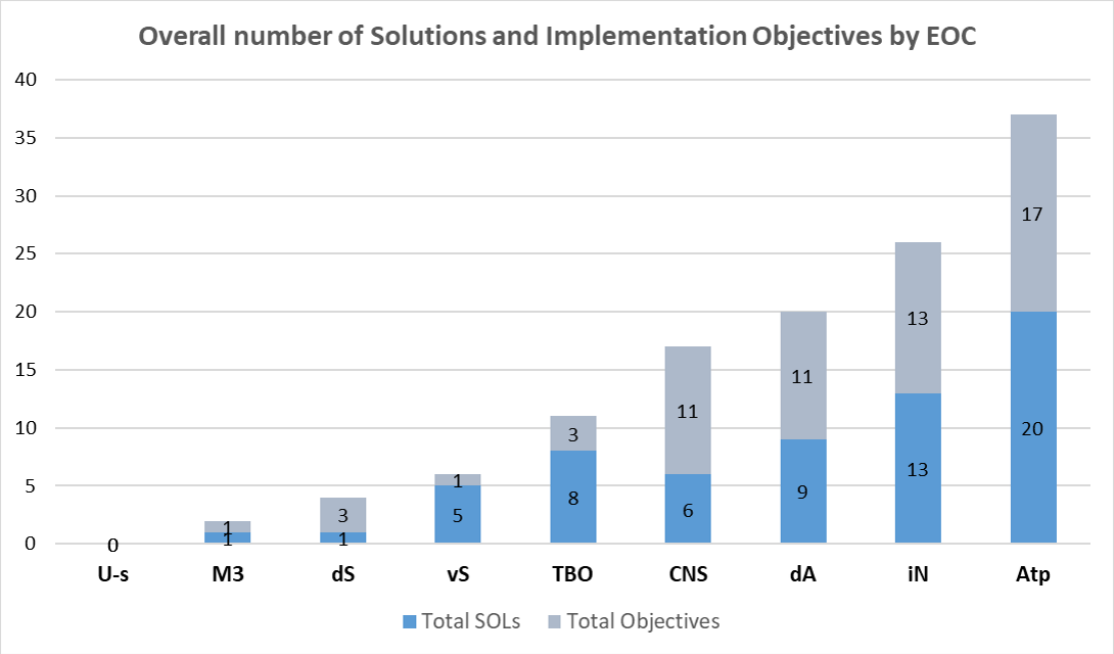


Figure 2-1 Overall number of SOLs and impl. objectives amongst EOCs

The majority of solutions and implementation objectives found in MPL3 Plan 2020 are at the E-OCVM implementation phase (V5). Still, there is a certain number of solutions that are at the industrialisation and standardisation phase (V4), see Figure 2.

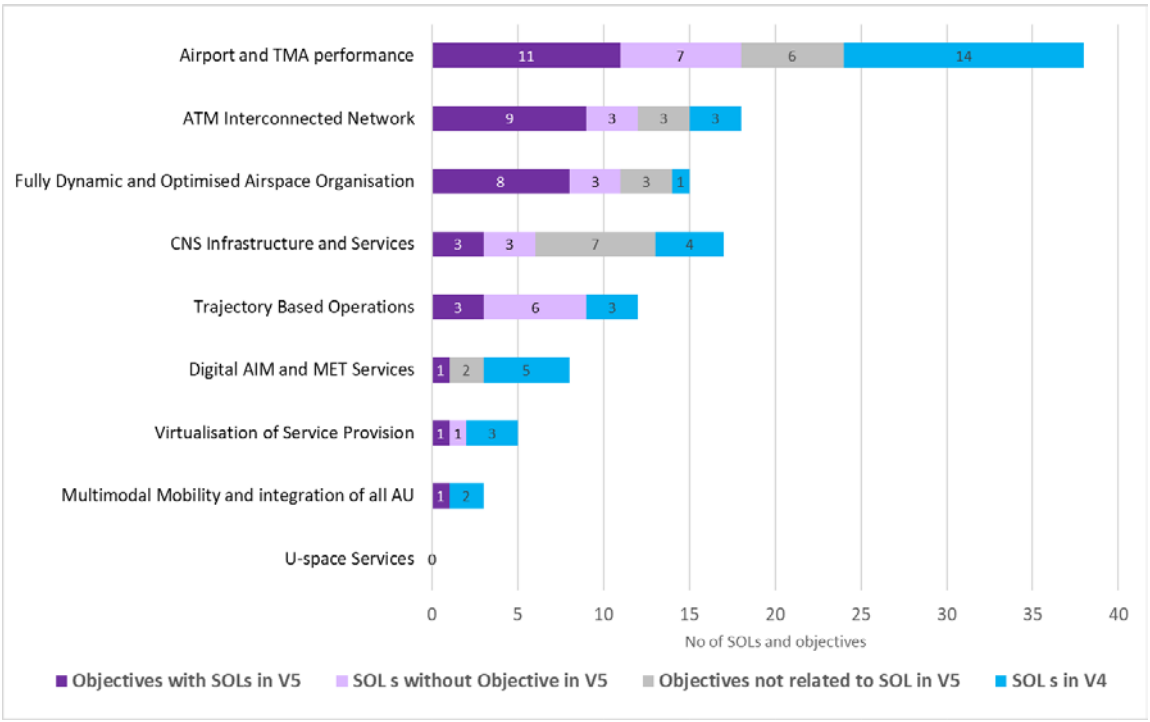


Figure 2-2 Distribution of SOLs and impl. objectives per E-OCVM phase and EOC in MPL3 Plan 2020.

In the context of implementation planning and monitoring mechanisms and tools used in support of the MPL3, there are two types of solutions in the implementation phase (V5). Those solutions that have a related implementation objective and those that do not have an implementation objective yet. The distribution of these two types of solutions and implementation objectives per EOC in MPL3 Plan 2020 is shown at Figure 2. Regardless of the type and the fact of having a related implementation objective or not, all the solutions in phase V5 are available to the stakeholders concerned for the implementation.

Focus on the stakeholders

The level of engagement of the stakeholders required to implement the solutions and objectives varies amongst the stakeholders. See Figure 3.

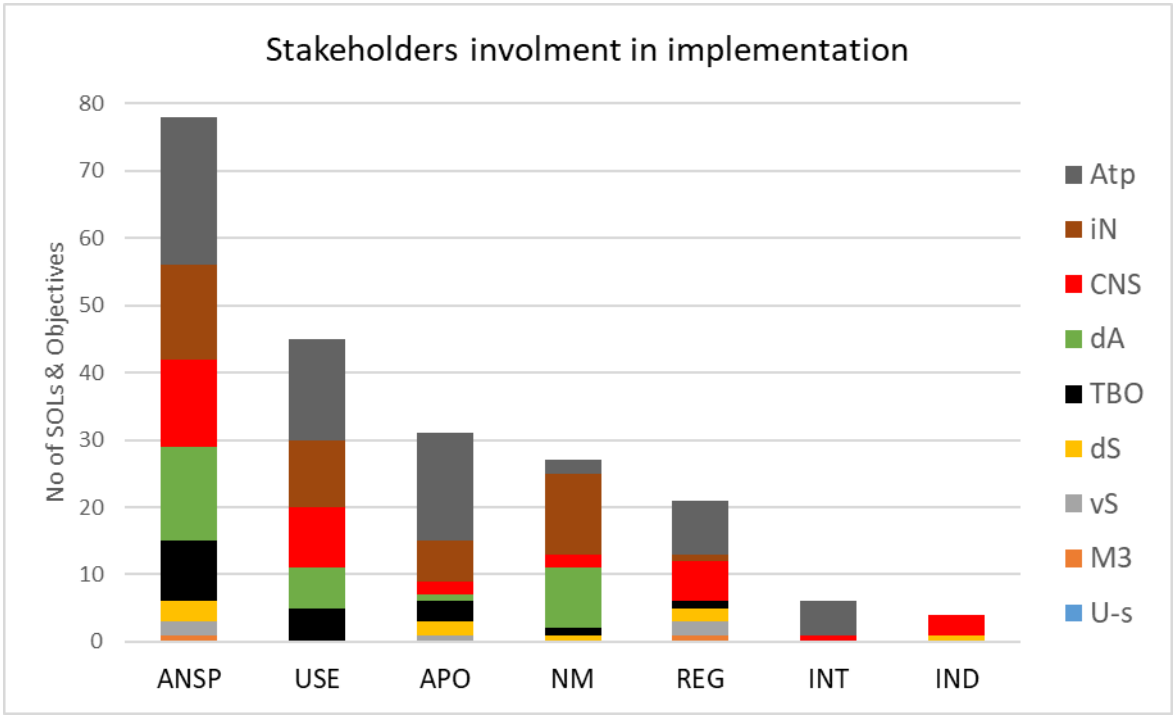


Figure 2-3 engagement of the stakeholders

The distribution of the stakeholders involved in the implementation of solutions and objectives within the EOCs is as indicated in the Figure 4.

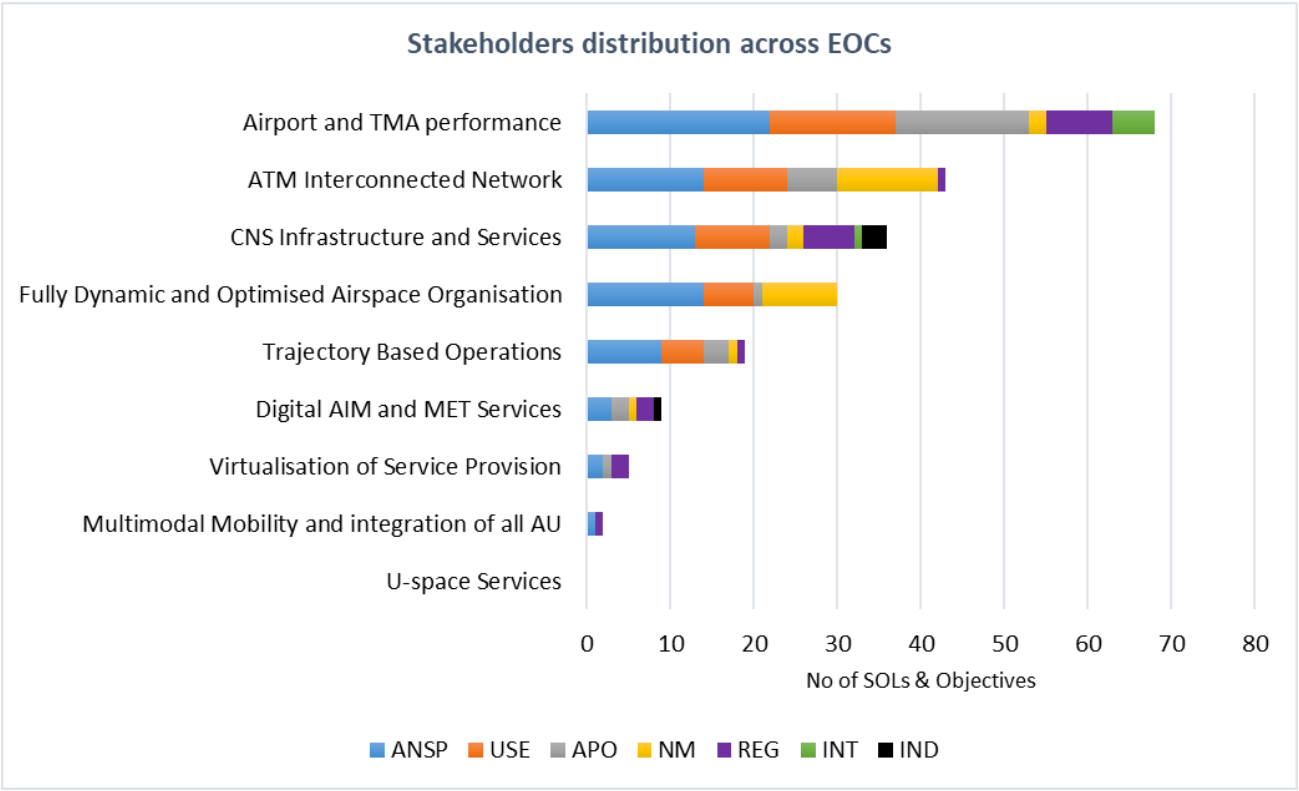


Figure 2-4 Distribution of the stakeholders within EOCs

Focus on the performance

All solutions and objectives in the Plan contribute to different KPAs, where each solution or objective may contribute to one or more KPAs. The number of solutions and objectives contributing to each KPA varies amongst KPAs, as shown in the Figure 5. In the cases where a solution has an implementation objective, only the objective is counted to avoid unnecessary double counting. This principle is applied through the document.

Performance benefits of SESAR solutions are taken from the solution data packs and other associated information on the SJU website. Performance benefits of implementation objectives not related to the SESAR solutions, originate from internal EUROCONTROL business cases and analyses.

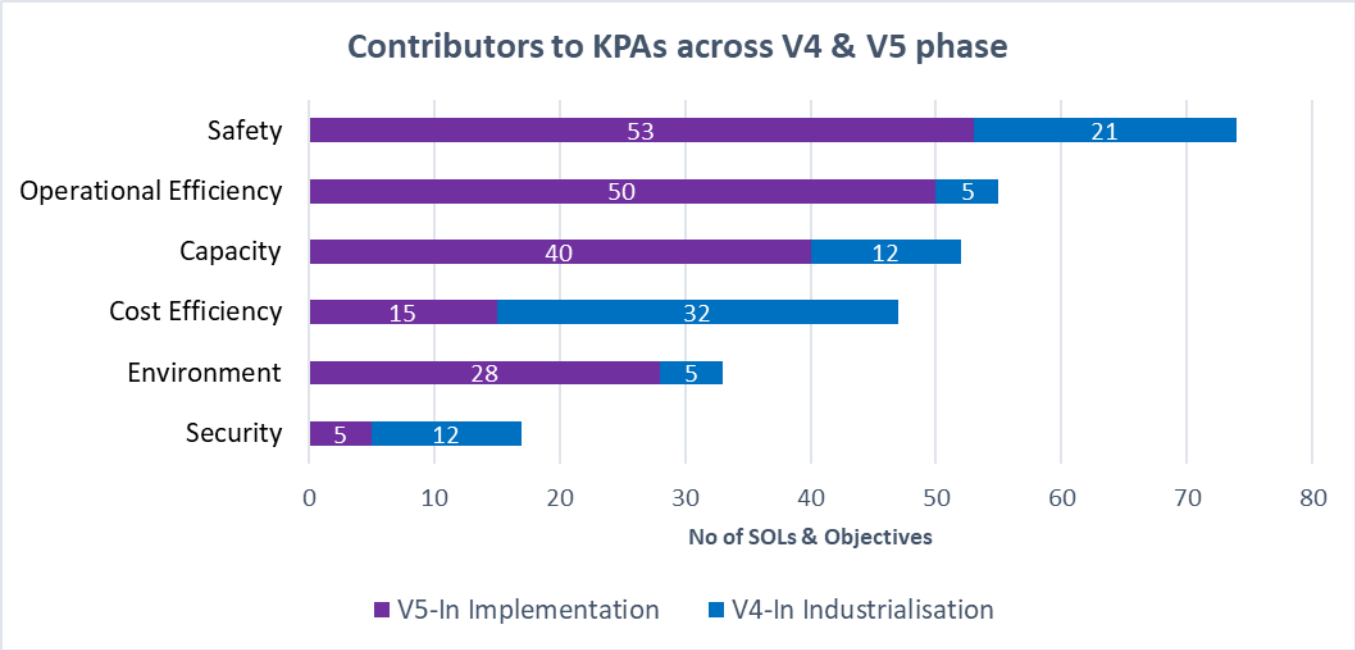


Figure 2-5 Contributors to KPAs across V4 & V5 phase

The contribution to KPAs, in implementation phase V5, is distributed amongst EOCs as shown in Figure 6. EOC "Airport and TMA Performance" is at the highest end, while EOC "U-Space" Services does not have any contribution in the L3 Plan 2020.

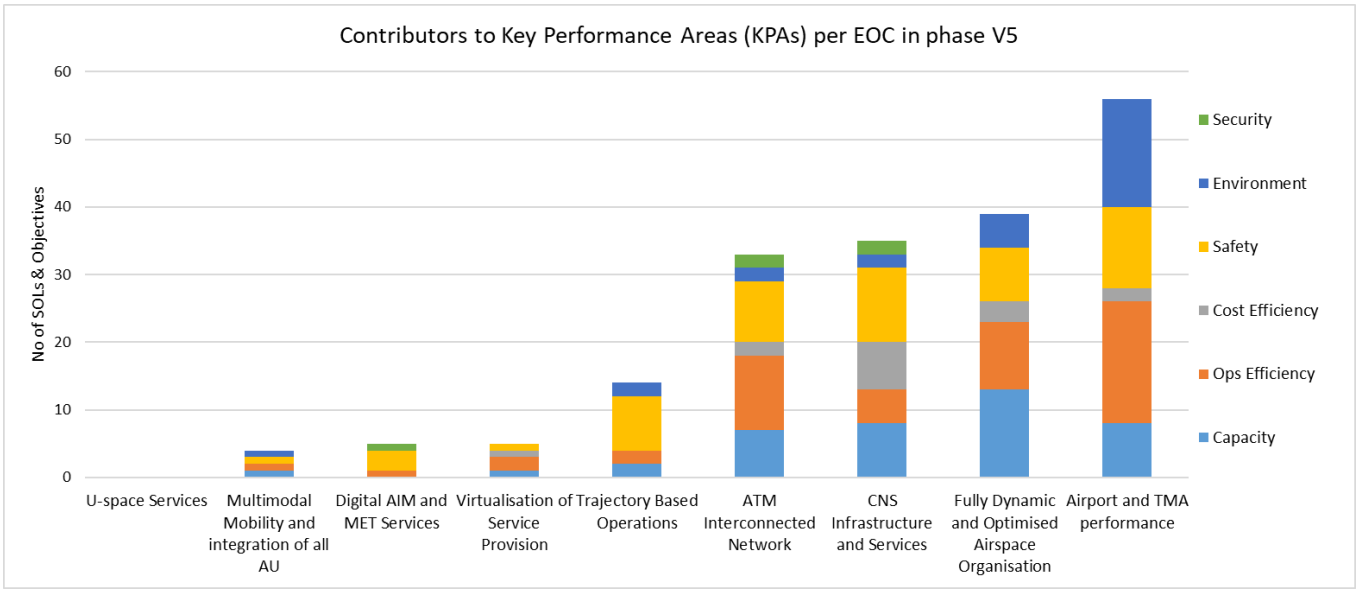


Figure 2-6 The contribution to KPAs in V5 - distribution per EOCs

The full information details about the solutions, objectives and performance contribution to KPAs, per individual EOC, are available in the following pages of this chapter.

2.1 EOC: CNS Infrastructure and services

The solutions and implementation objectives planned for implementation

V5 Deployment

SOL#	Solution name	Impl. Objective	Regulated	Committed	Local	Plan FOC date	ANSP	APO	USE	REG	NM	IND	INT	Capacity	Ops EFF	Cost EFF	Safety	Environment	Security
103	Approach Procedures with vertical guidance	NAV10	☑			25/01 2024	☑		☑	☑				☑	☑		☑	☑	
114	Composite surveillance ADS-B/WAM	ATC21 A (Initial)		☑		N/A	☑			☑						☑			☑
55	Precision approaches using GBAS Cat II/III	NAV11			☑	Open	☑		☑	☑		☑	☑	☑	☑	☑	☑	☑	
Implementation objectives not related to a solution. Originating from SESAR definition phase or support specific SES regulation.																			
Nil	Nil	ITY-ACID	☑			02/01 2020 02/01 2025	☑		☑					☑	☑		☑		
Nil	Nil	ITY-AGDL A	☑			05/02 2020	☑		☑	☑		☑		☑			☑		
Nil	Nil	ITY-AGVCS2	☑			31/12 2020	☑	☑	☑	☑	☑				☑				
Nil	Nil	ITY-SPI	☑			07/06 2020	☑		☑	☑				☑	☑		☑		
Nil	Nil	COM10		☑		31/12 2018	☑				☑	☑				☑	☑		☑
Nil	Nil	COM11.1 A		☑		01/01 2022	☑							☑		☑	☑		
Nil	Nil	COM11.2 A		☑		31/12 2023	☑							☑		☑	☑		
The solutions not subject to an implementation objective yet. They are implemented in a voluntary way without coordination at European level. Their progress is monitored through dedicated questionnaire via LSSIP process yearly.																			
102	Aeronautical mobile airport communication system AeroMACS						☑	☑	☑					☑		☑	☑		
109 A	Air traffic services (ATS) datalink using Iris Precursor (OD03)						☑		☑							☑	☑		
110	ADS-B surveillance of aircraft in flight and on the surface						☑		☑								☑		

Outlook at the solutions available for industrialisation/standardisation

V4 Industrialisation

SOL#	Solution name	Potential performance benefits	MP Vision Phase
PJ.11-A1	ACAS Xa European acceptability framework	Safety	B
PJ.14-03-04	RNP-1 reversion based on DME-DME	Cost EFF; Capacity	B
PJ.14-02-06	AeroMACs integrated with ATN, Digital Voice and Multilink	Cost EFF, Safety, Security	B
PJ.14-03-01	GBAS (for challenging environments)	Cost EFF, Environment	C
More details about these solutions can be found at https://www.sesarju.eu			

A= Indicates that the solution or implementation objective has a reference to AAS Transition Plan

Synopsis of CNS

Changes in the area of CNS will be driven by a service-based approach and a performance-based approach. This will enable the decoupling of CNS service provision from ATS and ATM data services. This change will make the European ATM system more flexible and resilient, allowing scalability. Through a service-based approach, CNS services will be specified through contractual relationships between customers and providers, with a clearly defined, European-wide set of harmonised services and level of quality. Following on from the implementation of the DLS first steps leading to CPDLC being the main means for air-ground communications, the focus will move towards further integration between airborne and ground systems with a view to accomplish full 4D information sharing. CNS rationalisation is one of the main priorities for the ATM Master Plan. Pending the availability of the comprehensive strategy, the current rationalisation is focused on developments already performed in the pre-SESAR phase, and consolidated by the PCP regulation. CNS implementation initiatives address specific shortcomings faced by the European ATM 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, VoIP, New PENS etc.).

The Essential Operational Change CNS relies on the following active implementation objectives:

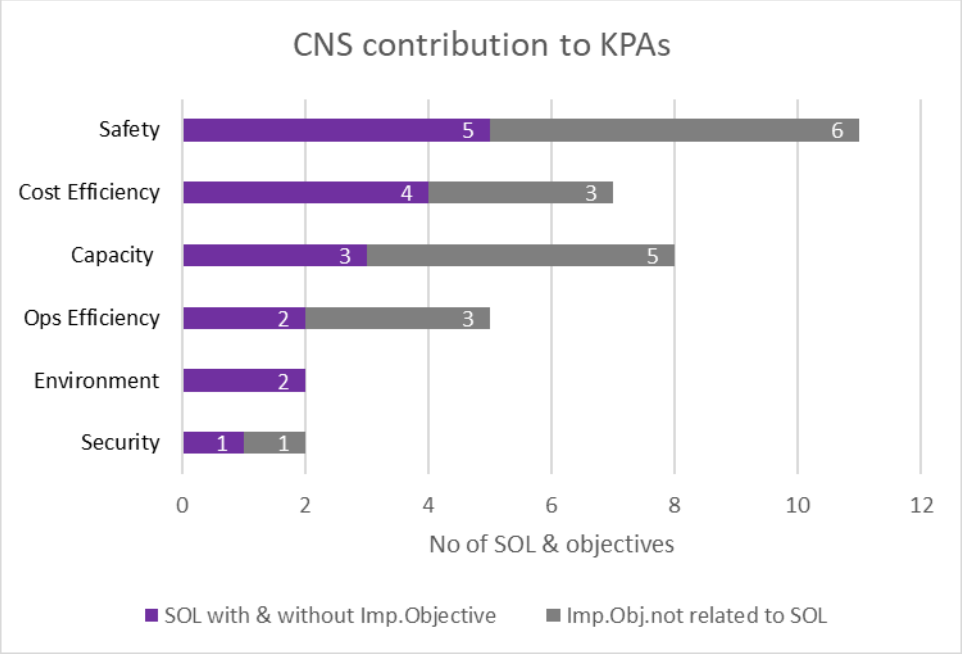
- COM10 on migration from AFTN to AMHS
- COM11.1 and COM11.2 on Voice over Internet Protocol (VoIP) in En-Route (COM11.1) and in Airport/Terminal (COM11.2) environments
- ITY-ACID on the capability of the ANSPs to establish individual aircraft identification using the downlinked aircraft identification feature, for all IFR/GAT flights
- ITY-AGDL on the deployment of initial ATC air-ground Data Link services
- ITY-AGVCS2 addressing the coordinated introduction of ground/air voice communications based on 8,33 kHz channel spacing
- ITY-SPI on the performance, interoperability spectrum protection and safety requirements for surveillance
- NAV10 addressing APV procedures

Four SESAR Solutions that are in implementation belong to this EOC, without being yet subject to an implementation objective:

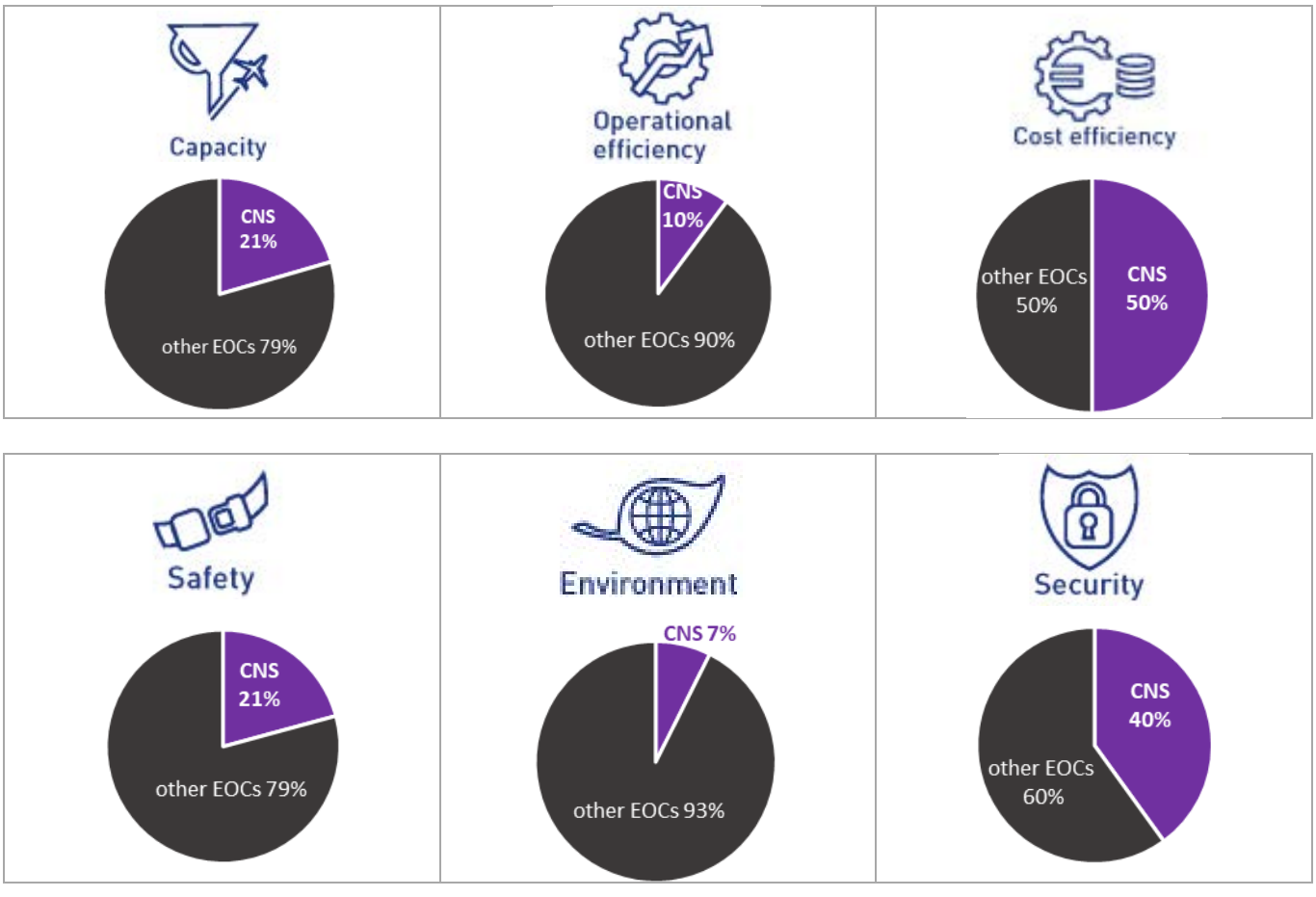
- #102 Aeronautical mobile airport communication system (AeroMACS),
- #Air traffic services (ATS) datalink using Iris Precursor,
- #110 ADS-B surveillance of aircraft in flight and on the surface

Focus on the performance contribution of CNS in deployment phase

The information on the bar chart shows a total number of the CNS contributors to each KPA. The numbers differentiate between the CNS solutions with/without an implementation objective and the implementation objectives not associated to any of the solution.



The information on the pie charts shows aggregated contribution per KPA. It compares a total number of CNS contributors (SOLs with and without implementation objectives, as well as the objectives not related to SOL) against the total number of the contributors from all other EOCs for the same KPA.



2.2 EOC: ATM Interconnected Network

The solutions and implementation objectives planned for implementation

V5 Deployment

SOL#	Solution name	Impl. Objective	Regulated	Committed	Local	Plan FOC date	ANSP	APO	USE	REG	NM	INT	Capacity	Ops EFF	Cost EFF	Safety	Environment	Security
21	AOP and AOP-NOP seamless integration	AOP11	☑			01/01 2021	☑	☑	☑				☑	☑			☑	
17	Advanced short-term ATFCM measure STAM	FCM04.2 A	☑			01/01 2022	☑		☑		☑		☑	☑		☑		
20, 21*	Collaborative NOP for step 1	FCM05 A	☑			01/01 2022	☑	☑	☑		☑		☑		☑	☑		
19	Auto. support for tfc. complexity detection and resolution	FCM06 A	☑			01/01 2022	☑				☑			☑		☑		
18	CTOT and TTA	FCM07 A	☑			01/01 2022	☑	☑	☑		☑		☑	☑				
35	MET information exchange	INF08.1 A	☑			01/01 2025	☑	☑	☑		☑			☑		☑		
46	SWIM yellow profile																	
56	Enhanced ATFM slot swapping	FCM09		☑		31/12 2021			☑		☑		☑	☑				
28 46*	Initial ground-ground interoperability	INF08.2 A	☑			01/01 2027	☑				☑							
61	CWP airport - low cost simple DEP entry panel	AOP17			☑	Open	☑				☑		☑	☑		☑		
Implementation objectives not related to a solution. Originating from SESAR definition phase or support specific SES regulation																		
Nil	Nil	AOM13.1		☑		31/12 2018	☑			☑				☑		☑		☑
Nil	Nil	COM12		☑		01/01 2025	☑	☑	☑		☑				☑			☑
Nil	Nil	FCM03 A		☑		01/01 2022	☑				☑		☑	☑		☑		
The solutions not subject to an implementation objective yet. They are implemented in a voluntary way without coordination at European level. Their progress is monitored through dedicated questionnaire via LSSIP process yearly.																		
57	User-driven prioritisation process (UDPP) – departure						☑	☑	☑		☑						☑	
67	AOC data increasing trajectory prediction accuracy						☑		☑					☑		☑		
37	Extended flight plan						☑		☑		☑			☑		☑		

Outlook at the solutions available for industrialisation/standardisation

V4 Industrialisation

SOL#	Solution name	Potential performance benefits	MP Vision Phase
PJ.09-03	Collaborative network management functions	Cost EFF; Ops EFF, Safety, Environment	B
PJ.15-01	Sub-regional demand capacity balancing service	Cost EFF	C
PJ.17-01	SWIM TI purple profile for A/G advisory information sharing	Cost EFF; Safety, Security	B
More details about these solutions can be found at https://www.sesarju.eu/			

A= Indicates that the solution or implementation objective has a reference to AAS Transition Plan

Synopsis of iN

The ATM collaborative network enables all relevant stakeholders to participate in collaborative decision-making processes in a transparent framework, and to negotiate their preferences and reach agreements that benefit not only one but all of the stakeholders involved, thus contributing to the performance of the entire network. One of the aims of this EOC is to pave the way from local-centric operations, planning and decision making to the SESAR target concept of flight and flow-centric operations. Furthermore, User-driven prioritisation process (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. By addressing UDPP-Departure ATFCM would evolve to facilitate the planning and departure sequencing through advanced airport operations (advanced collaborative decision-making and demand capacity balancing). The Network Operations Plan (NOP) integration with Airport Operations Plans (AOP) and further work on the 'Rolling/Dynamic Network Plan' will enable EUROCONTROL NM to further develop 'Common Network Awareness' and 'Collaborative Network Planning'. 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. The further integration of airports into the ATM Network planning function, via the 'AOP-NOP Seamless Integration' by fully integrating those landside processes within the terminal infrastructure that have a performance impact on flight predictability and efficiency with the ATM Network is important. Also integrating small/regional airports not implementing A-CDM or AOP by sharing of departure planning information with NM plays very important role in Network awareness and predictability. 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'.

The Essential Operational Change iN relies on the following implementation objectives:

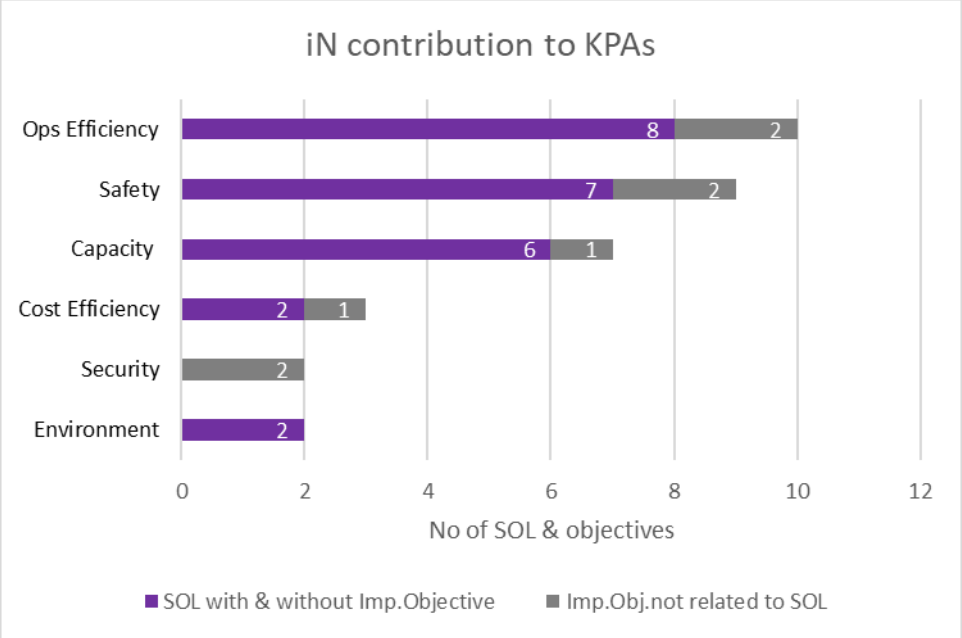
- AOM13.1 on Harmonisation of OAT and GAT handling
- AOP11 on Initial Airport Operations Plan
- AOP17 on the Provision/Integration of departure planning information to NMOC
- COM12 addressing NewPENS
- FCM03 on Collaborative Flight Planning
- FCM04.2 on STAM Phase 2
- FCM05 addressing the Interactive rolling NOP
- FCM06 on Traffic Complexity Assessment
- FCM07 on Calculated Take-Off Time (CTOT) to Target Times for ATFCM purposes
- FCM08 on Extended Flight Plan
- FCM09 addressing the Enhanced ATFM Slot swapping
- INF08.1 on Information exchanged using the SWIM yellow TI profile
- INF08.2 on Initial SWIM – Blue TI Profile

Two SESAR Solutions that are in implementation belong to this EOC, without being yet subject to an implementation objective:

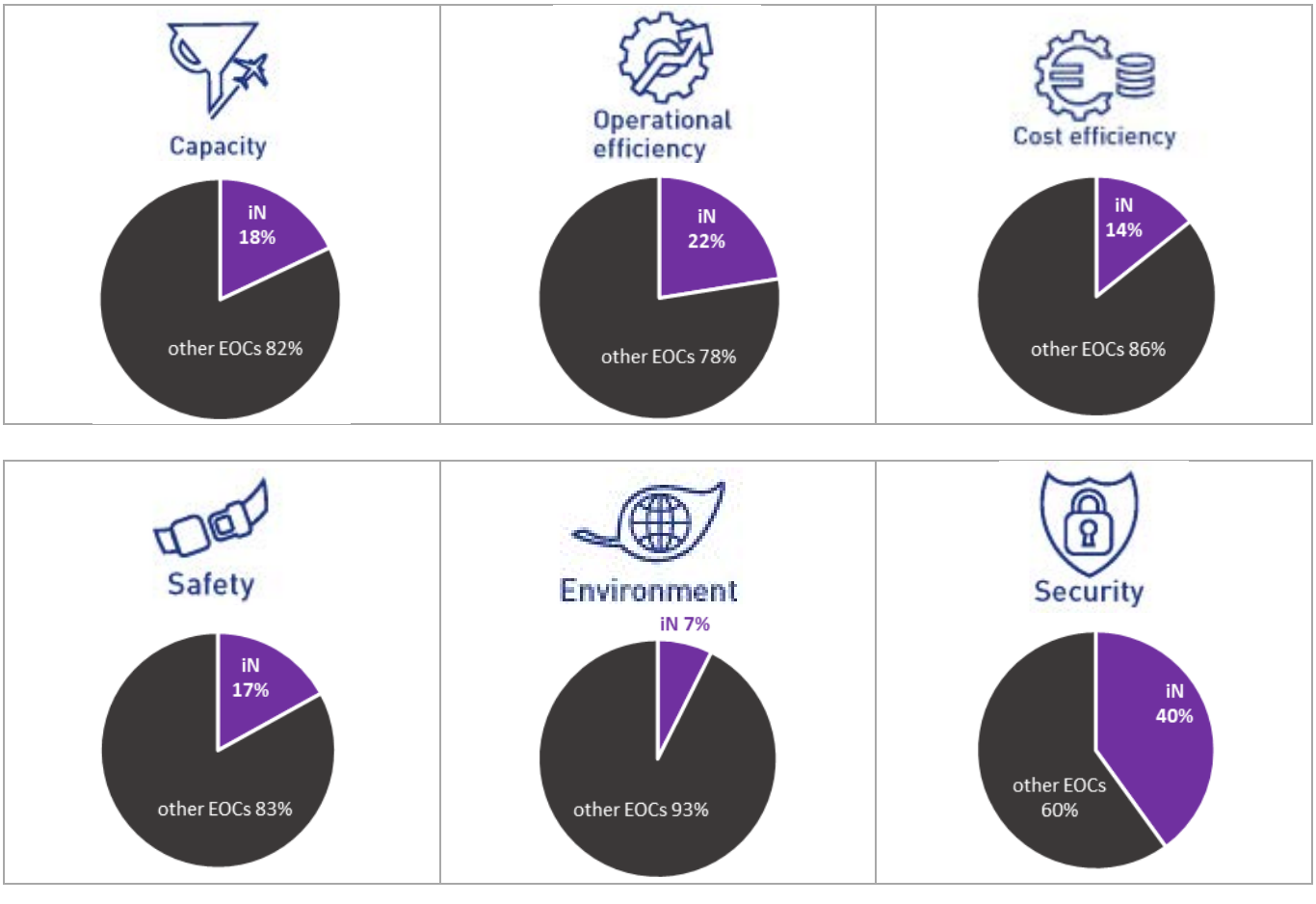
- #57 on User-driven prioritisation process (UDPP) – departure and
- #67 on AOC data increasing trajectory prediction accuracy.

Focus on the performance contribution of iN in deployment phase

The information on the bar chart shows a total number of the iN contributors to each KPA. The numbers differentiate between the iN solutions with/without an implementation objective and the implementation objectives not associated to any of the solution.



The information on the pie charts shows aggregated contribution per KPA. It compares a total number of iN contributors (SOLs with and without implementation objectives, as well as the objectives not related to SOL) against the total number of the contributors from all other EOCs for the same KPA.



2.3 EOC: Digital AIM and MET Services

The solutions and implementation objectives planned for implementation

V5 Deployment

SOL#	Solution name	Impl. Objective	Regulated	Committed	Local	Plan FOC date	ANSP	APO	IND	REG	NM	INT	Capacity	Ops EFF	Cost EFF	Safety	Environment	Security
34	Digital integrated briefing	INF09			☑	Open	☑				☑	☑		☑		☑		
Implementation objectives not related to a solution. Originating from SESAR definition phase or support specific SES regulation.																		
Nil	Approach Procedures with vertical guidance	ITY-ADQ	☑			30/06 2017	☑	☑	☑	☑						☑		☑
Nil	Nil	INF07		☑		01/01 2019	☑	☑		☑						☑		

Outlook at the solutions available for industrialisation/standardisation

V4 Industrialisation

SOL#	Solution name	Potential performance benefits	MP Vision Phase
PJ.15-10	Static aeronautical data service	Cost EFF, Security	B
PJ.15-11	Aeronautical digital map service	Cost EFF; Security	B
PJ.18-04a-01	Aeronautical Dataset service	Cost EFF; Security	B
PJ.18-04b-01	GWMS enhanced capability coupled with Glide Wind Profile capability and METF or TAM service	Cost EFF; Security	B
PJ.18-04b-02	Cb-global capability and service	Cost EFF; Security	B
More details about these solutions can be found at https://www.sesarju.eu			

Synopsis of dS

The digitalisation of AIM and MET services will enable the implementation of services to provide static and dynamic aeronautical and meteorological information in digital form, useable by ATM systems and human operators. The output is a SWIM compliant dynamic data set, subsets of which can be retrieved by individual requests for specific geographical areas, attributes or functional features. These services will also allow the on-board acquisition, processing and distribution of AIM, MET and other operational information, including the interpretation and representation of this information within the aircraft.

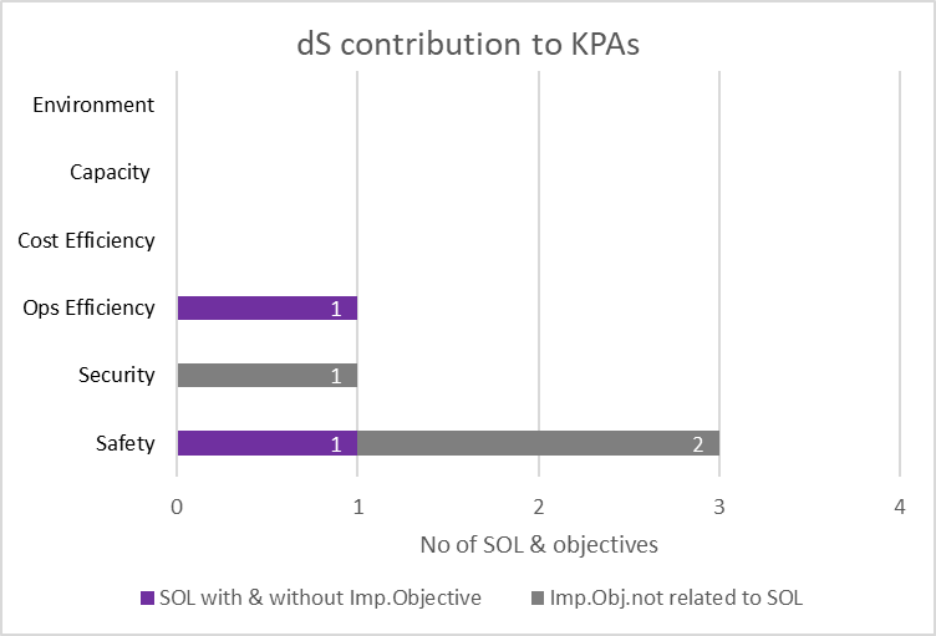
The Essential Operational Change dS relies on the following implementation objectives:

- INF07 on Electronic Terrain and Obstacle Data (e-TOD)
- ITY-ADQ on the Quality of Aeronautical Data and Aeronautical Information
- INF09 on Digital integrated briefing

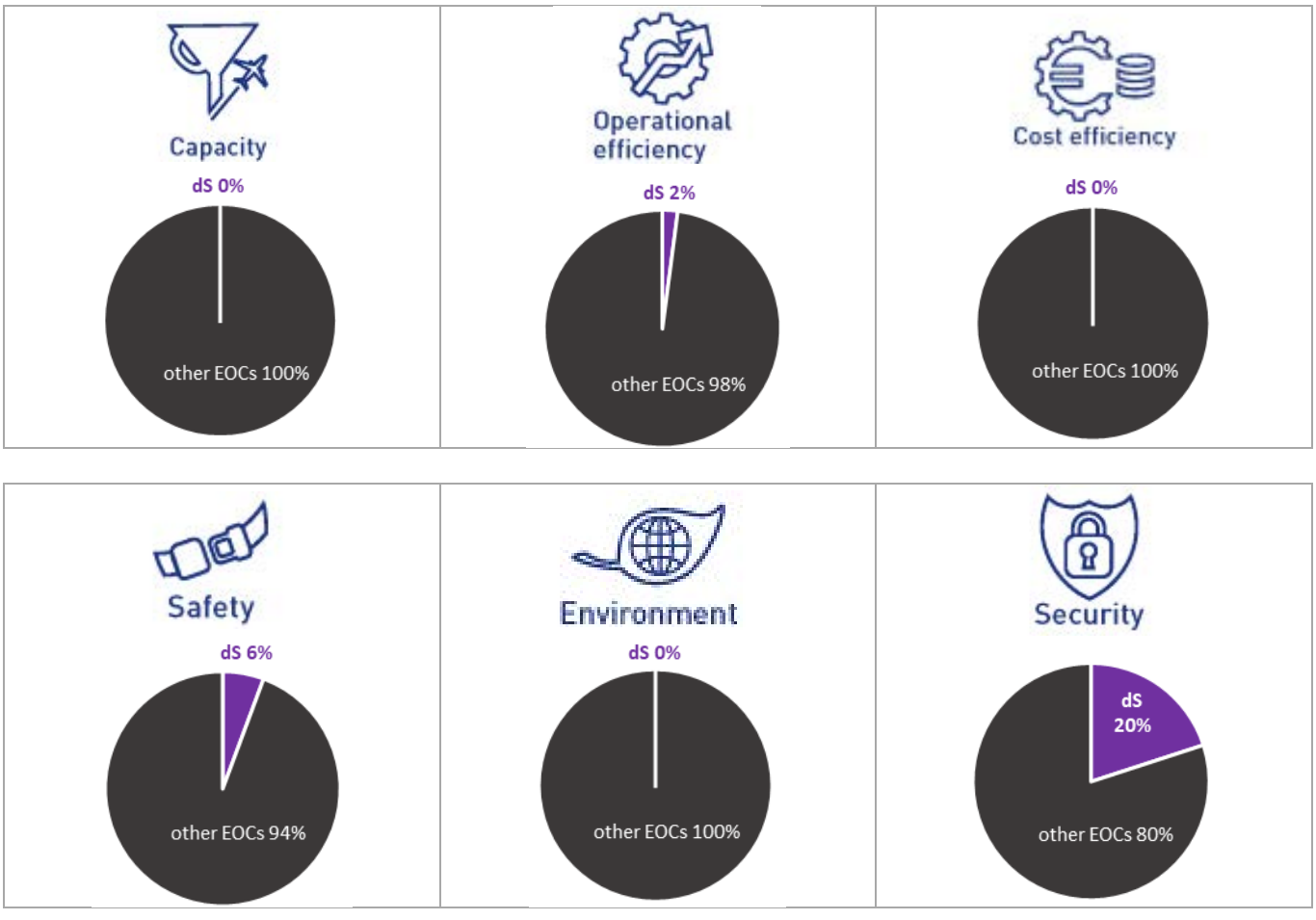
Within this EOC, there are no mature SESAR 1 Solutions not being yet subject to Implementation Objectives.

Focus on the performance contribution of dS in deployment phase

The information on the bar chart shows a total number of the dS contributors to each KPA. The numbers differentiate between the dS solutions with/without an implementation objective and the implementation objectives not associated to any of the solution.



The information on the pie charts shows aggregated contribution per KPA. It compares a total number of dS contributors (SOLs with and without implementation objectives, as well as the objectives not related to SOL) against the total number of the contributors from all other EOCs for the same KPA.



2.4 EOC: U-space Services

The solutions and implementation objectives planned for implementation

V5 Deployment

There are no U-Space Services related solutions or implementation objectives in the MPL3 Plan 2020 yet.

Outlook at the solutions available for industrialisation/standardisation

V4 Industrialisation

SOL#	Solution name	Potential performance benefits	MP Vision Phase
There are no U-Space Services solutions available yet.		-	-

2.5 EOC: Virtualisation of Service Provision

The solutions and implementation objectives planned for implementation

V5 Deployment

SOL#	Solution name	Impl. Objective	Regulated	Committed	Local	Plan FOC date	ANSP	APO	USE	REG	NM	INT	Capacity	Ops EFF	Cost EFF	Safety	Environment	Security
12	Single remote TWR operations for medium traffic volumes	AOP14			☑	Open	☑	☑		☑				☑	☑			
13	Remotely provided TWR services for contingency at aerodromes																	
52	Remote TWR for two low density aerodromes																	
71	ATC and AFIS in a single low density aerodrome from a remote CWP																	
The solutions not subject to an implementation objective yet. They are implemented in a voluntary way without coordination at European level. Their progress is monitored through dedicated questionnaire via LSSIP process yearly.																		
PJ.16-03	Enabling rationalisation of infrastructure using virtual centre based technology	OD-05 A			☑		☑			☑					☑			☑

Outlook at the solutions available for industrialisation/standardisation

V4 Industrialisation

SOL#	Solution name	Potential performance benefits	MP Vision Phase
PJ.05-02	Multiple remote tower module	Cost EFF, Safety	B
PJ.16-03	Enabling rationalisation of infrastructure using virtual centre based technology	Cost EFF, Security	C
PJ.16-04-01	Workstation, Controller productivity	Cost EFF, Ops EFF, Security	C
More details about these solutions can be found at https://www.sesarju.eu			

A= Indicates that the solution or implementation objective has a reference to AAS Transition Plan

Synopsis of vS

The ability to provide ATS from a remote location is relevant in all operating environments: airport, TMA or en route. In TMA and en-route environments, the virtual-centre concept allows a geographical sector to be managed from any place subject to the availability of some services crucial for the provision of ATS, namely CNS, MET, AIS and all data related to the flight plan. In airport environments, the remote TWR concept supports several use cases that allow the provision of ATS from a remote TWR centre (RTC), with a dynamic allocation of a number of physical aerodromes to remote TWR modules. It offers new alternatives for the provision of TWR ATS and in some cases reduces ANS costs. The integration of APP services to these airports through a remote virtual centre is also possible.

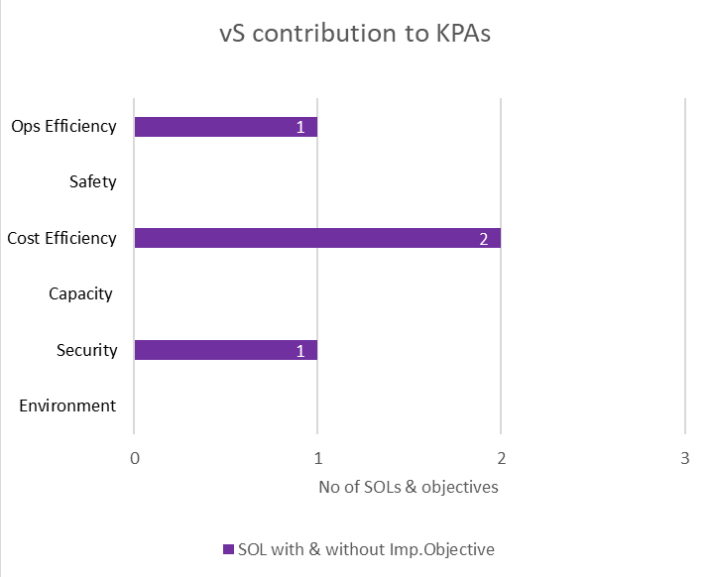
For the time being, the Essential Operational Change vS relies on only one Objectives addressing the provision of remote Tower services, grouping 4 SESAR Solutions:

- AOP14 on Remote Tower Services

Within this EOC, there is one Solution #PJ.16-03 on rationalisation of infrastructure using virtual centre, which has an Outline Description (OD), it does not have an implementation objective yet.

Focus on the performance contribution of vS in deployment phase

The information on the bar chart shows a total number of the vS contributors to each KPA. The numbers differentiate between the vS solutions with/without an implementation objective and the implementation objectives not associated to any of the solution.



The information on the pie charts shows aggregated contribution per KPA. It compares a total number of vS contributors (SOLs with and without implementation objectives, as well as the objectives not related to SOL) against the total number of the contributors from all other EOCs for the same KPA.

2.6 EOC: Airport and TMA performance

The solutions and implementation objectives planned for implementation

V5 Deployment

SOL#	Solution name	Impl. Obj.	Regulated	Committed	Local	Plan FOC date	ANSP	APO	USE	REG	NM	INT	Capacity	Ops EFF	Cost EFF	Safety	Environment	Security
106	DMAN baseline for integrated AMAN-DMAN	AOP05	☑			01/01 2021	☑	☑	☑		☑		☑	☑	☑		☑	
64	Time-based separation	AOP10	☑			01/01 2024	☑		☑	☑			☑			☑	☑	
02	Airport SNET for ATCO – MONA and CDT for ATC clearances	AOP12	☑			01/01 2021	☑	☑	☑							☑		
22	Auto. Assist. to ATCO for surface movement planning and routing	AOP13	☑			01/01 2024	☑			☑			☑	☑		☑	☑	
53	Pre-DEP sequencing supported by route planning																	
62	P-RNAV in a complex TMA	NAV03.1	☑			06/06 2030	☑		☑	☑				☑		☑	☑	
09	Enhanced TMA ops with auto RNP transit. to ILS	NAV03.2	☑			25/01 2024 06/06 2030	☑		☑	☑				☑		☑	☑	
51	Enhanced TMA ops with LVP procedures																	
70	Enhanced ground ATCO situation awareness in AWO	AOP04.1		☑		01/01 2021	☑	☑	☑	☑			☑	☑		☑	☑	
04	Enhanced situational awareness and APO SNET for vehicle drivers	AOP15			☑	Open		☑		☑						☑		
47	Guidance assistance through AGL	AOP16			☑	Open	☑	☑	☑			☑	☑	☑	☑	☑		
01	Runway status lights	AOP18			☑	Open	☑	☑	☑	☑		☑				☑		
54	Flow-based integration of AMAN and DMAN	ATC19			☑	Open	☑					☑		☑			☑	
Implementation objectives not related to a solution. Originating from SESAR definition phase or support specific SES regulation.																		
Nil	Nil	AOP04.2		☑		01/01 2021	☑	☑						☑		☑		
Nil	Nil	ATC07.1		☑		01/01 2020	☑						☑	☑			☑	
Nil	Nil	ENV01		☑		31/12 2023	☑	☑	☑					☑			☑	
Nil	Nil	SAF11		☑		31/01 2018	☑	☑	☑	☑	☑					☑		
Nil	Nil	ENV02			☑	Open	☑	☑	☑			☑		☑			☑	
Nil	Nil	ENV03			☑	Open	☑	☑	☑					☑			☑	
The solutions not subject to an implementation objective yet. They are implemented in a voluntary way without coordination at European level. Their progress is monitored through dedicated questionnaire via LSSIP process yearly.																		
11	Continuous descent operations (CDO) using point merge						☑	☑	☑					☑			☑	
23	D-TAXI service for controller-pilot datalink communications (CPDLC) application							☑						☑			☑	
48	Virtual block control in low visibility procedures (LVPs)						☑	☑	☑					☑		☑	☑	
107	Point merge in complex terminal airspace						☑						☑	☑		☑	☑	

108	Arrival Management (AMAN) and Point Merge	☑						☑	☑		☑	☑	
116	De-icing management tool	☑	☑						☑				
117	Reduce LVC landing minima using enhanced flight vision systems (EFVS)	☑	☑	☑			☑				☑		

Outlook at the solutions available for industrialisation/standardisation

V4 Industrialisation

SOL#	Solution name	Potential performance benefits	MP Vision Phase
PJ.02-01-01	Optimised Runway Delivery on Final Approach	Cost EFF; Capacity; Safety	B
PJ.02-01-02	Optimised Separation Delivery for Departure	Cost EFF; Capacity; Safety	B
PJ.02-01-03	Weather-Dependent Reductions of WTS for Departures	Cost EFF; Capacity; Safety	B
PJ.02-01-04	WTS (for Arrivals) based on Static Aircraft Characteristics	Cost EFF; Capacity; Safety	B
PJ.02-01-05	Weather-Dependent Reductions of WTS for Final Approach	Cost EFF; Capacity; Safety	B
PJ.02-01-06	WTS (for Departures) based on Static Aircraft Characteristics	Cost EFF; Capacity; Safety	B
PJ.02-01-07	Reduction of Wake Turbulence Risk considering Acceleration of Wake Vortex Decay in Ground Proximity	Cost EFF; Capacity; Safety	B
PJ.02-03	Minimum-pair separations based on RSP	Cost EFF; Capacity; Safety	B
PJ.02-08-01	Trajectory based Integrated Runway Sequence	Cost EFF; Safety; Security	B
PJ.02-08-02	Runway Manager	Cost EFF; Capacity; Safety	B
PJ.02-08-03	Increased Runway Throughput based on local ROCAT	Cost EFF; Capacity; Safety	B
PJ.03a-04	Enhanced visual operations	Cost EFF; Capacity; Safety	B
PJ.03b-05	Traffic alerts for pilots for airport operations	Safety; Security	B
PJ.15-02	E-AMAN service	Cost EFF	C
More details about these solutions can be found at https://www.sesarju.eu			

Synopsis of ATp

This EOC covers both changes to operations at airports and in TMA airspace that allow maintenance of operational capacity under limiting conditions and changes that allow an increase in operational capacity during normal operations. This includes improvements to the planning and execution of operations at and around airports, such as traffic sequencing, reduced separation, reduced and more predictable runway occupancy time, and enhanced management of taxiway throughput, for both arrivals and departures. ATp also addresses the required coordination with TMA operations when aircraft sequencing for the runway begins, and, in addition, with extended arrival management in en-route airspace. It also includes solutions that increase the safety of operations and seeks to reduce environmental impact at or near airports. Enhanced navigation and greater accuracy in LVP on the airport surface need to be made possible.

The Essential Operational Change relies on the following implementation objectives:

- AOP04.1 on A-SMGCS Surveillance
- AOP04.2 on A-SMGCS RMCA
- AOP05 on Airport CDM
- AOP10 addressing Time Based Separation
- AOP12 on the Improvement of Runway safety with CATC and CMAC
- AOP13 on Automated assistance to controller for surface movement planning and routing
- AOP15 on Safety Nets for vehicle drivers
- AOP16 addressing the Guidance assistance through airfield ground lightning
- AOP18 on Runway Status Lights
- ATC07.1 on AMAN tools and procedures
- ATC19 on Enhanced AMAN-DMAN integration
- ENV01 addressing Continuous Descent Operations (CDO
- ENV02 on Airport Collaborative Environmental Management
- ENV03 addressing Continuous Climb Operations (CCO)
- NAV03.1 on RNAV1 in TMA Operations

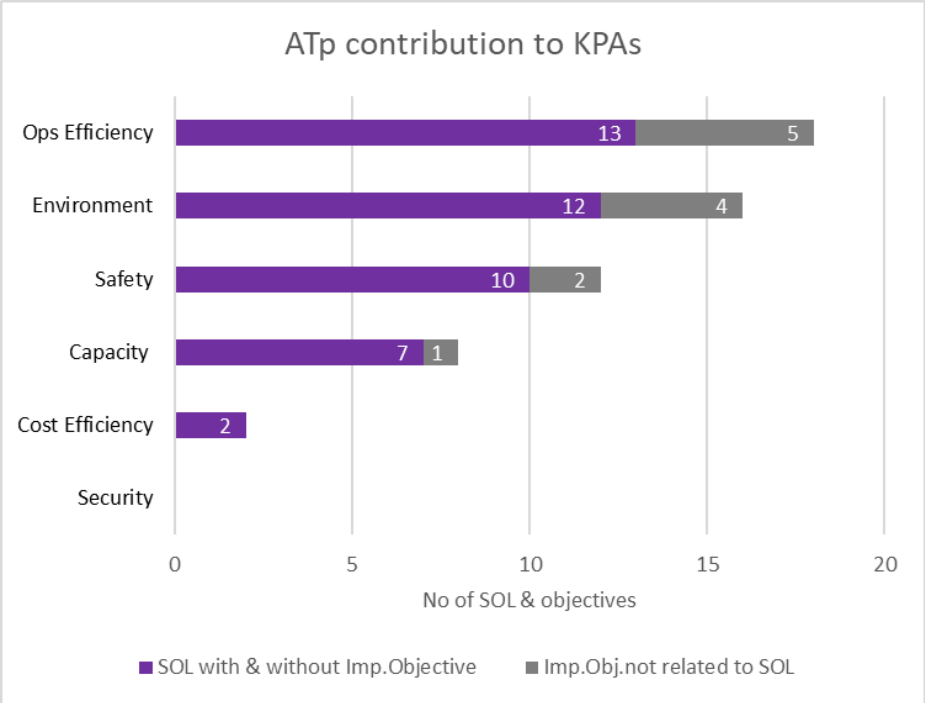
- NAV03.2 on RNP1 in TMA Operations
- SAF11 addressing the Prevention of Runway Excursion

Seven SESAR Solutions that are in implementation belong to this EOC, without being yet subject to an implementation objective:

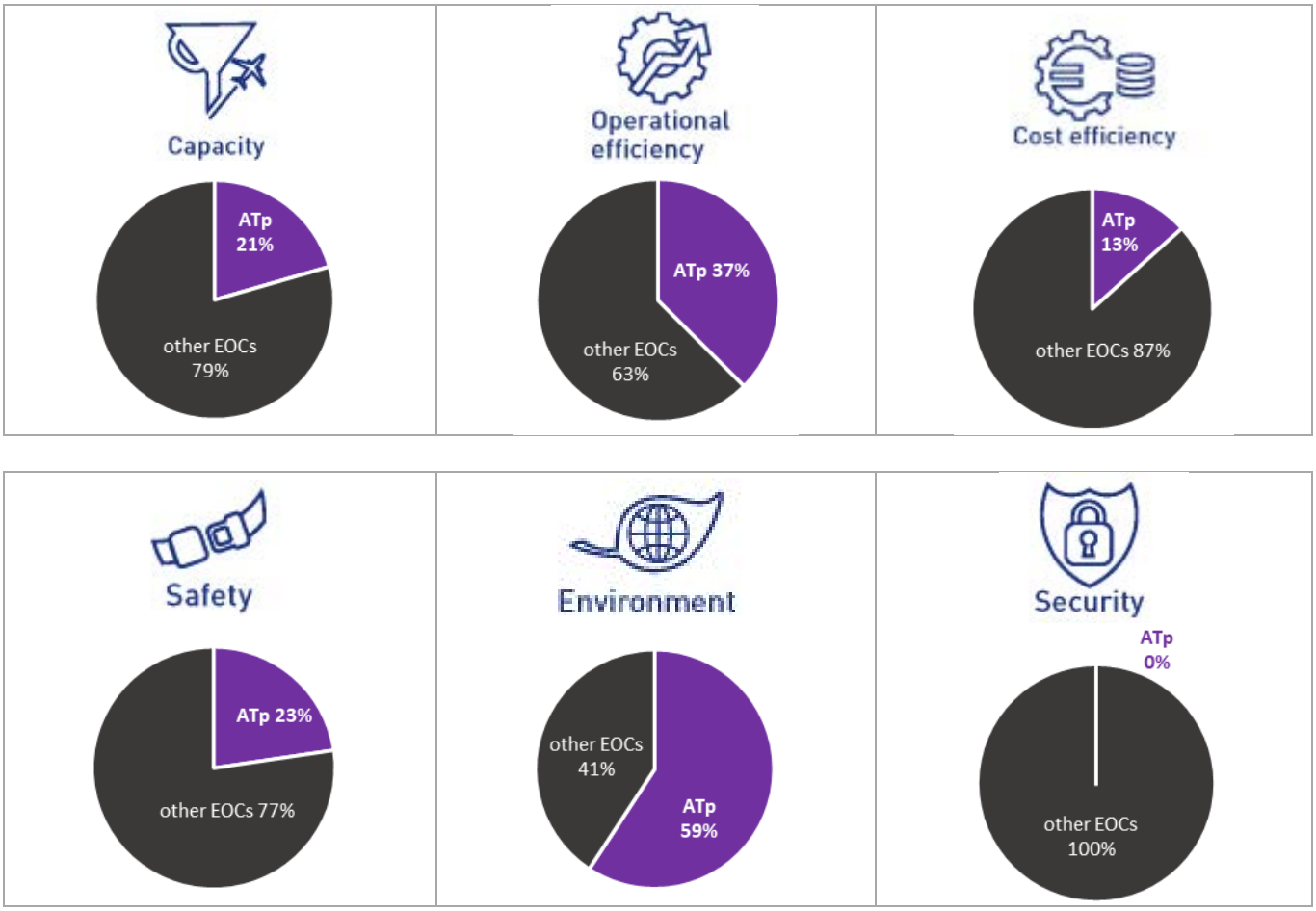
- #23 on D-TAXI service for controller-pilot datalink communications (CPDLC) application,
- #48 on Virtual block control in low visibility procedures (LVPs),
- #116 on De-icing management tool,
- #117 on Reducing Landing Minima in LVC using Enhanced Flight Vision Systems (EFVS),
- #11 on Continuous descent operations (CDO) using point merge,
- #107 on Point merge in complex terminal airspace and
- #108 on Arrival Management (AMAN) and Point Merge).

Focus on the performance contribution of ATp in deployment phase

The information on the bar chart shows a total number of the ATp contributors to each KPA. The numbers differentiate between the ATp solutions with/without an implementation objective and the implementation objectives not associated to any of the solution.



The information on the pie charts shows aggregated contribution per KPA. It compares a total number of ATp contributors (SOLs with and without implementation objectives, as well as the objectives not related to SOL) against the total number of the contributors from all other EOCs for the same KPA.



2.7 EOC: Fully Dynamic and Optimised Airspace Organisation

The solutions and implementation objectives planned for implementation

V5 Deployment

SOL#	Solution name	Impl. Objective	Regulated	Committed	Local	Plan FOC date	ANSP	APO	USE	REG	NM	INT	Capacity	Ops EFF	Cost EFF	Safety	Environment	Security
31	Variable profile military reserved areas and enhanced (further automated) civil-military collaboration	AOM19.1 A	✓			01/01 2022	✓				✓		✓	✓		✓		
		AOM19.2 A	✓			01/01 2022	✓		✓		✓		✓	✓		✓		
		AOM19.3 A	✓			01/01 2022	✓		✓		✓		✓	✓		✓		
		AOM19.4	✓			01/01 2022	✓				✓		✓	✓				
33	FRA for flights in cruise and vertically evolving above a specified FL	AOM21.2 A	✓			01/01 2022	✓		✓		✓		✓	✓		✓	✓	
66	Automated support for dynamic sectorisation																	
104	Sector team operations en-route air traffic organiser	ATC12.1 A	✓			01/01 2022	✓						✓			✓		
27	MTCD and MONA tools																	
05	Extended AMAN horizon	ATC15.2 A	✓			01/01 2024	✓				✓		✓	✓			✓	
63	Multi-sector planning	ATC18 A			✓	Open	✓						✓		✓			
Implementation objectives not related to a solution. Originating from SESAR definition phase or support specific SES regulation.																		
Nil	Nil	ITY-FMTP A	✓			31/12 2014	✓								✓			
Nil	Nil	ATC15.1		✓		31/12 2019	✓						✓	✓			✓	
Nil	Nil	ATC17 A		✓		01/01 2022	✓						✓	✓		✓		
The solutions not subject to an implementation objective yet. They are implemented in a voluntary way without coordination at European level. Their progress is monitored through dedicated questionnaire via LSSIP process yearly.																		
PJ.06-01	FRA in high and very high complexity environments	OD-02 A			✓	Open	✓		✓		✓		✓	✓		✓	✓	
10	Optimised route network advanced RNP						✓		✓		✓		✓			✓	✓	
118	Basic EAP						✓	✓	✓		✓		✓	✓	✓			

Outlook at the solutions available for industrialisation/standardisation

V4 Industrialisation

SOL#	Solution name	Potential performance benefits	MP Vision Phase
PJ.10-01a	High-productivity controller team organisation	Cost EFF, Safety	B
More details about these solutions can be found at https://www.sesarju.eu			

A= Indicates that the solution or implementation objective has a reference to AAS Transition Plan

Synopsis of dA

This EOC includes further steps towards TBO by enhancing free-route airspace (FRA) processes and system support. It will need to cover large-scale cross-border FRA. There is a need to ensure a smooth transition between FRA and highly structured airspace based on dynamic airspace configuration (DAC) principles. There is also a need for more dynamic, accurate and precise information on constraints, to allow the extension of FRA and the accommodation of different business trajectories. Extended AMAN horizon of up to 200 nautical miles from the arrival airport, increases predictability and resilience at an airport. The change in ATCO team organisation at ATCU by multi-sector planner (MSP) providing support to several tactical controllers operating in different adjacent sectors is expected to improve cost efficiency. The adoption of modular airspace reservations (ARES) using the variable profile area (VPA) design principles, 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.

The Essential Operational Change dA relies on the following implementation objectives:

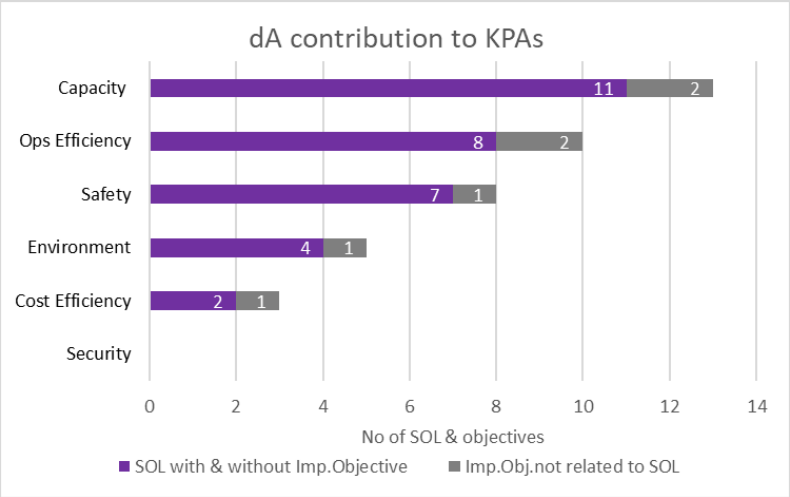
- AOM19.1 on ASM tools to support A-FUA
- AOM19.2 on ASM management of real-time airspace data
- AOM19.3 addressing a Full rolling ASM/ATFCM process and ASM information sharing
- AOM19.4 on Pre-defined airspace configurations
- AOM21.2 addressing Free Route Airspace
- ATC12.1 on MONA, TCT and MTCD
- ATC15.1 addressing the Implementation, in en-route operations, information exchange mechanisms, tools and procedures in support of basic AMAN
- ATC15.2 on Arrival Management extended to en-route airspace
- ATC17 on Electronic Dialogue supporting COTR
- ATC18 on Multi Sector Planning en-route – 1P2T
- ITY-FMTP addressing a Common Flight Message Transfer Protocol

Two SESAR Solutions that are in implementation belong to this EOC, without being yet subject to an implementation objective:

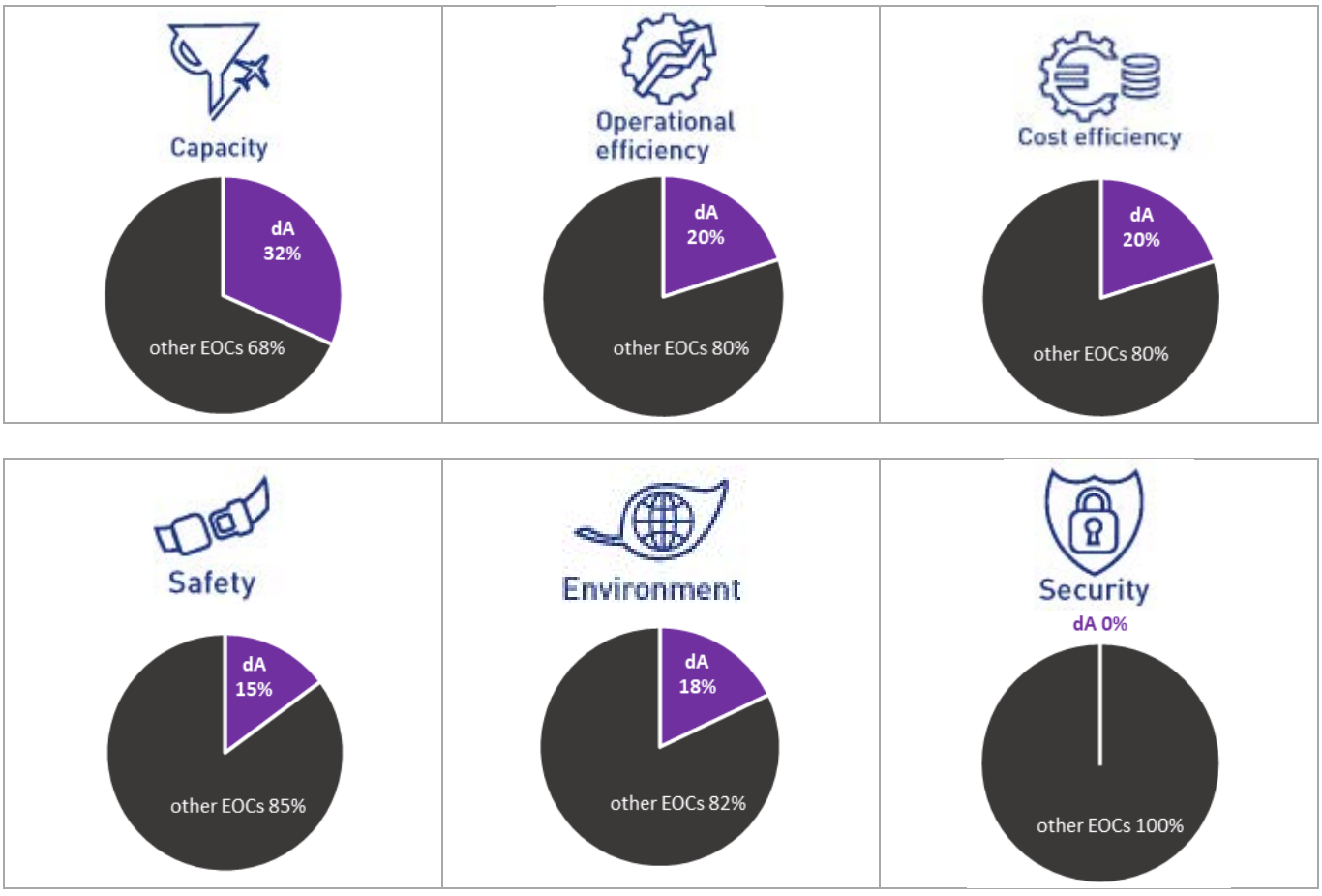
- #10 on Optimised route network using advanced RNP and
- #118 on Basic EAP (Extended ATC Planning) function).
- #PJ.06-01 on FRA in high and very high complexity environments

Focus on the performance contribution of dA in deployment phase

The information on the bar chart shows a total number of the dA contributors to each KPA. The numbers differentiate between the dA solutions with/without an implementation objective and the implementation objectives not associated to any of the solution.



The information on the pie charts shows aggregated contribution per KPA. It compares a total number of dA contributors (SOLs with and without implementation objectives, as well as the objectives not related to SOL) against the total number of the contributors from all other EOCs for the same KPA.



2.8 EOC: Trajectory Based Operations

The solutions and implementation objectives planned for implementation

V5 Deployment

SOL#	Solution name	Impl. Objective	Regulated	Committed	Local	Plan FOC date	ANSP	APO	USE	REG	NM	INT	Capacity	Ops EFF	Cost EFF	Safety	Environment	Security
Nil	Nil	ATC02.8	☑			01/01 2022	☑									☑		
60	Enhanced STCA for TMAs	ATC02.9	☑			31/12 2020	☑									☑		
69	Enhanced STCA with down-linked parameters	ATC20			☑	Open	☑			☑				☑		☑		
The solutions not subject to an implementation objective yet. They are implemented in a voluntary way without coordination at European level. Their progress is monitored through dedicated questionnaire via LSSIP process yearly.																		
115	Extended projected profile (EPP) availability on ground	OD-01 A			☑	Open	☑		☑					☑		☑		
06	Controlled time of arrival (CTA) in medium-density/medium complexity environments						☑	☑	☑		☑		☑	☑			☑	
08	Arrival management into multiple airports						☑	☑					☑			☑	☑	
100	ACAS Ground Monitoring and Presentation System						☑		☑							☑		
101	Extended hybrid surveillance						☑	☑	☑							☑		
105	Enhanced airborne collision avoidance system (ACAS) operations using the autoflight system						☑		☑							☑		

Outlook at the solutions available for industrialisation and standardisation

V4 Industrialisation

SOL#	Solution name	Potential performance benefits	MP Vision Phase
PJ.18-02c	eFPL supporting SBT transition to RBT	Cost EFF, Safety, Security	C
Pj.07-01	AU processes for trajectory definition	Cost EFF, Environment, Ops EFF	C
PJ.10-02a1	Integrated tactical and medium CD&R services and Conformance Monitoring tools for En-Route and TMA	Cost EFF, Environment, Ops EFF, Safety	C
More details about these solutions can be found at https://www.sesarju.eu			

A= Indicates that the solution or implementation objective has a reference to AAS Transition Plan

Synopsis of TBO

The integration of trajectory management processes into the planning and execution phases will involve the management, negotiation and sharing of the shared business trajectory (SBT) as well as the management, updating, revision and sharing of the reference business trajectory (RBT) and finally the transition from the SBT to the RBT.

The EOC also includes some legacy deployments (ground-based and airborne safety nets) that are already validated concepts, but have been included as they will facilitate trajectory execution for specific low-capability aircraft or in fallback procedures.

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.

The Essential Operational Change TBO relies on the following active implementation objectives:

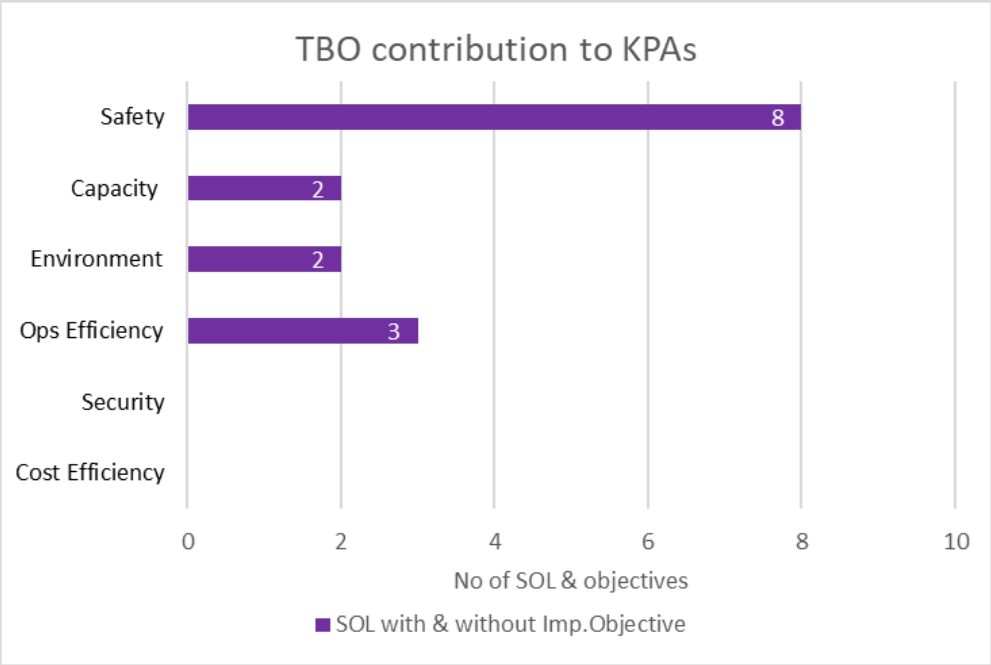
- ATC02.8 addressing Ground-based Safety Nets (STCA, APW, MSAW)
- ATC02.9 on Enhanced STCA for TMAs
- ATC20 on Enhanced STCA with down-linked parameters via Mode S EHS [Local]

Six SESAR Solutions that are in implementation belong to this EOC, without being yet subject to an implementation objective:

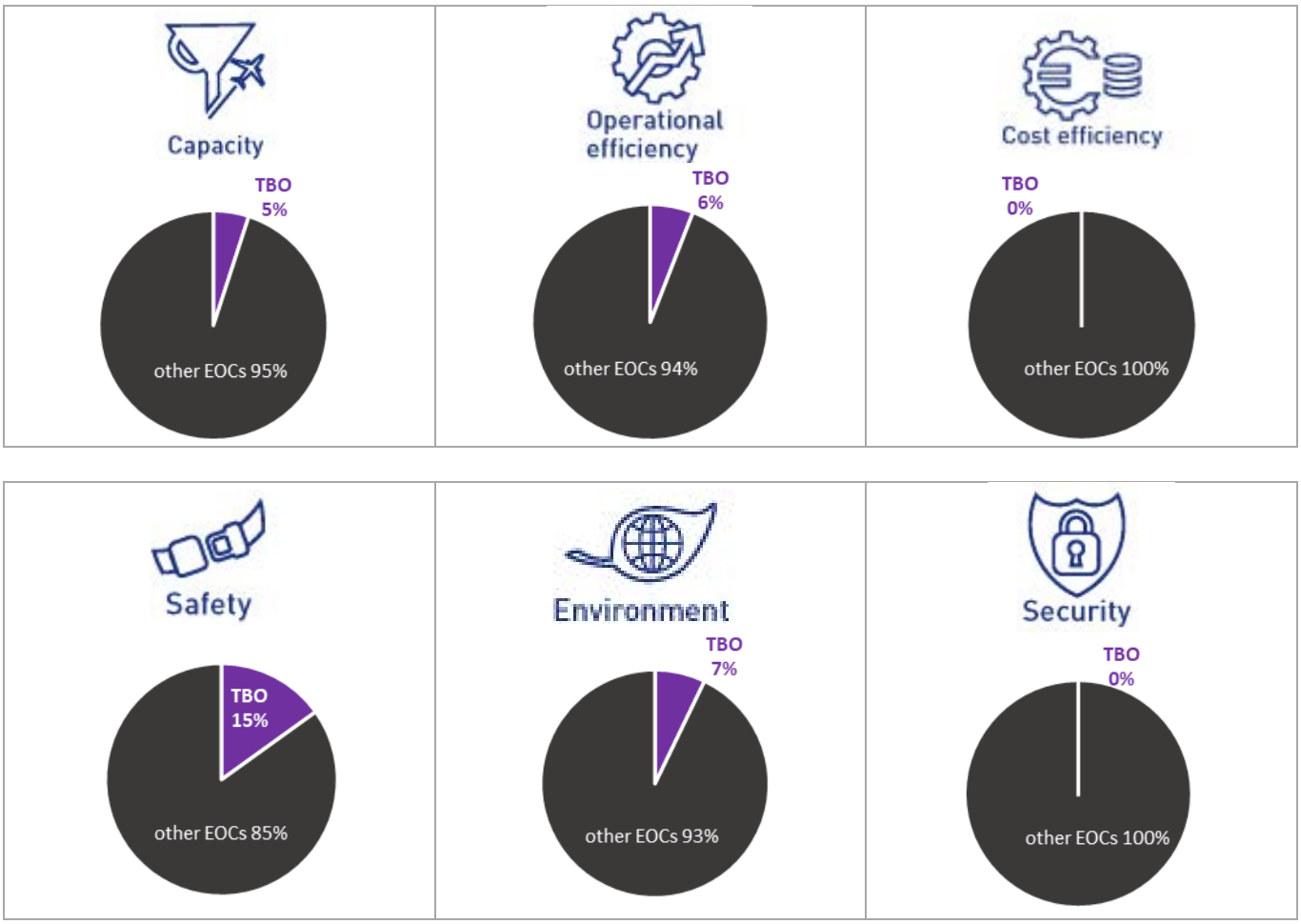
- #06 on Controlled time of arrival (CTA) in medium-density/medium-complexity environment,
- #08 on Arrival management into multiple airports,
- #100 on ACAS Ground Monitoring and Presentation System, and
- #101 on Extended hybrid surveillance),
- #105 on Enhanced airborne collision avoidance system (ACAS) operations using the autoflight system,
- #115 Extended projected profile (EPP) availability on ground, which has an Outline Description (OD-01), and not an implementation objective yet.

Focus on the performance contribution of TBO in deployment phase

The information on the bar chart shows a total number of the TBO contributors to each KPA. The numbers differentiate between the TBO solutions with/without an implementation objective and the implementation objectives not associated to any of the solution.



The information on the pie charts shows aggregated contribution per KPA. It compares a total number of TBO contributors (SOLs with and without implementation objectives, as well as the objectives not related to SOL) against the total number of the contributors from all other EOCs for the same KPA.



2.9 EOC: Multimodal Mobility & integration of all airspace users

The solutions and implementation objectives planned for implementation

V5 Deployment

SOL#	Solution name	Impl. Objective	Regulated	Committed	Local	Plan FOC date	ANSP	APO	USE	REG	NM	INT	Capacity	Ops EFF	Cost EFF	Safety	Environment	Security
113	Optimised low-level IFR routes for rotorcraft	NAV12	☑			06/06 2030	☑		☑	☑			☑	☑		☑	☑	

Outlook at the solutions available for industrialisation/standardisation

V4 Industrialisation

SOL#	Solution name	Potential performance benefits	MP Vision Phase
PJ.01-06	Enhanced rotorcraft and GA operations in the TMA	Ops EFF, Cost EFF, Environment	B
PJ.02-05	Independent rotorcraft operations at the airports	Cost EFF	C
More details about these solutions can be found at https://www.sesarju.eu			

Synopsis of M3

This EOC supports a safe, efficient and green travel experience and promotes use of the most appropriate means of transport. Mobility as a service will take intermodality to the next level, connecting numerous modes of transport, for people and goods, in seamless door-to-door services.

Various modes of transport, such as car, train, helicopter, drone and aircraft, for different segments of a trip will be seamlessly combined. The integration of RPAS, rotorcraft, and business and general aviation operations through IFR procedures using performance-based CNS infrastructure in the airspace surrounding airports, as well as in TMAs, is a priority.

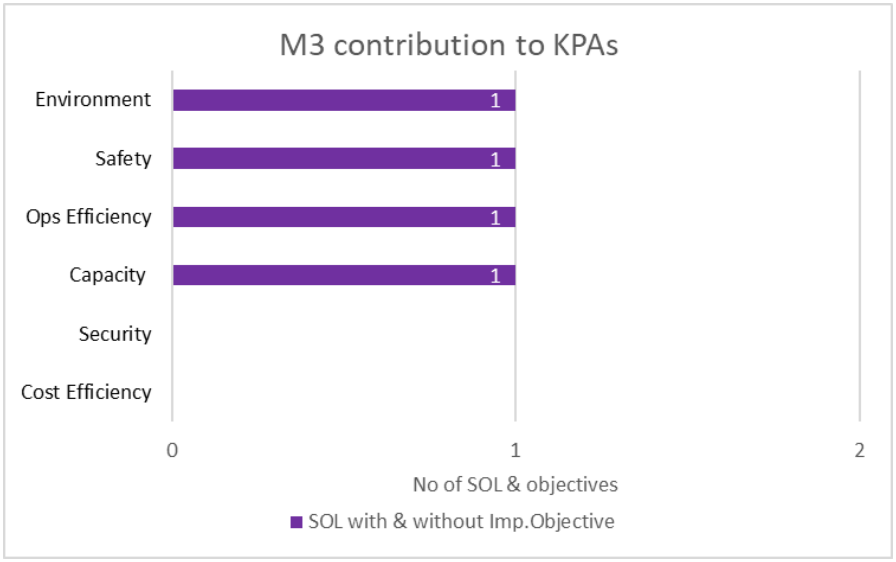
The Essential Operational Change M3 relies on the following implementation objective:

- NAV12 addressing Optimised low-level IFR routes in TMA for rotorcraft

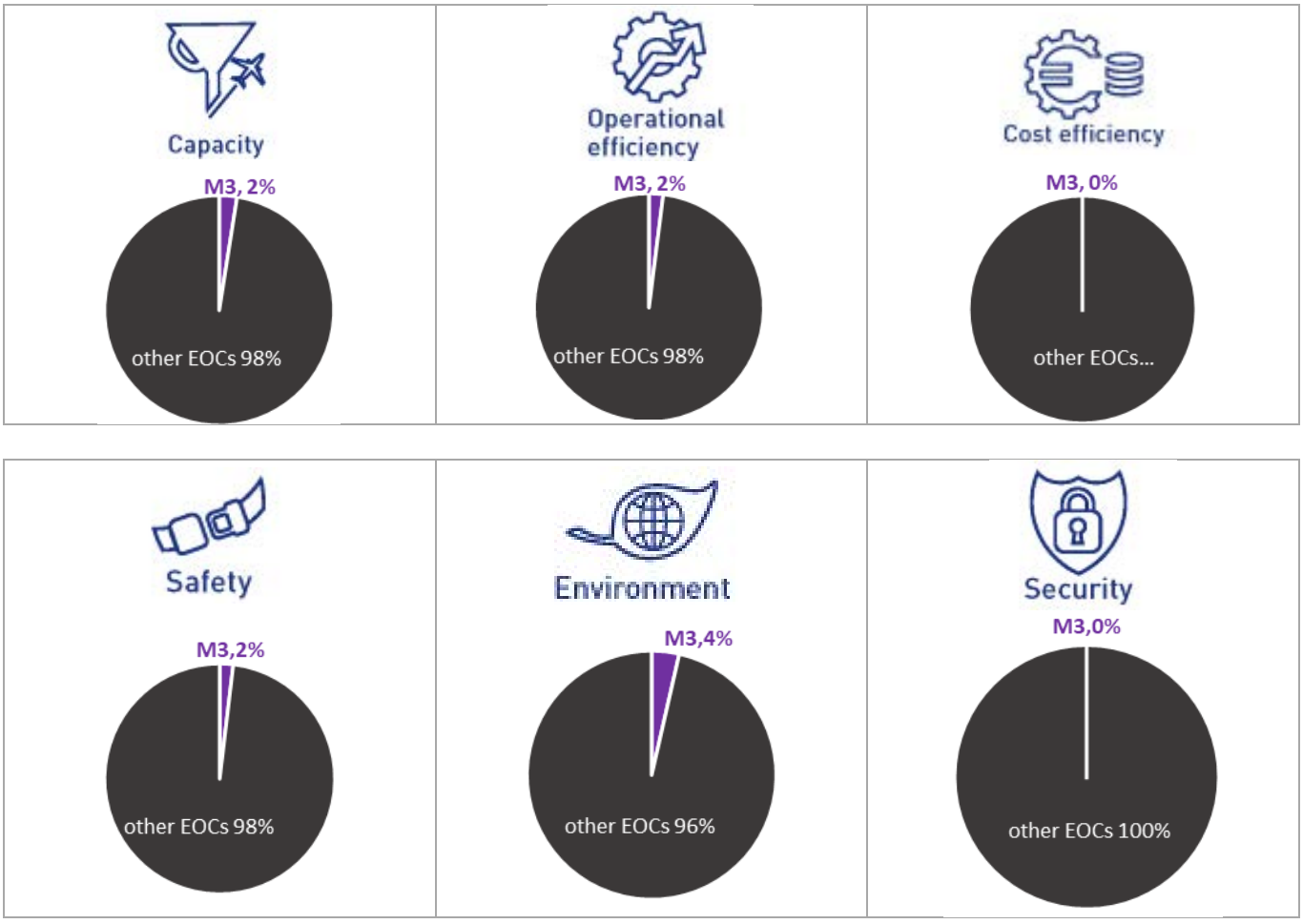
Within this EOC, there are no mature SESAR 1 Solutions not being yet subject to Implementation Objectives.

Focus on the performance contribution of M3 in deployment phase

The information on the bar chart shows a total number of the M3 contributors to each KPA. The numbers differentiate between the M3 solutions with/without an implementation objective and the implementation objectives not associated to any of the solution.



The information on the pie charts shows aggregated contribution per KPA. It compares a total number of M3 contributors (SOLs with and without implementation objectives, as well as the objectives not related to SOL) against the total number of the contributors from all other EOCs for the same KPA.



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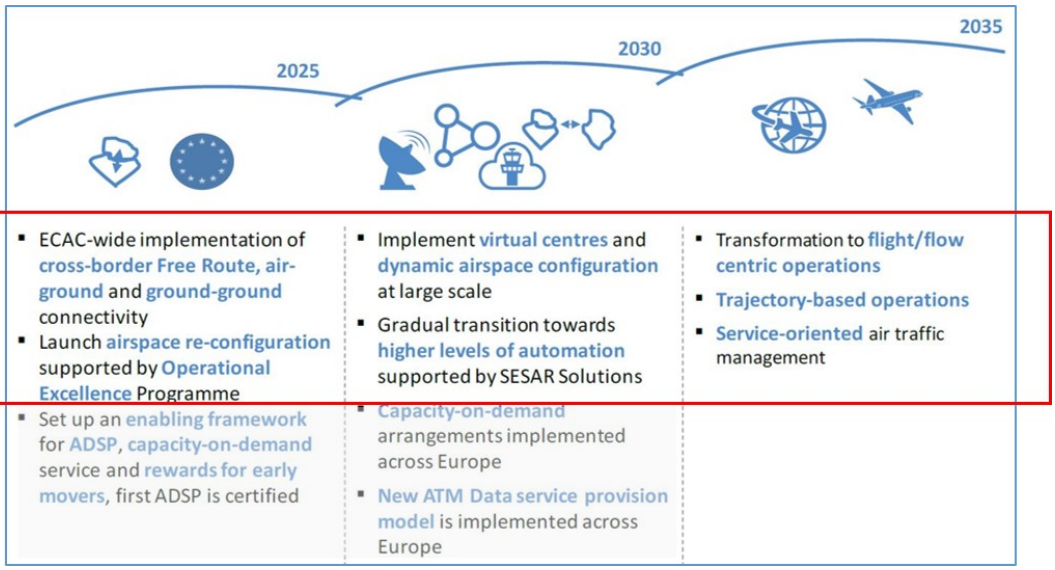
3. Airspace Architecture Study Transition Plan in MPL3 Plan

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 that enable achievement of AAS milestones.

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 AAS TP transition phase identifies the following:

a) the milestones and the elements supporting each AAS milestone *(identification, designators and numbering of the milestones and elements is established for the purpose of L3 Plan document specifically)* ,
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 2020
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	Nil
1.5.	G/G Connectivity-SWIM Yellow	#46 SESAR 1	INF08.1
1.6.	FRA cross-border above FL310	#66 SESAR 1 #33 SESAR 1 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 #33 SESAR 1 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 2020
			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	ATC21
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 2020
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 ATC18 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
5.5.	Improved ground trajectory predictions enabling future automation tools	#53 SESAR 2020 Wave 2	Nil

AAS Milestone	Element supporting the milestone	SESAR Solution	MPL3 Plan 2020
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 2020
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

4. DEPLOYMENT VIEWS

V5 Deployment

The Deployment View is organised per Essential Operational Change (EOC). Each one starts with Deployment Roadmap summary and continues with the individual SESAR Solutions and implementation objectives planned deployment information.

Each implementation objective is described in a more details 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**: describing main actions to be taken by each stakeholder.

In addition, for each implementation objective a preview is given of the reported implementation progress. The progress status for each objective comes from the Master Plan Level 3 2020 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 2019:	refers to the percentage of States/airports that have reported the objective as 'completed' (cf. LSSIP[1] 2019).
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, there are objectives that have not been monitored in 2019, e.g. ''Initial'' status, and therefore no progress status can be determined for them.

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

4.1 Deployment Views

V5 Deployment

CNS infrastructure and services

Roadmap

EOC	Deployment Scenario	SESAR SOL	Impl. Objective	Objective Title	Decision type			Planned Implementation FOC-Reported progress											AAS Milestone	SESAR Key Feature
					Regulated	Committed	Local	←	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
CNS	CNS rationalisation	#103	NAV10	RNP App. Procedures to instrument RWY				14%												Nil	AATS
CNS	CNS rationalisation	#55	NAV11	PA using GBAS CAT II/III based on GPS L1				Initial objective, not monitored in LSSIP yet.												Nil	HPAO
CNS	Nil	Nil	COM10	Migration from AFTN to AMHS				64%												Nil	EAI
CNS	Nil	Nil	COM11.1	VoIP in En-Route				11%												AM-1.3	EAI
CNS	Nil	Nil	COM11.2	VoIP in Airport/Terminal				9%												Nil	EAI
CNS	Nil	Nil	ITY-ACID	Aircraft identification				36%												Nil	EAI
CNS	Nil	Nil	ITY-AGDL	Initial ATC air-ground data link services				36%												AM-1.1	EAI
CNS	Nil	Nil	ITY-AGVCS2	8.33 kHz A/G Voice Channel Spacing below FL195				37%												Nil	EAI
CNS	Nil	Nil	ITY-SPI	Surveillance performance and interoperability				40%												Nil	EAI
CNS	CNS rationalisation	#109	OD-3	Iris precursor	No decision			No impl. objective yet. E.i no date yet.												AM-1.16	EAI
CNS	Cooperative SUR ADS-B / WAM	#114	ATC21	ADS-B/WAM				Initial objective, not monitored in LSSIP yet.												AM-1.17	EAI
CNS	AeroMACS	#102	Nil	Nil	No decision			No impl. objective yet. E.i no date yet.												Nil	EAI
CNS	CNS rationalisation	#110	Nil	Nil	No decision			No impl. objective yet. E.i no date yet.												Nil	EAI

SOLUTION - #114 Composite surveillance ADS-B/WAM

This implementation objective is 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. The exploitation of synergies between the two surveillance techniques into a "composite surveillance system" supports a number of benefits: e.g. cost savings achieved through the co-mounting of system components into a single unit, reducing the 1030/1090 MHz footprint of a WAM surveillance system especially a reduction in the number of 1030 MHz interrogations. Enabling the allowance of temporary reductions in ADS-B quality indicator values, by resolving ADS-B data-to-track association issues related to non-unique 24-bit addresses, by reducing the effects on the resulting along-track horizontal position error.

Implement. Objective	**ATC21 - Composite surveillance ADS-B/WAM**
SESAR Key Feature:	Enabling Aviation Infrastructure
Essential Operational Change / PCP:	Nil
DP Families:	Nil
OI Steps & *Enablers*:	CTE-S06, CTE-S05, CTE-S03a, CTE-S03b, CTE-S04a,
EPAS:	RMT.0679, RMT.0519
ICAO ASBUs:	ASUR-B0/1, ASUR-B0/2
Network Strategy Plan:	SO8/3, SO8/4
Operating Environment:	En-Route, Terminal, Airport
EATMN Systems:	SUR

When

FOC: **n/a**

Who

Stakeholders:
- Regulators
- ANSPs
- Airspace Users

Where

Applicability Area **n/a**

Status

Initial Objective

Completion rate end 2019: **n/a**

Estimated achievement: **n/a**

Applicable regulations & standards

Regulation (EU) No 1207/2011 (SPI) as amended.

Benefits

Security

Increases security of ADS-B surveillance layer by verification of received information.

Cost Efficiency

System provides two surveillance layers sharing HW components, with the associated cost reduction.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Minimum Operational Performance Standards (MOPS) for FIMED-236A, EUROCAE
- MOPS Mode S transponder ED-73F, EUROCAE
- MOPS Mode S GA transponder ED-115A, EUROCAE
- TS for WAM Ground System with Composite Surveillance, EUROCAE

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

Regulatory Authorities have to mandate the airborne carriage and operation of suitable equipment (ADS-B transponders)

NOTE 1: For the EU+ States the carriage requirement is addressed by Regulation (EU) No 1207/2011 (the Surveillance Performance and Interoperability (SPI) Regulation) as amended, therefore for them this action is already addressed through Implementation Objective ITY-SPI. However, this SLoA may be applicable in case the State wishes to extend the carriage requirements beyond the scope of the SPI IR. The non-EU States may have to issue local mandates for the carriage and operation of ADS-B transponders.

ANSPs have to deploy composite surveillance ADS-B/WAM systems.

Airspace Users have to:

1. Equip aircraft with ADS-B out systems;
2. Get airworthiness certification and operational approval.

NOTE 2: The aircraft systems are assumed compliant with the EU Regulation 1207/2011 (Surveillance Performance and Interoperability Implementing Rule - SPI IR) as amended (see also NOTE 1 above).

SOLUTION - Nil COM10-Migration 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.

Implement. Objective	**COM10-Migration from AFTN to AMHS**
SESAR Key Feature:	Enabling Aviation Infrastructure
Essential Operational Change / PCP:	Predecessor of 'CNS Rationalisation' (EOC)
OI Steps & *Enablers*:	CTE-C06c
ICAO ASBUs:	COMI B0/7
Operating Environment:	Airport, Terminal, En-Route, Network
EATMN Systems:	COM

Applicable regulations & standards

EUROCONTROL Specification on the ATS Message Handling System (AMHS) Edition 2.0 (recognised as Community Specification).

When

FOC: **31/12/2018**

Who

Stakeholders:
- ANSPs
- Industry
- EUROCONTROL

Where

Applicability Area
All ECAC+ States

Status

Late

Completion rate end 2019: **64%**

Estimated achievement: **12/2020**

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs, have to:

1. Implement AMHS capability (Basic ATSMHS) and gateway facilities to AFTN
2. Implement regional boundary gateways
3. Enhance AMHS capability (Extended ATSMHS)
4. Ensure the conformity of AMHS systems and associated procedures
5. Participate in ATS Messaging Management Centre (AMC) activities for ATS messaging management

EUROCONTROL has to :

1. Provide AMC (ATS Messaging Management Centre) service
2. Implement AMHS capability (Basic ATSMHS) and gateway facilities to AFTN
3. Enhance AMHS capability (Extended ATSMHS)
4. Develop further relevant elements of the Extended ATSMHS in AMHS Community Specification (CS)
5. Implement AMHS-CS compliance testing methodology and tools

Industry have to Ensure the conformity of AMHS systems

SOLUTION - Nil COM11.1- 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.

Implement. Objective	**COM11.1-VoIP in En-Route**
SESAR Key Feature:	Enabling Aviation Infrastructure
DP Families	3.1.4 Management of Dynamic Airspace Configurations 3.2.1 Upgrade of systems (NM, ANSPs, AUs) to support DCT and FRA
OI Steps & *Enablers*:	CTE-C05a, CTE-C05b
ICAO ASBUs:	COMI B2/1
Network Strategy Plan	SO8/4
Operating Environment:	En-Route, Network
EATMN Systems:	COM

When

FOC: **01/01/2022**

Who

Stakeholders:
- ANSPs

Where

Applicability Area
All ECAC+ States

Status

Planned delay

Completion rate end 2019: **11%**

Estimated achievement: **12/2022**

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 (Part 1 and 2)

Benefits

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

Safety
Maintained or improved by providing enhanced signalisation functions. Improved by providing a more resilient infrastructure.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Upgrade and put into service voice communication systems to support VoIP intercentre telephony by upgrading voice communication systems and their HMI to enable intercentre communication using VoIP telephony at ATS units providing services enroute.
2. Upgrade and put into service voice communication systems to support VoIP links to the ground radio stations by upgrading voice communication systems to enable the operators to perform AG radio communication using VoIP links between VCS and ground radio stations, for services provided en-route.

SOLUTION - Nil COM11.2- 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 centre-tower voice communication and the links with the ground radio stations. Centre-tower 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.

Implement. Objective	**COM11.2- VoIP in Airport/Terminal**
SESAR Key Feature:	Enabling Aviation Infrastructure
OI Steps & *Enablers*:	*CTE-C05a, CTE-C05b*
ICAO ASBUs:	COMI B2/1
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 Armenia, MUAC, Malta, North Macedonia.

Status Planned delay

Completion rate end 2019: **9%**

Estimated achievement: **Beyond 2023**

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 (Part 1 and 2)

Benefits

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

Safety
Maintained or improved by providing enhanced signalisation functions. Improved by providing a more resilient infrastructure.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Upgrade and put into service voice communication systems to support VoIP centre-tower Telephony by upgrading voice communication systems and their HMI to enable centre-tower communication using VoIP telephony at ATS units providing services in Airport and Terminal environments.
2. Upgrade and put into service voice communication systems to support VoIP links to the ground radio stations by upgrading 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.

SOLUTION - Nil 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.

Implement. Objective	**ITY-ACID - Aircraft identification**
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

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

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

All ECAC+ States, except Morocco.

Status

Late

Completion rate end 2019: **36%**

Estimated achievement: **12/2021**

Benefits

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.

Safety

Enhanced safety levels by ensuring that unambiguous individual aircraft identification is achieved, maintained and shared accurately throughout EATMN airspace.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Ensure that the cooperative surveillance chain has the necessary capability to allow the establishment of the individual aircraft identification using the downlinked aircraft identification feature and its operational use. ANSPs have the choice between Mode S surveillance, ADS-B or WAM, taking into account the local operating environments, constraints and needs as well as the capabilities of the airspace users.

Airspace Users have to:

1. Equip aircraft with Mode S and ADS-B out systems;
2. Get airworthiness certification and operational approval.

NOTE: The aircraft systems are assumed compliant with the EU Regulation 1207/2011 (Surveillance Performance and Interoperability Implementing Rule - SPI IR) as amended (see also Objective ITY-SPI).

SOLUTION - Nil

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.

Implement. Objective	**ITY-AGDL - Initial ATC air-ground data link services**
SESAR Key Feature:	Enabling Aviation Infrastructure
Essential Operational Change / PCP:	- A/G datalink - 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 6.1.3 A/G and G/G Multi Frequency DL Network in defined European Service Areas 6.1.4 ATN B1 capability in Multi Frequency environment in Aircraft Domain
OI Steps & *Enablers*:	AUO-0301
Dependencies	No dependencies
ICAO ASBUs:	COMI B0/4, COMI B1/2
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, Moldova , the Netherlands and Ukraine.

Status

Late

Completion rate end 2019: **36%**

Estimated achievement: **12/2023**

Benefits

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.

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Data Link Services (DLS) System; Community Specification ; Requirements for ground constituents and system testing, Revision EN 303 214 (V 1.3.1), ETSI
- Data Link Services RMT.0524, EASA
- Companion document (Ground VDL Mode 2 systems expected behaviour) ED-xx, EUROCAE
- VHF air-ground Digital Link (VDL) Mode 2, Part 3: Harmonized standard for access to radio spectrum, EN 301 841-3(V 2.2.1), ETSI
- VHF air-ground Digital Link (VDL) Mode 2; Technical characteristics and methods of measurement for ground-based equipment; Part 1: Physical layer and MAC sub-layer, EN 301 841-1(V 1.5.1), ETSI

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Ensure the conformity of communications, flight data and initial flight plan processing systems and associated procedures,
2. Ensure ground communication systems comply with air-ground communication requirements;
3. Implement a process for the transmission of logon parameters of flight data (Logon Forward - LOF) between ATC units;
4. Implement a process for the transmission of information of flight data (Next Authority Notified – NAN) between ATC units.

Airspace Users have to:

1. Equip aircraft with data link equipment supporting the identified services;
2. Specify relevant operational procedures.

Military Authorities have to:

1. Equip transport-type State aircraft;
2. Ensure the conformity of communications, flight data and initial flight plan processing systems and associated procedures.

National Regulators have to:

1. Notify potential exemption cases to the European Commission.

SOLUTION - Nil

ITY-AGVCS2 - 8.33 kHz A/G 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.

Implement. Objective	**ITY-AGVCS2 - 8.33 kHz A/G Voice Channel Spacing below FL195**
SESAR Key Feature:	Enabling Aviation Infrastructure
OI Steps & *Enablers*:	*CTE-C01a*
Dependencies (Predecessor):	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

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 2019:	**37%**
Estimated achievement:	**12/2022**

Benefits

Operational efficiency

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

National Regulators have to:

1. Ensure that radios have 8,33 kHz channel spacing capability;
2. Ensure compliance with the requirements on 8,33 kHz frequency conversions.

ANSPs have to:

1. Ensure conformity of voice communications systems and associated procedures;
2. Convert all 25 kHz frequencies to 8,33 kHz
3. Establish and implement a transition plan for using PBN (for States subject to Commission Implementing Regulation (EU) 2018/1048 of 18 July 2018 laying down airspace usage requirements and operating procedures concerning performance-based navigation).

Airport Operators have to:

1. Convert all 25 kHz frequencies to 8,33 kHz;
2. Accommodate non-equipped vehicles

Military Authorities have to:

1. Equip State aircraft with radio equipment with 8,33 kHz channel spacing capability;

Airspace Users have to:

1. Equip aircraft with radio equipment with 8,33 kHz channel spacing capability.

NOTE: The Network Manager has ensured that the centralised flight planning processing and distribution service complies with the Regulation.

SOLUTION - Nil

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 ADSB 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.

Implement. Objective	**ITY-SPI - Surveillance performance and interoperability**
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:	ASUR B0/1, ASUR B0/3
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

When

FOC: 07/06/2020

See intermediate milestones in the Engineering View of Implementation Objectives.

Who

Stakeholders:
- Regulators
- ANSPs
- Airspace Users
- Military

Where

Applicability Area
All ECAC+ States,
except: Georgia and Turkey.

Status

Risk of delay

Completion rate end 2019: 40%

Estimated achievement: 12/2020

Benefits

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 trajectories that are more efficient.

Safety
Improved safety through the deployment of surveillance solutions in non-radar areas.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Minimum Operational Performance Standards (MOPS) for FIM, ED-236A, EUROCAE
- MOPS Mode S transponder ED-73F, EUROCAE
- MOPS Mode S GA transponder ED-115A, EUROCAE

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Ensure interoperability of all surveillance data transferred from their ground-based surveillance systems; and that data transferred from their surveillance data processing systems to other navigation service providers are subject to a common protocol.

Airspace Users and **Military Authorities** have to:

1. Equip aircraft with:
    a. Mode S Elementary Surveillance;
    b. Mode S Enhanced Surveillance;
    c. ADS-B Out on 1090 Extended Squitter.
2. Obtain airworthiness approval for equipped aircraft.

SOLUTION - #103 Approach Procedures with vertical guidance

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.

Implement. Objective	**NAV10-RNP Approach Procedures to instrument RWY**
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 1.2.2 Geographic Database for procedure design
OI Steps & *Enablers*:	AOM-0602, AOM-0604, CTE-N06a, CTE-N06b
Dependencies (Predecessor):	No dependencies (no predecessor impl. objective)
ICAO ASBUs:	NAVS B0/2, APTA B0/1, APTA B1/1
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

On time

Completion rate end 2019: **14%**

Estimated achievement: **2024**

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

Capacity

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

Environment

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

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.

Safety

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

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Performance-based Navigation (PBN) Manual ICAO Doc 9613 Edition 5.
- MASPS for SVS SVGS CVS, ED-XX, EUROCAE
- MASPS for EVS CVS EFVS, ED-XX, EUROCAE
- MASPS for a Combined Vision System for Helicopter Operations for Low Visibility Operational Credit, ED-XX, EUROCAE

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Design and publish RNP approach procedures to LNAV, LNAV/VNAV and LPV minima to RWYs served by precision approach, as well as to RWY without precession approach. As an alternative when PA is not feasible, design and publish RNP non-precision (NPA) approach procedures to LNAV minima.
2. Establish the transition plan for PBN in ANS provision

Regulators have to:

1. Publish national regulatory material for RNP approach procedures based on EASA AMC 20-27 (LNAV/VNAV minima) and EASA AMC 20-28 (LPV minima).
2. Verify the transition plan for PBN in ANS provision.

Airspace Users have to equip aircraft with systems approved for RNP APCH down to LNAV/VNAV and/or LPV minima operations.

SOLUTION - #55 Precision approaches using GBAS Cat II/III

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.

Implement. Objective	**NAV11- Precision Approach using GBAS CAT II/III based on GPS L1**
SESAR Key Feature:	High Performing Airport Operations
Essential Operational Change / PCP:	LVPs using GBAS
OI Steps & *Enablers*:	AO-0505-A
Dependencies:	No dependencies
ICAO ASBUs:	NAVS B1/1
Operating Environment:	Airport
EATMN Systems:	NAV

Applicable regulations & standards

N/A

When

FOC: **n/a**

Who

Stakeholders:
- Regulators
- International Organisations
- ANSPs
- Airspace Users

Where

Applicability Area
Subject to local needs

Status

Initial Objective

Completion rate end 2019: **n/a**

Estimated achievement: **n/a**

Benefits

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.

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.

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.

Safety

GBAS improves safety in the segment of avoiding a scenario of false LOC or Glide beam capture.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- GBAS Cat II/III L1, ED-114B, EUROCAE

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Install GBAS CAT II/III ground equipment
2. Design and Publish GBAS CAT II/III precision approach procedures.

International organisations have to develop material for certification of GBAS ground facilities. Publish EASA material for GBAS CAT II/III ground facilities approval/certification.

Regulators have to apply EASA material to local national regulatory activities.

Airspace Users have to equip aircraft with systems approved for GBAS CAT II/III operations.

Industry has to get certification for GBAS CAT II/III ground facilities.

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. 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

4.2 Deployment Views

V5 Deployment

ATM interconnected network

Roadmap

EOC	Deployment Scenario	SESAR SOL	Impl. Objective	Objective Title	Decision type			Planned Implementation FOC-Reported progress												AAS Milestone	SESAR Key Feature
					Regulated	Committed	Local	←	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
iN	Nil	Nil	AOM13.1	Harmonise OAT and GAT handling				45%												Nil	OANS
iN	Nil	Nil	FCM03	Collaborative flight planning				59%												AM1.14	OANS
iN	Enhanced short-term ATFCM measures	#17	FCM04.2	STAM phase 2				13%												AM-1.11	OANS
iN	Collaborative NOP	#20, #21	FCM05	Interactive rolling NOP				5%												AM-1.12	OANS
iN	Auto. support for traffic complexity	#19	FCM06	Traffic Complexity Assessment				17%												AM-1.13	OANS
iN	CTOT to TTA for ATFCM purposes	#18	FCM07	CTOT to TTA for ATFCM																AM-1.9	OANS
iN	Enhanced ATFM slot swapping	#56	FCM09	Enhanced ATFM Slot swap																Nil	OANS
iN	Collaborative NOP	#21	AOP11	Initial Airport Operations Plan				13%												Nil	HPAO
iN	Airport integration into the network	#61	AOP17	Provision/integration of DEP planning info to NMOC						Based on local decision										Nil	HPAO
iN	Nil	Nil	COM12	NewPENS				17%												Nil	EAI
iN	Initial SWIM: infrastructure and profiles. Initial SWIM:MET information exchange.	#35, #46	INF08.1	Information Exchanges using the SWIM Yellow TI Profile				0%												AM-1.5	EAI
iN	Initial SWIM: flight information exchange	#28, #46 PJ.18-02b	INF08.2	Info. Exchanges using the SWIM Blue TI Profile																AM-9.1	EAI
iN	UDPP departure	#57	Nil	Nil	No decision				No impl. objective yet. E.i no date yet.											Nil	OANS
iN	Initial SWIM: flight information exchange	#67	Nil	Nil	No decision				No impl. objective yet. E.i no date yet.											Nil	EAI
iN	Initial SWIM: flight information exchange	#37	Nil	Nil	No decision				No impl. objective yet. E.i no date yet.											Nil	EAI

SOLUTION - Nil 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.

Implement. Objective	**AOM13.1-Harmonise OAT and GAT handling**
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 2019: **45%**

Estimated achievement: **12/2020**

Benefits

Operational efficiency

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

Safety

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

Security

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

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to Apply common principles, rules and procedures for OAT handling and OAT/GAT interface.

Regulators have to perform conformance analysis between existing rules and the EUROAT specification and determine, changes of regulatory material, where necessary. Develop and enact national regulations and rules pertinent to this specification.

Military have to:

1. Apply common principles, rules and procedures for OAT handling and OAT/GAT interface
2. Provide EUROCONTROL with a national point of contact (POC) and a distribution list for the dissemination of EUROAT specification.
3. Migrate military aeronautical information to EAD.

SOLUTION - #21 AOP and AOP-NOP seamless integration

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.

Implement. Objective	**AOP11-Initial Airport Operations Plan**
SESAR Key Feature:	High Performing Airport Operations
Essential Operational Change / PCP:	S-AF2.1 DMAN synchronised with predeparture sequencing 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:	NOPS B1/3
Network Strategy Plan:	SO6/2
Operating Environment:	Airport
EATMN Systems:	Airport Operations Centre Support Tools

Applicable regulations & standards

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

When

FOC: **01/01/2021**

Who

Stakeholders:
- ANSPs
- Airport Operators
- Airspace Users

Where

Applicability Area
24 PCP Airports
16 non-PCP airports

Status On time

Completion rate end 2019: **13%**

Estimated achievement: **12/2021**

Benefits

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

Environment
Reduced noise and emissions due to limiting engine ground running time due to better timed operations.

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Airport CDM, Community Specification, ETSI
- AIXM Edition 5.2, EUROCONTROL

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

Airport Authorities have to:

1. Set up an AOP containing Traffic demand, Airport capabilities, Airport operational context. The information available in the AOP should be separated in two AOP content blocks to distinguish between information fields to be implemented at every airport (core information) and the set of information that can be included depending on local agreements (supporting information).

2. Provide and maintain AOP elements (core and supporting) which include (but not limited to): Possible airport configurations; Unforeseen / Temporary aerodrome constraints; Restrictions regarding aerodrome resources; Information sharing between airport partners; Airport usage and any restriction rule; Operational capacity of airport resources; Airport resources availability and allocation plan.

ANSPs have to:

1. Provide and maintain AOP elements (core and supporting) based on the local agreements. This information may include available Airspace Capacity, other Constraining factors (e.g. adjacent airports, military training areas, etc.).

Airspace Users have to:

1. Update the AOP, notably with regard the information relating to the inbound and outbound flights connected by a turn-around process, and, in the future, the planning of their Business Trajectories.

SOLUTION - #61 CWP airport - low cost simple DEP entry panel

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.

Implement. Objective	**AOP17-Provision/integration of DEP planning info to NMOC**
SESAR Key Feature:	High Performing Airport Operations
Essential Operational Change:	Collaborative airport
OI Steps & *Enablers*:	DCB-0304
Dependencies:	No dependencies
ICAO ASBUs:	NOPS B0/4
Operating Environment:	Airport, Network
EATMN Systems:	FDPS & HMI, ATFCM

Applicable regulations & standards

- N/A

When

FOC: **n/a**

Who

Stakeholders:
- ANSPs
- Network Manager

Where

Applicability Area
Subject to local needs

Status **Not available**

Completion rate end 2019: **10%**

Estimated achievement: **n/a**

Benefits

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.

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. upgrade the local ATC system so as to provide departure planning information. 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.
2. upgrade the local system to support reception of estimated landing time from NM. 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.

Network Manager has to integrate Departure Planning Information (DPI) in NM systems.

SOLUTION - Nil 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, for not only 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.

Implement. Objective	**COM12-NewPENS**
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 5.2.1 Stakeholders Internet Protocol Compliance
OI Steps & *Enablers*:	*CTE-C06b*
Dependencies:	No dependencies
ICAO ASBUs:	COMI B1/1
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

When

FOC	**01/01/2025**
- 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 2019:	**17%**
Estimated achievement:	**12/2022**

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- SWIM Technical Infrastructure - Blue Profile, EUROCONTROL
- Revision of ATM information security EN 16495, CEN

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to adapt communications systems and infrastructure to enable connectivity between NewPENS and the ANSP's network, and migrate the selected services and applications to NewPENS. This shall include, when and where applicable, the exchange of flight object (FO) information.

Airport Operators and Airspace Users have to, according to local needs and requirements, migrate to NewPENS for communications with ANSPs and NM (e.g. CDM, messages).

Network Manager has to, adapt NM systems to allow stakeholders have access to existing data centres via NewPENS and migrate the selected services and applications to NewPENS including exchange of FO information.

SOLUTION - Nil 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.

Implement. Objective	**FCM03-Collaborative flight planning**
SESAR Key Feature:	Optimised ATM Network Services
Essential Operational Change / PCP:	- Basic Network Operations Planning - 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:	NOPS B0/2
Network Strategy Plan:	SO4/2, SO5/1, SO5/6
Operating Environment:	Airport, Terminal, En-Route, Network
EATMN Systems:	ATFCM, FDPS/SDPS & HMI

When

FOC: **01/01/2022**

Who

Stakeholders:
- ANSPs
- Network Manager

Where

Applicability Area
All ECAC+ States

Status

Late

Completion rate end 2019: **59%**

Estimated achievement: **12/2020**

Applicable regulations & standards

N/A

Benefits

Capacity

Better use of the available network capacity hence reducing delays.

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.

Safety

Prevention of ATCO overload.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis of the actions still needed finalisation across the implementation area, per stakeholder group as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Provide flight plan message processing in ADEXP format;
2. Automatically provide AFP for missing flight plans;
3. Automatically provide AFP message for change of route;
4. Automatically provide AFP message for a diversion;
5. Automatically provide AFP message for a change of flight rules or flight type;
6. Automatically provide AFP message for a change of requested cruising level;
7. Automatically provide AFP message for change of aircraft type;
8. Automatically provide AFP message for change of aircraft equipment.

Network Manager has to:

1. Ensure integration of Automatic AFP in NM systems.

SOLUTION - #17 Advanced short-term ATFCM measure STAM

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.

Implement. Objective	**FCM04.2-STAM phase 2**
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*
ICAO ABUs:	NOPS B1/1
Network Strategy Plan:	SO4/3, SO5/4
Operating Environment:	En-Route, Network
EATMN Systems:	ATFCM

Applicable regulations & standards

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

FOC: **01/01/2022**

Who

Stakeholders:
- ANSPs
- Airspace Users
- Network Manager

Where

Applicability Area
All ECAC+ States
Except: Armenia, Azerbaijan, Georgia, Israel, Malta, Morocco and Moldova

Status

Risk of delay

Completion rate end 2019: **13%**

Estimated achievement: **Beyond 2021**

When

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Develop STAM procedures and upgrade the local systems;
2. Use of STAM Phase 2 application and services provided by NM.

Airspace Users have to:

1. Deploy, in particular Flight Planning Services, the appropriate tools (STAM application and services provided by NM) and associated procedures to support Enhanced Short Term ATFCM Measures.

Network Manager has to:

1. Update the NM systems, develop the associated procedures and train the personnel.

SOLUTION - #20 Collaborative NOP for step 1

SOLUTION - #21 AOP and AOP-NOP seamless integration

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.

Implement. Objective	**FCM05-Interactive rolling NOP**
SESAR Key Feature:	Optimised ATM Network Services
Essential Operational Change / PCP:	S-AF4.2 Collaborative NOP
DP Families:	4.2.2 Interactive Rolling NOP 4.2.4 AOP/NOP Information Sharing
OI Steps & *Enablers*:	DCB-0102, DCB-0103-A
Dependencies	AOM19.1
ICAO ASBUs:	NOPS B1/2
Network Strategy Plan:	SO2/1, SO2/2, SO2/3, SO2/4
Operating Environment:	Airport, Terminal, En-Route, Network
EATMN Systems:	ATFCM

Applicable regulations & standards

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

When

FOC: **01/01/2022**

Who

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

Where

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

Status

On time

Completion rate end 2019: **5%**

Estimated achievement: **12/2021**

Benefits

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.

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

Safety
Enhanced by improved sharing of the network situation.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Develop and implement ATFCM procedures for interaction with the NOP.

Airport Operators have to:

1. Provide the required data to the Network Manager for DDR;
2. Perform the integration of the AOP with the NOP.

Airspace Users have to:

1. Provide the required data to the Network Manager for DDR.

Network Manager has to:

1. Develop AOP/NOP interfaces;
2. Integrate the AOPs into the Network Operation Plan;
3. Enhance the NM technical platform and services, including inter alia new functional capabilities; enhanced planning process, enhancements of post-analysis tools and process;
4. Implement ATFCM procedures pertinent to the NM system changes.

SOLUTION - #19 Automated support for traffic complexity detection and resolution

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.

Implement. Objective	**FCM06-Traffic Complexity Assessment**
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:	NOPS B1/4
Network Strategy Plan:	SO4/3, SO5/4
Operating Environment:	Terminal, En-Route, Network
EATMN Systems:	ATFCM, FDPS/SDPS & HMI

When

FOC: **01/01/2022**

Who

Stakeholders:
- ANSPs
- Network Manager

Where

Applicability Area
All ECAC+ States
Except Luxembourg, Malta and Morocco.

Status

Risk of delay

Completion rate end 2019: **17%**

Estimated achievement: **12/2022**

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Implement Local Traffic Load Management tool, Local Traffic Complexity tools and procedures;
2. Receive, process and integrate ETFMS Flight Data (EFD)

Network Manager has to:

1. Provide EFD to the local traffic complexity tools;
2. Improve the quality of the planned trajectory, thus enhancing flight planning and complexity assessment;
3. Implement scenario management tools and procedures in support of traffic complexity management in the pre-tactical phase.

SOLUTION - #18 CTOT and TTA

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.

Implement. Objective	**FCM07-CTOT to TTA for ATFCM**
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 4.3.2 - Reconciled target times for ATFCM and arrival sequencing
OI Steps & *Enablers*:	DCB-0208
Dependencies:	No dependencies
ICAO ASBUs:	NOPS B1/9
Network Strategy Plan:	SO4/3, SO6/4
Operating Environment:	Terminal, En-Route, Network
EATMN Systems:	ATFCM, FDPS/SDPS & HMI

When

FOC: **01/01/2022**

Who

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

Where

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

Status

Initial objective

Completion rate end 2019: **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
Copy 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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Adapt ATM/ATFCM systems to enable the Target Times extraction and presentation to relevant operational personnel;
2. Implement procedures and processes in support of Target Time sharing;
3. Adapt systems, and implement procedures and processes to support Calculated Take-off Time to Target Times for ATFCM purposes.

Airport Operators have to:

1. Adapt airport systems, and implement procedures to support reconciled target times for ATFCM and arrival sequencing.

Airspace Users have to:

1. Adapt systems at airspace users' operations centres to enable Target Times extraction and distribution and Implement procedures and processes to adhere to TTs;
2. Adapt systems and implement procedures to support Calculated Take-off Time to Target Times for ATFCM purposes.

Network Manager has to:

1. Adapt NM systems to support Target Time sharing;
2. Adapt systems and implement procedures to support Calculated Take-off Time to Target Times for ATFCM purposes

SOLUTION - #56 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 by reducing the rate of rejection of swap request.
The Network Manager will supervise the swapping or changing of flight priority requests.

Implement. Objective	**FCM09-Enhanced ATFM Slot swap**
SESAR Key Feature:	Optimised ATM Network Services
Essential Operational Change / PCP:	Intermediate step towards UDPP - User Driven Prioritisation Process
OI Steps & *Enablers*:	AUO-0101-A
Dependencies:	No dependencies
ICAO ASBUs:	NOPS B1/7
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 2019: **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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

Network Manager has to:

1. Update the NM systems, and develop associated procedures as necessary allowing ATFM Slot swapping;

Airspace Users have to:

1. Update as necessary the Flight Operations Centre (FOC) systems and interface within the NM systems so as to allow the use of the ATFM Slot swapping functionality;
2. Ensure that all operational personnel concerned with FOC is adequately trained for their job functions in relation to the implementation of ATFM Slot swapping.

SOLUTION - #35 MET information exchange
SOLUTION - #46 SWIM yellow 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).

Implement. Objective	**INF08.1-Information Exchanges using the SWIM Yellow TI Profile**
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:	AMET B2/4, DAIM B2/1, SWIM B3/1
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: **01/01/2025**

Who

Stakeholders:
- Regulators
- ANSPs
- Airspace Users
- Military Authorities
- Network Manager

Where

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

Status **Not available**

Completion rate end 2019: **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

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Supporting material for SWIM foundational specifications, EUROCONTROL
- SWIM Technical Infrastructure - Blue Profile, EUROCONTROL
- SARPS on AIRM, ICAO
- Community specification on FDP IOP, CEN
- Revision of ATM information security EN 16495, CEN
- Aeronautical Information System Security (AISS) Framework GuidanceED-201A, EUROCAE
- Aeronautical Information System Security (AISS) Framework GuidanceED-204A, EUROCAE

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs, Airport Operators, Military Authorities, Airspace Users and **Network Manager** have to:

1. Implement Aeronautical information exchanges;
2. Implement Meteorological Information exchanges;
3. Implement Cooperative Network information exchanges;
4. Implement Flight Information exchanges.

SOLUTION - #28, *#46* Initial ground-ground interoperability

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.

Implement. Objective	**INF08.2- Information Exchanges using the SWIM Blue TI Profile**
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:	SWIM B3/1, TBO B3/1
Network Strategy Plan:	SO5/2, SO5/5
Operating Environment:	Airport, Terminal, En-Route, Network
EATMN Systems:	AIS, ASM/ATFCM, FDPS/SDPS & HMI

When

FOC: **01/01/2027**

Who

Stakeholders:
- ANSPs
- Network Manager

Where

Applicability Area
All EU+ States

Status **Initial objective**

Completion rate end 2019: **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

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Supporting material for SWIM foundational specifications, EUROCONTROL
- SWIM Technical Infrastructure - Blue Profile, EUROCONTROL
- AIXM Edition 5.2, EUROCONTROL
- SARPS on AIRM, ICAO
- Community specification on FDP IOP, CEN
- Revision of ATM information security EN 16495, CEN
- Aeronautical Information System Security (AISS) Framework GuidanceED-201A, EUROCAE
- Aeronautical Information System Security (AISS) Framework GuidanceED-204A, EUROCAE

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs and **Network Manager** have to:

1. Implement the appropriate infrastructure components in accordance with the SWIM TI Blue Profile;
2. Implement Flight information exchanges related to the Flight Object using the Blue SWIM TI profile

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4.3 Deployment Views

V5 Deployment

Digital AIM and MET services

Roadmap

EOC	Deployment Scenario	SESAR SOL	Impl. Objective	Objective Title	Decision type			Planned Implementation FOC-Reported progress											AAS Milestone	SESAR Key Feature
					Regulated	Committed	Local	←	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
dS	Nil	Nil	INF07	Electronic Terrain and Obstacle Data (e-TOD)				21%												*Nil*	*EAI*
dS	Digitally enhanced briefing	#34	INF09	Digital Integrated Briefing						Based on local decision										*Nil*	*EAI*
dS	Nil	Nil	ITY-ADQ	Ensure quality of AIM data and inormation				10%												*Nil*	*EAI*

SOLUTION - Nil INF07-Electronic Terrain and Obstacle Data (e-TOD)

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.

Implement. Objective	**INF07-Electronic Terrain and Obstacle Data (e-TOD)**
SESAR Key Feature:	Enabling Aviation Infrastructure
Essential Operational Change / PCP:	Information reference and exchange models
DP Families:	1.2.2 Geographical database for procedure design
OI Steps & *Enablers*:	*AIMS-16*
Dependencies (Preedecessor):	ITY-ADQ
ICAO ASBUs:	DAIM B1/3, DAIM B1/4
Network Strategy Plan:	SO2/5
Operating Environment:	Airport, Terminal
EATMN Systems:	AIS

When

FOC: **01/01/2019**

Who

Stakeholders:
- Regulators
- ANSPs
- Airspace Users

Where

Applicability Area
All ECAC+ States except MUAC

Status

Late

Completion rate end 2019: **21%**

Estimated achievement: **12/2022**

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

Benefits

Safety

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).

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Performance-based Navigation (PBN) Manual ICAO Doc 9613 Edition 5.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

National Regulators have to:

1. Establish a National TOD policy and a TOD regulatory framework.

ANSPs and **Airport Authorities** have to:

1. Plan and execute the collection, management and provision of TOD in accordance with the national TOD policy and regulatory framework;

SOLUTION - #34 Digital integrated briefing

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).

Implement. Objective	**INF09-Digital Integrated Briefing**
SESAR Key Feature:	Enabling Aviation Infrastructure
Essential Operational Change / PCP:	Digital integrated briefing
OI Steps & *Enablers*:	*IS-0205*
Dependencies:	INF08.1 SWIM
ICAO ASBUs:	DAIM B1/7, AMET B1/4
Network Strategy Plan:	SO2/5
Operating Environment:	Airport, Network
EATMN Systems:	AIS

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 2019: **n/a**

Estimated achievement: **n/a**

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)

Benefits

Operational efficiency

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.

Safety

Safety

CopyThe 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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Update the systems to receive and distribute AIS and MET information electronically;
2. Provide airspace users with pre-flight digital integrated briefing.

International Organisations (including Standardisation bodies**)** have to:

1. Develop the standards for the use of digital NOTAM;
2. Develop regulatory material for the use of digital NOTAM.

Network Manager has to:

1. Generate and provide pre-flight briefings based on digital data.

SOLUTION - Nil ITY-ADQ - Ensure quality of AIM data and 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.

Implement. Objective	**ITY-ADQ - Ensure quality of AIM data and information**
SESAR Key Feature:	Enabling Aviation Infrastructure
Essential Operational Change / PCP:	Prerequisite for: - S-AF1.2 - Enhanced Terminal Airspace using RNP based Operations - 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 Engineering View of Implementation Objectives.

Who

Stakeholders:
- Regulators
- ANSPs
- Airport Operators
- Industry

Where

Applicability Area
All EU+ States,
plus Israel and Turkey,
except MUAC.

Status

Late

Completion rate end 2019: **10%**

Estimated achievement: **12/2023**

Benefits

Safety

Improved consistency, reliability and integrity of aeronautical data and aeronautical information.

Security

Enhanced security due to the implementation of security requirements.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Performance-based Navigation (PBN) Manual ICAO Doc 9613 Edition 5.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs, Airport Operators, Industry have to take the necessary steps to:

1. Implement the requirements concerning data quality, evidence, origination, process, error reporting and rectification;
2. Validate and verify all tools used to support or automate processes in the origination, production, storage, handling, processing and transfer of aeronautical data and/or aeronautical information;
3. Establish formal arrangements with other relevant parties for the exchange of aeronautical data and/or aeronautical information;
4. Implement and maintain a quality management system;
5. Implement the common dataset, provide and document the IAIP, aerodrome mapping, electronic obstacle data, electronic terrain data and metadata;
6. Implement a common data exchange for IAIP, aerodrome mapping, electronic obstacle data and electronic terrain data allowing digital data exchange and verify that all aeronautical data and aeronautical information within the IAIP, AIP amendments and AIP supplements are made available to the next intended user;

Regulators have to, verify the compliance with data quality requirements and supervise safety assessments. As well as, verify the establishment of formal arrangements and that all parties comply with all data requirements.

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4.4 Deployment Views

V5 Deployment

Virtualisation of service provision

Roadmap

EOC	Deployment Scenario	SESAR SOL	Impl. Objective	Objective Title	Decision type			Planned Implementation FOC-Reported progress											AAS Milestone	SESAR Key Feature
					Regulated	Committed	Local	←	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
vS	Single remote TWR for medium traffic volumes. Remotely provided ATS for contingency situations at aerodromes. Remote TWR for two low density aerodromes. ATC and AFIS in a single low density aerodrome from a remote CWP.	#12 #71 #52 #13	AOP14	Remote Tower Services				Based on local decision											*Nil*	*HPAO*
vS	Virtual centre concept	PJ.16-03	OD-5	VC concept, CWP and service interface	No decision			No impl. objective yet. E.i no date yet.											*AM-4.5*	*EAI*

Virtualisation of service provision

Deployment Scenario
Single remote TWR for medium traffic volumes
Remotely provided ATS for contingency situations at ADs

SOLUTION - #12	**Single remote TWR operations for medium traffic volumes**
SOLUTION - #13	**Remotely provided TWR services for contingency at ADs**
SOLUTION - #52	**Remote TWR for two low density aerodromes**
SOLUTION - #71	**ATC and AFIS at single low density AD from a remote CWP**

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 with 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).

Implement. Objective	**AOP14-Remote Tower Services**
SESAR Key Feature:	Advanced Air Traffic Services
Essential Operational Change	Remote Tower
OI Steps & *Enablers*:	SDM-0201, SDM-0204, SDM-0205
Dependencies :	No dependencies
ICAO ASBUs:	RATS B1/1
Network Strategy Plan:	SO6/5
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 2019: **Implemented in 4 locations Planned / ongoing in 20 locations**

Estimated achievement: **n/a**

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

Operational efficiency

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.

Cost efficiency

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the “Technical Annex”, as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ‘’Technical Annex’’.

ANSPs have to define and implement system improvements allowing for the implementation of remote tower. This will allow 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. 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.;

ANSPs and **Airport Operators** have to ensure that all procedures and processes applicable for the remote tower concept are updated to the chosen operating scenario for remote tower aerodrome

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. 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. 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. 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. 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. The main enablers of VC are: • a standardised/common CWP for the controllers based on standardised "plug-in" applications; • ATM data/information service providers operating on standardised systems; • Common standardised interfaces between CWP and data/information providers. 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; RDP, FDP, VCS to transition to SOA 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: - Common controllers CWP; - ATM data/information service providers ; - Interfaces between CWP and data/information providers;

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4.5 Deployment Views

V5 Deployment

ATp Airport and TMA performance

Roadmap

EOC	Deployment Scenario	SESAR SOL	Impl. Objective	Objective Title	Decision type			Planned Implementation FOC-Reported progress												AAS Milestone	SESAR Key Feature
					Regulated	Committed	Local	←	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
ATp	Nil	Nil	ATC07.1	Arrival management tools				61%												Nil	AATS
ATp	Enhanced AMAN/DMAN integration	#54	ATC19	Enhanced AMAN/DMAN integration						Based on local decision										Nil	AATS
ATp	Nil	Nil	ENV01	Continuous Descent Operations				39%												Nil	AATS
ATp	Nil	Nil	ENV03	Continuous Climb Operations						Based on local decision										Nil	AATS
ATp	Enhanced TMA using RNP-based operations	#62	NAV03.1	RNAV1 in TMA Operations				23%												Nil	AATS
ATp	Enhanced TMA using RNP-based operations	#09, #51	NAV03.2	RNP1 in TMA Operations				7%												Nil	AATS
ATp	Enhanced GND ATCO awareness in AWO	#70	AOP04.1	A-SMGCS Surveillance (former Level 1)				70%												Nil	HPAO
ATp	Nil	Nil	AOP04.2	A-SMGCS RMCA (former Level 2)				56%												Nil	HPAO
ATp	DMAN synchronised with pre-departure sequencing	#106	AOP05	Airport CDM				53%												Nil	HPAO
ATp	Time-based separation for final approach	#64	AOP10	Time Based Separation				6%												Nil	HPAO
ATp	Airport safety nets	#02	AOP12	Improve RWY safety with CATC detection and CMAC				23%												Nil	HPAO
ATp	Auto. assist to ATCO for surface movement plan & routing DMAN synchronised with pre-DEP sequencing	#22 #53	AOP13	Auto. Assist. ATCO for Surface plan. and routing				0%												Nil	HPAO
ATp	Airport safety nets vehicle	#04	AOP15	Traffic sit. awareness and SNET for the vehicle drivers						Based on local decision										Nil	HPAO
ATp	Integrated surface management	#47	AOP16	Guidance assistance through AGL						Based on local decision										Nil	HPAO
ATp	Enhanced airport safety nets	#01	AOP18	Runway Status Lights (RWSL)						Based on local decision										Nil	HPAO
ATp	Nil	Nil	ENV02	Airport Collaborative Env. Management						Based on local decision										Nil	HPAO
ATp	Nil	Nil	SAF11	Improve RWY safety by preventing RWY excursions				66%												Nil	HPAO
ATp	D-TAXI service for CPDLC application	#23	Nil	Nil	No decision					No impl. objective yet. E.i no date yet.										Nil	HPAO
ATp	Virtual block control in LVPs	#48	Nil	Nil	No decision					No impl. objective yet. E.i no date yet.										Nil	HPAO
ATp	De-icing management tool	#116	Nil	Nil	No decision					No impl. objective yet. E.i no date yet.										Nil	HPAO
ATp	Reducing landing minima in LVP using enhanced flight vision systems (EFVS)	#117	Nil	Nil	No decision					No impl. objective yet. E.i no date yet.										Nil	HPAO
ATp	Continuous descent operations (CDO)	#11	Nil	Nil	No decision					No impl. objective yet. E.i no date yet.										Nil	AATS
ATp	Point merge in complex TMA	#107	Nil	Nil	No decision					No impl. objective yet. E.i no date yet.										Nil	AATS
ATp	AMAN and point merge	#108	Nil	Nil	No decision					No impl. objective yet. E.i no date yet.										Nil	AATS

SOLUTION - #70 Enhanced ground ATCO situation awareness in AWO

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 clearance to traffic on the basis of A-SMGCS Surveillance data.

Implement. Objective	**AOP04.1-A-SMGCS Surveillance (former Level 1)**
SESAR Key Feature:	High Performing Airport Operations
Essential Operational Change / PCP:	Pre-requisite for: - S-AF2.4 Automated Assistance to Controller for Surface Movement Planning and Routing (PCP) - S-AF2.2 DMAN integrating Surface Management Constraints (PCP) - 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:	SURF B0/2
Network Strategy Plan:	SO6/6
Operating Environment:	Airport
EATMN Systems:	FDPS/SDPS & HMI, SUR

When

FOC: **01/01/2021**

Who

Stakeholders:
- Regulators
- ANSPs
- Airspace Users

Where

Applicability Area
24 PCP airports
32 non-PCP airports

Status

Late

Completion rate end 2019: **70%**

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
- EUROCAE ED-87C, ED-116 & ED-117

Benefits

Capacity
Traffic throughput notably increased in low visibility conditions.

Environment
Reduction in fuel burn and emissions.

Operational Efficiency
More efficient control of surface traffic.

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

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- EUROCONTROL Specification for A-SMGCS, SPEC-171, Edition 1.1
- Interop Document on Surveillance, Routing, Safety Support, ED-xxx, EUROCAE
- Interop Document on Guidance Service data exchange, EUROCAE
- Guidelines for Surveillance Data Fusion for A-SMGCS Levels 1&2, ED-128A, EUROCAE
- A-SMGCS; Part 5: Harmonised Standard for access to the radio spectrum for Multilateration (MLAT) equipment; Sub-part 1: Receivers and Interrogators EN 303 213-5-1 (V 1.1.1) ETSI
- A-SMGCS; Part 5: Harmonised Standard for access to the radio spectrum for Multilateration (MLAT) equipment; Sub-part 2: Reference and vehicle transmitters EN 303 213-5-2 (V 1.1.1), ETSI

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

Regulators have to:

1. Mandate the carriage of required aircraft and vehicle equipment to enable location and identification of the aircraft and vehicles on the movement area (including military aircraft, as appropriate)
2. Publish A-SMGCS Surveillance procedures (including transponder-operating procedures) in national aeronautical information publications.

ANSPs have to install all the surveillance equipment and related systems to enable aerodrome controllers to locate and identify aircraft and vehicles on the manoeuvering area and implement approved A-SMGCS operational procedures.

Airport Operators have to

3. Install all the surveillance equipment and related systems to enable aerodrome controllers to locate and identify aircraft and vehicles on the manoeuvering area and implement approved A-SMGCS operational procedures.
4. Equip vehicles operating on the manoeuvering area to provide their position and identity to the A-SMGCS Surveillance system.

Airspace users have to adopt the procedures for use of correct Mode-S transponder setting for enabling cooperative A-SMGCS detection on the movement areas.

SOLUTION - Nil AOP04.2 - A-SMGCS 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.

Implement. Objective	**AOP04.2-A-SMGCS RMCA (former Level 2)**
SESAR Key Feature:	High Performing Airport Operations
Essential Operational Change / PCP:	Pre-requisite for: - S-AF2.4 Automated Assistance to Controller for Surface Movement Planning and Routing (PCP) - S-AF2.2 DMAN integrating Surface Management Constraints (PCP) - Integrated Surface Management (EOC)
DP Families:	2.2.1 A-SMGCS level 1 and 2
OI Steps & *Enablers*:	AOM-0602, AOM-0604, CTE-N06a, CTE-N06b
Dependencies:	AOP04.1 (A-SMGCS Surveillance)
ICAO ASBUs:	SURF B0/3
Network Strategy Plan:	SO6/6
Operating Environment:	Airport
EATMN Systems:	FDPS/SDPS & HMI, SUR

When

FOC: **01/01/2021**

Who

Stakeholders:
- ANSPs
- Airport Operators

Where

Applicability Area
24 PCP airports
29 non-PCP airports

Status Late

Completion rate end 2019: **56%**

Estimated achievement: **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-E

Benefits

Operational efficiency

Operational Efficiency
More efficient control of surface traffic.

Safety

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

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- EUROCONTROL Specification for A-SMGCS, SPEC-171, Edition 1.1
- Interop Document on Surveillance, Routing, Safety Support, ED-xxx, EUROCAE
- Interop Document on Guidance Service data exchange, EUROCAE
- Guidelines for Surveillance Data Fusion for A-SMGCS Levels 1&2, ED-128A, EUROCAE
- A-SMGCS; Part 5: Harmonised Standard for access to the radio spectrum for Multilateration (MLAT) equipment; Sub-part 1: Receivers and Interrogators EN 303 213-5-1 (V 1.1.1) ETSI
- A-SMGCS; Part 5: Harmonised Standard for access to the radio spectrum for Multilateration (MLAT) equipment; Sub-part 2: Reference and vehicle transmitters EN 303 213-5-2 (V 1.1.1), ETSI

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to install runway monitoring and conflict alerting (RMCA) function systems and adopt RMCA operational procedures in order to enable the detection of conflicts and intrusions in accordance with A-SMGCS RMCA requirements.

Airport Operators have to 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.

SOLUTION - #106 DMAN baseline for integrated AMAN-DMAN

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 enhancing the predictability of events, optimising the utilisation of resources and therefore increasing the efficiency of the overall system.

Implement. Objective	**AOP05 - Airport CDM**
SESAR Key Feature:	High Performing Airport Operations
Essential Operational Change / PCP:	- S-AF2.1 DMAN synchronised with Pre-departure sequencing (PCP) Pre-requisite for: - Collaborative Airport (EOC)
DP Families:	2.1.1 Initial DMAN 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:	ACDM B0/2, NOPS B0/4, RSEQ B0/2
Network Strategy Plan:	SO6/4
Operating Environment:	Airport, Network
EATMN Systems:	FDPS/SDPS & HMI

When

FOC: **01/01/2021**

Who

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

Where

Applicability Area
24 PCP airports
27 non-PCP Airports

Status

Late

Completion rate end 2019: **53%**

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.

Environment
Reduced noise and emissions due to limiting engine ground running time due to better timed operations.

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

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Airport CDM, Community Specification, ETSI
- AIXM Edition 5.2, EUROCONTROL

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs, Airport Operators and Airspace Users have to:

1. Define and agree performance objectives and KPIs at local level;
2. Define and implement local procedures for information sharing through Letters of Agreement and/or Memorandum of Understanding;
3. Define and implement local procedures for turnaround processes;
4. Define and implement procedures for CDM in adverse conditions, including the de-icing;
5. Continually review and measure airport performance.

Furthermore:

ANSPs have to define and implement variable taxi-time and pre-departure sequencing procedure (i.e. initial DMAN);

Airport Operators have to define and implement the exchange of messages, Flight Update Message (FUM) and Departure Planning Information (DPI) between NMOC and the airport;

Network Manager has already updated NM systems and defined procedures to support the exchange of messages, Flight Update Message (FUM) and Departure Planning Information (DPI) between NMOC and airports.

SOLUTION - #64 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.

Implement. Objective	**AOP10-Time Based Separation**
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:	WAKE B2/7
Network Strategy Plan:	SO6/5
Operating Environment:	Airport, Terminal
EATMN Systems:	FDPS/SDPS & HMI, MET

When

FOC: **01/01/2024**

Who

Stakeholders:
- Regulators
- ANSPs
- Airspace Users

Where

Applicability Area
16 PCP Airports

Status

Not available

Completion rate end 2019: **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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- EUROCONTROL Guidelines for TBS, EUROCONTROL-GUID-xxx, Edition 1.0

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Ensure that the flight data processing and AMAN systems are compatible with the TBS support tool for the visualisation of the final approach separation or spacing, and are able to switch between time and distance based wake turbulence radar separation rules. Switching from TBS to Distance Based Separation (DBS) is necessary to cover contingency and other locally-driven requirements
2. Modify the controller working position (CWP) to integrate the new TBS support tool with safety nets to support the air traffic controller
3. Feed local meteorological (MET) information providing actual glide slope wind conditions to the TBS support tool;
4. Ensure that the TBS Support tool to provide automatic monitoring and alerting of non-conformant behaviours, infringements, wrong aircraft.

Airspace Users have to:

1. Train flight crews on TBS operations

SOLUTION - #02 Airport safety nets

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).

Implement. Objective	**AOP12- Improve RWY safety with CATC detection and CMAC**
SESAR Key Feature:	High Performing Airport Operations
Essential Operational Change / PCP:	- S-AF2.1 - DMAN synchronised with pre-departure sequencing - S-AF2.5 - Airport Safety Nets
DP Families:	2.1.2 Electronic Flight Strips (EFS) 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:	SURF B1/3
Network Strategy Plan:	SO6/6
Operating Environment:	Airport
EATMN Systems:	FDPS/SDPS & HMI

FOC: **01/01/2021**

Who

Stakeholders:
- ANSPs
- Airport Operators
- Airspace Users

Where

Applicability Area
24 PCP airports
5 non-PCP airports

Status

Planned delay

Completion rate end 2019: **23%**

Estimated achievement: **12/2024**

Applicable regulations & standards

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

When

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- EUROCONTROL Specification for A-SMGCS, SPEC-171, Edition 1.1
- MASPS for A-SMGCS, ED-87E, EUROCAE
- CS on A-SMGCS Part 1: surveillance service including external interfaces, EN 303 213-1 (V 2.1.1), ETSI
- CS on A-SMGCS Part 2: airport safety support service EN 303 213-2(V 2.1.1,), ETSI
- CS on A-SMGCS Part 3: deployed cooperative sensor including its interfaces, EN 303 213-3(V 2.1.1), ETSI
- CS on A-SMGCS to comply with ED-87D EN 303 213-7(V 1.1.1), ETSI
- CS on A-SMGCS Part 8: A-SMGCS routing service EN 303 213-8(V 1.1.1), ETSI

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Deploy appropriate systems, constituents and associated procedures allowing the detection 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. This deployment is considered as an enhancement of the 'A-SMGCS Airport Safety Support' service (former A-SMGCS level 2 - Implementation Objective AOP04.2).
2. Implement an electronic clearance input (ECI) means such as the electronic flight strip (EFS), allowing the air traffic controller to input all clearances given to aircraft or vehicles into the ATC system. This means, such as EFS, shall have the appropriate interfaces allowing the integration of the instructions given by the air traffic controller with other data such as flight plan, surveillance, routing, published routes and procedures.

Airspace Users have to:

1. Train pilots on the 'Airport Safety Nets' systems and procedures (including phraseology);

SOLUTION - #22 Auto. assist ATCO surf movement planning and routing
SOLUTION - #53 Pre-DEP sequencing supported by route planning

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.

Implement. Objective	**AOP13-Auto. Assist. ATCO for Surface plan. and routing**
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:	SURF B1/4
Network Strategy Plan:	SO6/6
Operating Environment:	Airport
EATMN Systems:	FDPS/SDPS & HMI

When

FOC: **01/01/2024**

Who

Stakeholders:
- Regulators
- ANSPs

Where

Applicability Area
24 PCP airports
2 non-PCP airports

Status

Not available

Completion rate end 2019: **0%**

Estimated achievement: **Not available**

Applicable regulations & standards

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

Benefits

Capacity
Increased availability of taxiway resources and reduced total taxi time by ground movements.
Improved traffic flow on the aerodrome's manoeuvring area.

Environment
Reduced environmental impact by reducing fuel consumption and then CO2 emissions.

Operational Efficiency
Reduced fuel consumption due to reduced taxi time and reduced number of stops while taxiing.

Safety
Improved through increased controllers' situational awareness for all ground movements and potential conflicts resolution.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- EUROCONTROL Specification for A-SMGCS, SPEC-171, Edition 1.1
- MASPS for A-SMGCS, ED-87E, EUROCAE
- Interop Document on Surveillance, Routing, Safety Support, ED-xxx, EUROCAE
- Interop Document on Guidance Service data exchange, EUROCAE CS on A-SMGCS Part 1: surveillance service including external interfaces, EN 303 213-1 (V 2.1.1), ETSI
- CS on A-SMGCS Part 2: airport safety support service EN 303 213-2(V 2.1.1,), ETSI
- CS on A-SMGCS Part 3: deployed cooperative sensor including its interfaces, EN 303 213-3(V 2.1.1), ETSI
- CS on A-SMGCS to comply with ED-87D EN 303 213-7(V 1.1.1), ETSI
- CS on A-SMGCS Part 8: A-SMGCS routing service EN 303 213-8(V 1.1.1), ETSI

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Upgrade ATS systems to support the capability of receiving planned and cleared surface routes assigned to aircraft and vehicles and managing the status of the routes for all concerned aircraft and vehicles;
2. Ensure the planning and routing function is used to optimise pre-departure sequencing;
3. Define and implement local procedures for surface movement planning and routing

SOLUTION - #04 Enhanced sit. awareness and APO SNET for vehicle drivers

Vehicle drivers allowed to operate in the manoeuvring area of an aerodrome should use the functionality. 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 manoeuvring area regardless of weather conditions.

Implement. Objective	**AOP15 – Safety Nets for vehicle drivers**
SESAR Key Feature:	High Performing Airport Operations
Essential Operational Change:	Airport Safety Nets Vehicles
OI Steps & *Enablers*:	AO-0105, AO-0204
Dependencies:	AOP04.1
ICAO ASBUs:	SURF B2/2
Operating Environment:	Airport
EATMN Systems:	FDPS/SDPS & HMI

When

FOC: **n/a**

Who

Stakeholders:
- Regulators
- International Organisations
- Airspace Users

Where

Applicability Area
Subject to local needs

Status

Not available

Completion rate end 2019: **2%**

Estimated achievement: **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 vehicles operating in the manoeuvring area but also provide a safety enhancement for the aircraft operations, both on taxiways and runways, at the airport.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the “Technical Annex”, as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ‘’Technical Annex’’.

Regulators have to Promulgate the procedures for use of "Onboard Ground Vehicle System" and SNET.

International organisations have to develop standard for interface between A-SMGCS and On Board Vehicle System.

Airport Operators have to install "Onboard Ground Vehicle System" to process and display the own position and surrounding traffic. The processing may be provided by the central server making use A-SMGCS system or autonomously by Onboard Ground Vehicle system. SNET alerts to vehicle drivers function shall be installed in "Onboard Ground Vehicle System" too.

SOLUTION - #47 Guidance assistance through AGL

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.

Implement. Objective	**AOP16-Guidance assistance through AGL**
SESAR Key Feature:	High Performing Airport Operations
Essential Operational Change:	Ground Situational Awareness
OI Steps & *Enablers*:	AO-0222-A
Dependencies:	AOP13
ICAO ASBUs:	SURF B1/1
Operating Environment:	Airport
EATMN Systems:	FDPS/SDPS & HMI

Applicable regulations & standards

N/A

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 2019: **n/a**

Estimated achievement: **n/a**

Benefits

Capacity

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 manoeuvring area.

Environment

Environment.
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.

Operational Efficiency

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.

Safety

Safety.
Increase of situational awareness from pilots perspectives. Reduction of unplanned / unwanted taxi route deviations. Significantly lower runway incursion risk.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

International organisations have to develop the procedures and phraseology for taxi guidance by AGL and integrate taxi guidance by AGL in MASPS for the A-SMGCS.

ANSPs have to upgrade CWP/HMI to display and manage lights and routes and implement procedures for use of taxi guidance by AGL, as well as upgrade A-SMGCS to send taxi instructions as commands to the AGL system.

Airport Operators have to upgrade AGL system to enable the selective switching of the lamps and upgrade A-SMGCS to send taxi instructions as commands to the AGL system. The procedures for use of taxi guidance by AGL shall be implemented too.

Airspace users have to develop and implement procedures for use of taxi guidance by AGL.

SOLUTION - #01 Runway status lights

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.

Implement. Objective	**AOP18-Runway Status Lights (RWSL)**
SESAR Key Feature:	High Performing Airport Operations
Essential Operational Change:	Enhanced Airport Safety Nets
OI Steps & *Enablers*:	AO-0209
Dependencies:	AOP04.1
ICAO ASBUs:	SURF B2/2
Operating Environment:	Airport
EATMN Systems:	FDPS & HMI, ATFCM

Applicable regulations & standards

- ICAO Annex 14 (Aerodromes), Volume I

When

FOC: **n/a**

Who

Stakeholders:
- Regulators
- International Organisation
- ANSPs
- Airport Operators
- Airspace Users

Where

Applicability Area
Subject to local needs

Status

Not available

Completion rate end 2019: **1%**

Estimated achievement: **n/a**

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

International organisations have to develop the standards for operational use of RWSL, RWSL design and approval, and interfaces and information exchanges of RWSL Management Tool.

Regulators have to promulgate the procedures for use of RWSL.

ANSPs have to Install RWSL management tool, upgrade TWR CWP to interface with RWSL management tool and implement procedures for the use of RWSL.

Airport Operators have to upgrade Airfield Ground Lighting system to provide the RWSL, install RWSL management tool, and implement procedures for the use of RWSL.

Airspace users have to develop and implement procedures for use of RWSL.

SOLUTION - Nil ATC07.1 - Arrival management tools

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.

Implement. Objective	**ATC07.1 - Arrival management tools**
SESAR Key Feature:	Advanced Air Traffic Services
Essential Operational Change / PCP:	- Basic AMAN Facilitator for: - S-AF1.1 AMAN Extended to En-route Airspace (PCP) - AMAN/DMAN Integration Including Multiple Airports (OC)
DP Families:	1.1.1 Basic AMAN
OI Steps & *Enablers*:	TS-0102
Dependencies:	No dependencies
ICAO ASBUs:	RSEQ B0/1
Network Strategy Plan:	SO4/1
Operating Environment:	Terminal
EATMN Systems:	FDPS/SDPS & HMI

When

FOC: **01/01/2020**

Who

Stakeholders:
- ANSPs

Where

Applicability Area
22 PCP Airports
11 non-PCP airports

Status

On time

Completion rate end 2019: **69%**

Estimated achievement: **12/2020**

Applicable regulations & standards

N/A

Benefits

Capacity
Improved airport/TMA capacity and reduced delays.

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Implement initial basic arrival management tools;
2. Define, validate and implement ATC procedures for operational use of basic AMAN tools;
3. Adapt TMA organisation, where necessary, to accommodate the use of basic AMAN.

SOLUTION - #54 Flow-based integration of AMAN and DMAN

Integrated AMAN and DMAN aims at increasing predictability and resilience at an airport by improved coordination 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

Implement. Objective	**ATC19- Enhanced AMAN/DMAN integration**
SESAR Key Feature:	Advanced Air Traffic Services
Essential Operational Change / PCP:	AMAN/DMAN integration including multiple airports
OI Steps & *Enablers*:	TS-0308
Dependencies:	No dependencies
ICAO ASBUs:	RSEQ B2/1
Network Strategy Plan:	SO6/5, SO4/1
Operating Environment:	Airport, Terminal
EATMN Systems:	FDPS/SDPS & HMI

Applicable regulations & standards

N/A

When

FOC: **n/a**

Who

Stakeholders:
- ANSPs
- International Organisations

Where

Applicability Area
Subject to local needs and complexity

Status

Not available

Completion rate end 2019:

Implemented in one location
Planned / Ongoing in 5 locations

Estimated achievement: **n/a**

Benefits

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).

Operational Efficiency

Contribution to Predictability; increase in resilience.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Couple AMAN and DMAN systems in a master/slave configuration and shall support co-ordination between ACC/APP and TWR controllers;
2. Integrate surface movement processing system with DMAN for a stable and optimized pre-departure sequence;
3. Upgrade CWP to enable display and management of the data coming from integrated AMAN/DMAN.

SOLUTION - Nil 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-descentoperations.

(*) 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.

Implement. Objective	**ENV01-Continuous Descent Operations**
SESAR Key Feature:	Advanced Air Traffic Services
OI Steps & *Enablers*:	AOM-0701, AOM-0702-A
Dependencies:	No dependencies
ICAO ASBUs:	APTA B0/4
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
69 Airports

Status **On time**

Completion rate end 2019: **39%**

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Coordinate activities and implement rules and ATC procedures for the application of CDO techniques in the TMA, whenever practicable;
2. Deploy performance-based airspace and arrival procedures that allow the aircraft to fly a continuous descent approach taking into account airspace and traffic complexity;
3. In cooperation with airports, monitor and measure CDO execution, where possible based upon a harmonised methodology and metrics.

Airport Operators have to:

1. In cooperation with the ANSP, monitor and measure CDO execution, where possible based upon a harmonised methodology.

Airspace Users have to:

1. Include CDO techniques in the aircrew training manual and support its implementation wherever possible;

SOLUTION - Nil ENV02-Airport Collaborative Env. Management

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 CO2 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.

Implement. Objective	**ENV02-Airport Collaborative Env. Management**
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

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
- ICAO Annex 16; Vol. I-Aircraft Noise & Vol. II-Aircraft engine emissions

When

FOC: **n/a**

Who

Stakeholders:
- ANSPs
- Airport Operators
- Airspace Users
- EUROCONTROL

Where

Applicability Area
Subject to local needs

Status

On time

Completion rate end 2019: **Implemented in 46 airports;**

Planned/ongoing in 4 airports

Estimated achievement: **n/a**

Benefits

Environment

Reduction of noise, fuel burn and CO. Contributing to cost savings for airlines and CO2 reductions for airports.

Operational efficiency

Operational Efficiency

Reductions of noise, fuel burn and CO. Contributing to cost savings for airlines and C02 reductions for airports.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs, Airport Operators and **Airspace Users** have to:

1. Establish together working partnership arrangements to manage and control environmental impacts of air traffic procedures in and around the airport.

Airport Operators have to:

1. Ensure that appropriate and relevant performance information availability at Airports;
2. Ensure appropriate Airport policy and procedures and, if required, relevant infrastructures needed to manage and mitigate pollution due to de-icing activities.

SOLUTION - Nil ENV03-Continuous Climb Operations

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-anddescent-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.

Implement. Objective	**ENV03-Continuous Climb Operations**
SESAR Key Feature:	Advanced Air Traffic Services
OI Steps & *Enablers*:	AOM-0703
Dependencies:	No dependencies
ICAO ASBU:	APTA B0/5
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.

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 2019: **Implemented in 51 airports**

Planned/ongoing in 31 airports

Estimated achievement: **n/a**

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 maybe 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.

Industrialisation & standardisation activities:

Not applicable. Details of available supporting material are in the “Technical Annex”. The details of all already available standards, specifications, guidelines and the regulations are found in the “Technical Annex”, as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ‘’Technical Annex’’.

ANSPs have to:

1. Implement rules and procedures for the application of CCO techniques;
2. In cooperation with airports, monitor and measure CCO execution, where possible based upon a harmonised methodology and metrics;

Airport Operators have to:

1. In cooperation with the ANSP, monitor and measure CCO execution, where possible based upon a harmonised methodology and metrics;

Airspace Users have to:

1. Include CCO techniques in the aircrew training manual.

SOLUTION - #62 P-RNAV in a complex TMA

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.

Implement. Objective	**NAV03.1-RNAV1 in TMA Operations**
SESAR Key Feature:	Advanced Air Traffic Services
Essential Operational Change / PCP:	- Introduction of P-RNAV - Predecessor of S-AF1.2 Enhanced TMA using RNP-based operations
OI Steps & *Enablers*:	AOM-0601, *CTE-N08*
Dependencies:	No dependencies
ICAO ASBUs:	APTA B0/2
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

When

FOC: **06/06/2030**

Who

Stakeholders:
- Regulators
- ANSPs
- Airspace Users

Where

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

Status

On time

Completion rate end 2019: **23%**

Estimated achievement: **12/2030**

Benefits

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

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

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

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Develop an airspace concept based on RNAV 1 arrival and departure procedures and provide appropriate terrestrial navigation infrastructure to support RNAV 1 operations.
2. Develop and implement RNAV 1 SID and RNAV 1 STAR for the instrument RWY, as well as establish the transition plan for PBN in ANS provision.

Regulators have to verify the transition plan for PBN in ANS provision.

Airspace Users have to equip aircraft with systems approved for RNAV 1 operations.

*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.*

SOLUTION - #09 Enhanced TMA ops with auto RNP transit. to ILS
SOLUTION - #51 Enhanced TMA ops with LVP procedures

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).

Implement. Objective	**NAV03.2-RNP1 in TMA Operations**
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) 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:	APTA B1/2
Network Strategy Plan:	SO6/5
Operating Environment:	Terminal
EATMN Systems:	FDPS/SDPS & HMI, NAV

When

FOC: **06/06/2030**

Who

Stakeholders:
- ANSPs
- Airspace Users
- Regulators

Where

Applicability Area
App.1 = EU SES RWYs
App.2 = Other ECAC+ RWYs
except Armenia, Azerbaijan, Estonia, Latvia, Malta, Portugal, Romania and MUAC.

Status

Not available

Completion rate end 2019: **7%**

Estimated achievement: **n/a**

Applicable regulations & standards

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

Benefits

Operational Efficiency
Reduction in fuel burn through optimised TMA procedures.

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

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

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Performance-based Navigation (PBN) Manual ICAO Doc 9613 Edition 5.
- EASA regulatory material on PBN incorporating ICAO Doc 9613, EASA RMT0519

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Develop an airspace concept based on designated RNP 1 arrival and departure procedures with Radius to Fix (RF). Where necessary, provide appropriate navigation infrastructure to support RNP 1 operations including the infrastructure required for GNSS reversion.
2. Develop and implement RNP1 SID and RNP1 STAR for the instrument RWY, as well as establish the transition plan for PBN in ANS provision.

Regulators have to verify the transition plan for PBN in ANS provision.

Airspace Users have to equip aircraft with systems approved for RNP 1 with Radius to Fix (RF) operations.

*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.*

SOLUTION - Nil SAF11-Improve RWY safety by preventing RWY 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.

Implement. Objective	**SAF11-Improve RWY safety by preventing RWY excursions**
SESAR Key Feature:	Advanced Air Traffic Services
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
- Airspace Users
- Network Manager

Where

Applicability Area
All ECAC+ States,
except Malta and Morocco

Status

Late

Completion rate end 2019: **69%**

Estimated achievement: **12/2020**

Benefits

Safety

Significant improvement, through reduced risk of incidents and accidents on runways.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs, **Airport Operators** and **Airspace Users** have to Implement the appropriate parts of the European Action Plan for the Prevention of Runway Excursions.

Furthermore, **ANSPs** have to Implement the appropriate parts of the European Action Plan for:

1. The Prevention of Runway Excursions with regard to the provision of aeronautical information services
2. The Prevention of Runway Excursions with regard to the provision of meteorological services for international aviation.

Network Manager have to, maintain EAPPRE and participate in safety information sharing networks, and exchange relevant information.

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4.6 Deployment Views

V5 Deployment

dA Fully dynamic and optimised airspace

Roadmap

EOC	Deployment Scenario	SESAR SOL	Impl. Objective	Objective Title	Decision type			Planned Implementation FOC-Reported progress											AAS Milestone	SESAR Key Feature
					Regulated	Committed	Local	←	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
dA	Airspace management and advanced FUA	#31	AOM19.1	ASM Tools to Support AFUA				34%												AM-1.8	OANS
dA	Airspace management and advanced FUA	#31	AOM19.2	ASM Management of Real-Time Airspace Data				5%												AM-1.8	OANS
dA	Airspace management and advanced FUA	#31	AOM19.3	Full Rolling ASM/ATFCM and ASM Information Sharing				14%												AM-1.8	OANS
dA	Airspace management and advanced FUA	#31	AOM19.4	Management of Pre-defined Airspace Configurations				11%												Nil	OANS
dA	Free Route	#66 #33 PL06-01	OD-2	FRA ensuring connectivity with TMA	No decision				No impl. objective yet. E.i no date yet.											AM-1.7	OANS
dA	Free Route	#33, #66	AOM21.2	Free Route Airspace				67%												AM-1.6 AM-1.10	AATS
dA	Sector team operations - en-route air traffic organiser. MTCD and conformance monitoring tool.	#27, #104	ATC12.1	MONA, TCT and MTCD				49%												AM-1.15 AM-5.1	AATS
dA	Nil	Nil	ATC15.1	Initial extension of AMAN to En-route				61%												Nil	AATS
dA	AMAN extended to en-route airspace	#05	ATC15.2	AMAN Extended to En-route Airspace				18%												AM-1.3	AATS
dA	Nil	Nil	ATC17	E. Dialogue, Automat.Assist to ATCO during COTR				32%												AM-1.3	AATS
dA	Multi-sector planning	#63 #70W2	ATC18	Multi Sector Planning En-route P2T						Based on local decision										AM-4.3 AM-5.1	AATS
dA	Nil	Nil	ITY-FMTP	Common flight message transfer protocol (FMTP)				77%												AM-1.3	EAI
dA	Optimised route network using advanced RNP	#10	Nil	Nil	No decision				No impl. objective yet. E.i no date yet.											Nil	AATS
dA	Basic EAP (extended ATC planning function)	#118	Nil	Nil	No decision				No impl. objective yet. E.i no date yet.											Nil	AATS

SOLUTION - #31

Variable profile military reserved areas and enhanced (further automated) civil-military collaboration

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 coordination, 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

Implement. Objective	**AOM19.1 - ASM Tools to Support AFUA**
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:	FRTO B0/2
Network Strategy Plan:	SO3/2, SO3/3
Operating Environment:	Terminal, En-Route, Network
EATMN Systems:	ASM

Applicable regulations & standards

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

When

FOC: **01/01/2022**

Who

Stakeholders:
- ANSPs
- Network Manager

Where

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

Status

Late

Completion rate end 2019: **34%**

Estimated achievement: **31/12/2021**

Benefits

Capacity
Increased through better utilization 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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- EUROCONTROL Specification for ASM support system requirements supporting the ASM processes at local and FAB level - Part II - ASM Systems Interface RequirementsEUROCONTROL-SPEC-166, Edition 1.0
- AIXM Edition 5.2, EUROCONTROL

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Deploy ASM support systems (LARA or locally developed ones) to support the local or sub-regional airspace planning and allocation (without interface with NM).
2. Implement interoperability of local ASM support system with NM system. Conclude the Operational Access Acceptance Activities required to validate the ASM tool interfacing NM system via B2B service. Alternatively, update the existing agreement with NM in order to cover B2B services.
3. Improve planning and allocation of reserved/segregated airspace at pre-tactical ASM level 2 by planning and releasing reserved/segregated airspace in accordance with actual need. Utilise reserved/segregated airspace that has not been planned in airspace use plan (AUP).

Network Manager have to integrate the local automated ASM support systems with NM systems and update existing agreement NM-ANSP in order to cover B2B services.

SOLUTION - #31

Variable profile military reserved areas and enhanced (further automated) civil-military collaboration

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.

Implementation Objective	**AOM19.2 - ASM Management of Real-Time Airspace Data**
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:	FRTO B1/3, NOPS B1/5
Network Strategy Plan:	SO3/2, SO3/3
Operating Environment:	Terminal, En-Route, Network
EATMN Systems:	ASM, FDPS/SDPS & HMI

Applicable regulations & standards

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

When

FOC: **01/01/2022**

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 2019: **5%**

Estimated achievement: **Not available**

Benefits

Capacity

Increased through better utilization 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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- EUROCONTROL Specification for ASM support system requirements supporting the ASM processes at local and FAB level - Part II - ASM Systems Interface RequirementsEUROCONTROL-SPEC-166, Edition 1.0
- AIXM Edition 5.2, EUROCONTROL

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Adapt ATM systems for real-time ASM data exchanges. Adapt local ASM support system for real-time ASM data exchanges with NM systems.
2. 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).

Network Manager have to:

1. Enhance systems to receive and process real-time airspace activation, deactivation and modification of airspace reservation (ARES) and include this information in the Network Operations Plan (NOP).
2. 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.

Airspace users have to adapt systems (computer flight plan software providers (CFSP)) for real-time ASM data exchanges with NM.

SOLUTION - #31

Variable profile military reserved areas and enhanced (further automated) civil-military collaboration

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.

Implement. Objective	**AOM19.3 - Full Rolling ASM/ATFCM and ASM Information Sharing**
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-A, AOM-0206-A
Dependencies:	AOM19.1, AOM19.2
ICAO ASBUs:	NOPS B1/5, FRTO B1/3
Network Strategy Plan:	SO3/2, SO3/3
Operating Environment:	Terminal, En-Route, Network
EATMN Systems:	ASM, ATFCM

Applicable regulations & standards

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

When

FOC: **01/01/2022**

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 2019: **14%**

Estimated achievement: **Not available**

Benefits

Capacity
Increased through better utilization 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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- EUROCONTROL Specification for ASM support system requirements supporting the ASM processes at local and FAB level - Part II - ASM Systems Interface RequirementsEUROCONTROL-SPEC-166, Edition 1.0
- AIXM Edition 5.2, EUROCONTROL

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to implement system improvements supporting a full management of airspace structures via AUP/UUP and initial CDM.) and 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.

Network Manager have to Adapt NM systems to support a full rolling ASM/ATFCM process and 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. As well as make graphical display of AUP/UUP on NOP Portal.

Airspace users have to adapt systems at airspace users' operations centers for full management of AUP/UUP airspace structure via B2B service.

SOLUTION - #31

Variable profile military reserved areas and enhanced (further automated) civil-military collaboration

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.

Implement. Objective	**AOM19.4 - Management of Pre-defined Airspace Configurations**
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:	NOPS B1/6, FRTO B1/4
Network Strategy Plan:	SO3/2, SO3/3
Operating Environment:	Terminal, En-Route, Network
EATMN Systems:	ASM, ATFCM

Applicable regulations & standards

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

When

FOC: **01/01/2022**

Who

Stakeholders:
- ANSPs
- Network Manager

Where

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

Status

Not available

Completion rate end 2019: **11%**

Estimated achievement: **Not available**

Benefits

Operational efficiency

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

Capacity

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

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to adapt ATM systems to and procedures to support the management of ASM solutions and predefined airspace configurations including sharing of the ASM solutions, pre-defined airspace configuration management via B2B services.).

Network Manager have to adapt NM systems and procedures to support the management of pre-defined airspace configurations, as well as implement tools to support ASM performance analysis.

SOLUTION - #33 FRA for flights in cruise and vertically evolving above a specified FL

SOLUTION - #66 Automated support for dynamic sectorisation

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.

Implement. Objective	**AOM21.2 - Free Route Airspace**
SESAR Key Feature:	Advanced Air Traffic Services 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 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:	FRTO B1/1
Network Strategy Plan:	SO3/1, SO3/4
Operating Environment:	En-Route, Network
EATMN Systems:	ASM, ATFCM, FDPS/SDPS & HMI

When

FOC: **01/01/2022**

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 2019: **67%**

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

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

Environment
Reductions in emissions through use of optimal routes.

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

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Identify the local FRA airspace in coordination with the Network and FAB partners and the update Route Availability Document (RAD) accordingly. Also ANSP will update the local ATFCM procedures in cooperation with the network to take on board the FRA impact.
2. Implement system improvements to upgrade FDP and CWP to support FRA, as required.
3. Implement dynamic sectorisation
4. Implement procedures and processes in support of the local dimension. Publish FRA airspace in the AIP and charts, update letters of agreement, if necessary. Update ASM and ATC procedures to take on board the FRA impact.

Airspace users have to Adapt as necessary the flight Planning system and procedures to support free routing.

Network Manager have to adapt NM systems (IFPS and Airspace Management tools) and procedures to support FRA By updating European Airspace with the integration of the coordinated FRA definition and Route Availability Document (RAD) accordingly.

SOLUTION - #104 Sector team operations en-route air traffic organiser
SOLUTION - #27 MTCD and conformance monitoring tool

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.

Implement. Objective	**ATC12.1 - MONA, TCT and MTCD**
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:	FRTO B1/5
Network Strategy Plan:	SO3/1, SO4/1
Operating Environment:	En-Route
EATMN Systems:	FDPS/SDPS & HMI

When

FOC: 01/01/2022

Who

Stakeholders:
- ANSPs

Where

Applicability Area
All ECAC+ States, except Luxembourg

Status Planned delay

Completion rate end 2019: **49%**

Estimated achievement: **12/2022**

Applicable regulations & standards

N/A

Benefits

Capacity

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).

Safety

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Deploy the MTCD 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;
2. Deploy the resolution support function which includes conflict probe and passive conflict resolution assistant (e.g. presentation of context traffic) in support of MTCD
3. Deploy the Tactical Controller Tool (TCT) to support: Detection conflicts between state vector trajectories(extended STCA); Detection conflicts between state vector trajectories and tactical trajectories; Detection conflicts between tactical trajectories;
4. Deploy MONA functions: Lateral deviation; Longitudinal deviation; Vertical deviation; CFL deviation; Aircraft Derived Data (ADD) deviations;
5. Adapt the operational procedures and working methods accordingly.

SOLUTION - Nil ATC15.1 - Initial extension of AMAN to En-route

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.

Implement. Objective	**ATC15.1 - Initial extension of AMAN to En-route**
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:	Nil.
Network Strategy Plan:	SO4/1
Operating Environment:	Terminal, En-route
EATMN Systems:	FDPS/SDPS & HMI

Applicable regulations & standards

N/A

When

FOC: **31/12/2019**

Who

Stakeholders:
- Regulators
- ANSPs
- Airspace Users

Where

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

Status

Late

Completion rate end 2019: **61%**

Estimated achievement: **12/2021**

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. 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;
2. Define, validate and implement the necessary ATC procedures.

SOLUTION - #05 Extended AMAN horizon

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.

Implement. Objective	**ATC15.2 - AMAN Extended to En-route Airspace**
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:	RSEQ B1/1, NOPS B1/8
Network Strategy Plan:	SO4/1
Operating Environment:	Terminal, En-route
EATMN Systems:	FDPS/SDPS & HMI

FOC: **01/01/2024**
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, Azerbaijan, Cyprus, Finland, North Macedonia, Malta, Moldova, Latvia, Lithuania, Luxembourg, Montenegro, Morocco, Serbia and Ukraine.

Status

Not available

Completion rate end 2019:	**18%**
Estimated achievement:	**n/a**

Applicable regulations & standards

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

When

Benefits

Capacity
Optimal use of TMA capacity.

Environment
Delays are resolved 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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Upgrade ATC system to support extended AMAN in En-route sectors (including data exchange, data processing and information display at the ATCO working positions in support the handling of AMAN constrains). ATM systems must be upgraded in order to be able to generate, communicate, receive and display AMA OLDI messages or other extended AMAN data exchanges via B2B services;
2. Define and implement the needed ATC procedures to support the extended AMAN functionality.

Network Manager has to:

1. 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.
2. Define the data exchanges and operational procedures between NM and concerned ATS units.
3. Define and implement the required ATFCM procedures to support the extended AMAN functionality.

SOLUTION - Nil ATC17 - E. Dialogue, Auto. Assistance to ATCO during COTR

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.

Implement. Objective	**ATC17 - E. Dialogue, Automated Assistance to ATCO during COTR**
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 coordination processes
Network Strategy Plan:	SO3/1, SO4/1
Operating Environment:	Terminal, En-Route, Network
EATMN Systems:	FDPS/SDPS & HMI

When

FOC: **01/01/2022**

Who

Stakeholders:
- ANSPs

Where

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

Status

Late

Completion rate end 2019: **32%**

Estimated achievement: **12/2022**

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

Benefits

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

Operational Efficiency
More efficient planning and operational decision making.

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

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- EUROCONTROL Specification for On-Line Data Interchange (OLDI), EUROCONTROL-SPEC-106, Edition 5.0

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to upgrade and put into service ATC system to support:

1. The Basic procedure, specifically Preliminary Activation Message (PAC) and, if applicable, SSR Code Assignment Message (COD),
2. The electronic dialogue procedure in Transfer of communication process using OLDI.
3. The electronic dialogue procedure in Coordination process using OLDI.

SOLUTION - #63 Multi-sector planning

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.

Implement. Objective	**ATC18 - Multi Sector Planning En-route - 1P2T**
SESAR Key Feature:	Advanced Air Traffic Services
Essential Operational Change / PCP:	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
ICAO ASBUs:	FRTO B1/6
Operating Environment:	En-Route
EATMN Systems:	FDPS/SDPS & HMI

Applicable regulations & standards

N/A

When

FOC: **n/a**

Who

Stakeholders:
- ANSPs

Where

Applicability Area
Subject to local needs and Complexity

Status

	Not available
Completion rate end 2019:	**Implemented by 6 ANSPs**
	Planned / ongoing by 7 ANSPs.
Estimated achievement:	**n/a**

Benefits

Cost Efficiency

Copy 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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Ensure ATM system support to permit a single planner role associated to two adjacent tactical roles;
2. Develop multi-sector planning procedures and working methods for en-route sectors;
3. Train air traffic controllers to multi sector planning.

SOLUTION - Nil 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.

Implement. Objective	**ITY-FMTP - Common flight message transfer protocol (FMTP)**
SESAR Key Feature:	Enabling Aviation Infrastructure
Essential Operational Change / PCP:	- IP Network - 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 2019: **77%**

Estimated achievement: **12/2020**

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. 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;

Military Authorities have to:

1. 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.

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. This outline description aims at deployment of FRA in lower airspace down to TMA boundaries within the ICAO EUR region. 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. Adapt NM systems (IFPS and Airspace Management tools) to support FRA. 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	Fully dynamic and optimised airspace
PCP	None
SESAR Solutions	#33 #66 PJ.06-01
OI Steps / *Enablers*	[AOM-0401]-Multiple Route Options & Airspace Organisation Scenarios [AOM-0402]-Further Improvements to Route Network and Airspace incl. Cross-Border Sectorisation and Further Routing Options [AOM-0501]-Free Routing for Flights both in cruise and vertically evolving within low to medium complexity environments [AOM-0505]-Free Routing for Flights both in cruise and vertically evolving within high - complexity environments in Upper En Route airspace [CM-0102-A]-Dynamic Sectorisation based on complexity *[PRO-148]-ASM Procedures for identifying and promulgating 'Free Route' areas* *[PRO-085]-ATC procedures to cover issues such as hand-off, transfer of control, and for defining trajectory changes* *necessitated by changes in airspace availability, weather constraints and other non-nominal events* *[AAMS-16a]-Airspace management functions equipped with tools able to deal with free-routing* *[ER APP ATC 78]-Update FDP to support 4D trajectory direct segments in free routing airspace beyond local AoR* *[ER APP ATC 15]-Flight Data Processing: support Dynamic Sectorisation and Dynamic*

	Constraint Management. *[AOC-ATM-10]-Modification of AOC/WOC-ATM trajectory management system (or new systems) to allow quality of* *service requested by NOP for pre-flight trajectory with dynamic routing* *[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 3.2.4 Implement Free Route Airspace
MP Level 3 dependencies	ATC 12.1 (MTCD), ITY-COTR (OLDI) , ATC17 (SYSCO) and ATC02.8 (APW)
ICAO ASBUs	FRTO B1/1
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 - EUROCONTROL - European Route Network Improvement Plan (ERNIP) Part 3 - Airspace Management Handbook -Guidelines for Airspace Management

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4.7 Deployment Views

V5 Deployment

TBO Trajectory -based operations

Roadmap

EOC	Deployment Scenario	SESAR SOL	Impl. Objective	Objective Title	Decision type			Planned Implementation FOC-Reported progress											AAS Milestone	SESAR Key Feature
					Regulated	Committed	Local	←	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
TBO	Nil	Nil	ATC02.8	Ground based safety nets				53%												Nil	AATS
TBO	Enhanced safety nets	#60	ATC02.9	Enhanced STCA for TMAs				69%												Nil	AATS
TBO	Enhanced safety nets	#69	ATC20	Enhanced STCA with DAPs via Mode S EHS						Based on local decision										Nil	AATS
TBO	Initial trajectory information sharing (i4D)	#115	OD-1	EPP/ADS C	No decision				No impl. objective yet. E.i no date yet.											AM-1.2	EAI
TBO	CTA in medium density / medium complexity environment	#06	Nil	Nil	No decision				No impl. objective yet. E.i no date yet.											Nil	AATS
TBO	Arrival management into multiple airports	#08	Nil	Nil	No decision				No impl. objective yet. E.i no date yet.											Nil	AATS
TBO	Enhanced ACAS	#105	Nil	Nil	No decision				No impl. objective yet. E.i no date yet.											Nil	AATS
TBO	ACAS ground monitoring and presentation system	#100	Nil	Nil	No decision				No impl. objective yet. E.i no date yet.											Nil	EAI
TBO	Extended hybrid surveillance	#101	Nil	Nil	No decision				No impl. objective yet. E.i no date yet.											Nil	EAI

SOLUTION - Nil 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.

Implement. Objective	**ATC02.8-Ground based safety nets**
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:	SNET B0/1, SNET B0/2, SNET B0/3, SNET B0/4
Network Strategy Plan:	SO4/1
Operating Environment:	Terminal, En-Route
EATMN Systems:	FDPS/SDPS & HMI

Applicable regulations & standards

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

When

FOC: **01/01/2022**

Who

Stakeholders:
- ANSPs

Where

Applicability Area
All ECAC+ States, except the Netherlands

Status

Late

Completion rate end 2019: **53%**

Estimated achievement: **12/2022**

Benefits

Safety

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to put into service ground-based systems and associated procedures supporting:

1. The APW function. The implementation of APW is recommended for both en-route and terminal airspace;
2. The MSAW function;
3. The APM function.

SOLUTION - #60 Enhanced 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 manoeuvring aircraft, in comparison to linear STCA algorithms.

Implement. Objective	**ATC02.9- Enhanced STCA for TMAs**
SESAR Key Feature:	Advanced Air Traffic Services
Essential Operational Change / PCP:	ATM Systems
OI Steps & *Enablers*:	CM-0801, CM-0811
Dependencies:	No dependencies
ICAO ASBUs:	SNET B1/2
Network Strategy Plan:	SO4/1
Operating Environment:	Terminal
EATMN Systems:	FDPS/SDPS & HMI

Applicable regulations & standards

N/A

When

FOC: **31/12/2020**

Who

Stakeholders:
- ANSPs

Where

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

Status

On time

Completion rate end 2019: **69%**

Estimated achievement: **12/2020**

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Put into service the 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);
2. Where required, improve the STCA functionality with the use of e.g. multi-hypothesis algorithms or other technical solutions;
3. The local procedures should address the operational use of the STCA functionality in the TMAs.

SOLUTION - #69 Enhanced STCA with down-linked parameters

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.

Implement. Objective	**ATC20-Enhanced STCA with DAPs via Mode S EHS**
SESAR Key Feature:	Advanced Air Traffic Services
Essential Operational Change / PCP:	ATM Systems
OI Steps & *Enablers*:	CM-0807-A
Dependencies:	No dependencies
ICAO ASBUs:	SNET B1/1
Network Strategy Plan:	SO7/2
Operating Environment:	En-route, Terminal
EATMN Systems:	FDPS/SDPS & HMI

When

FOC: **n/a**

Who

Stakeholders:
- ANSPs
- Regulators

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

Status

Not available

Completion rate end 2019: **n/a**

Estimated achievement: **n/a**

Applicable regulations & standards

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

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.

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Deploy an enhanced STCA function with the use of Selected Flight Level downlinked parameter;
2. Develop and implement ATC procedures related to the availability for display and use of SFL in the STCA functionality.

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. 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. 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. The new capabilities of the ATM system are: a) establishing and operating the appropriate ADS-C contract; b) processing and integration of EPP information in the ATM system; and 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. EPP implementation should be coordinated with neighbouring stakeholders to achieve a synchronized implementation, avoiding geographical "holes" in the communication with aircraft. 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. 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. • *ER APP ATC 100 — 4D Trajectory Management by Synchronization of Air and Ground Trajectories through EPP* • *ER APP ATC 119 — Air/Ground Datalink Communication/Protocols for i4D and Controlled Time of Arrival* • *ER APP ATC 149a — Air-Ground Datalink Exchange to Support i4D - Extended Projected Profile (EPP)* • *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 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. • ITY-AGDL is a prerequisite, providing the physical and logical network infrastructure for ATN Air/Ground communication.
ICAO ASBUs	None
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); • ED-229A Interoperability Requirements Standard for Baseline 2 ATS Data Communications (Baseline 2 Interop Standard).

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4.8 Deployment Views

Roadmap

EOC	Deployment Scenario	SESAR SOL	Impl. Objective	Objective Title	Decision type			Planned Implementation FOC-Reported progress											AAS Milestone	SESAR Key Feature
					Regulated	Committed	Local	←	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
M3	Optimised low-level IFR routes for rotorcraft	#113	NAV12	ATS IFR Routes for Rotorcraft Operations				0%												*Nil*	*AATS*

SOLUTION - #113 Optimised low-level IFR routes for rotorcraft

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 better approach procedures thanks to the implementation of "Standard PinS - Point In Space" procedures concept.

Implement. Objective	**NAV12-ATS IFR Routes for Rotorcraft Operations**
SESAR Key Feature:	Advanced Air Traffic Services
OI Steps & *Enablers*:	AOM-0810
Dependencies :	NAV03.1, NAV03.2
ICAO ASBUs:	APTA B0/6
Operating Environment:	Terminal, En-route
EATMN Systems:	FDPS/SDPS, HMI, NAV

Applicable regulations & standards

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

When

FOC: **06/06/2030**

Who

Stakeholders:
- Regulators
- ANSPs
- Airspace Users

Where

Applicability Area
App.1 = EU SES
App.2 = Other ECAC+ states, except .

Status	**Not available**
Completion rate end 2019:	**0%**
Estimated achievement:	**n/a**

Benefits

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

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

Operational Efficiency
Copy 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 Take off Area-FATO (and vice versa) and more direct routing in dense terminal airspace (obstacle-rich or noise-sensitive terminal environment).

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

Industrialisation & standardisation activities:

The details of all already available standards, specifications, guidelines and the regulations are found in the "Technical Annex", as applicable.

The applicable new/modified standards, specifications, guidelines and regulations that are planned/ongoing, as specified in European Standardisation Rolling Development Plan (RDP) version 11 of 09/03/2020, are the following:

- Nil.

European Standardisation RDP is available at https://www.eascg.eu

Main deployment actions by stakeholder

Short synopsis per stakeholder group, as identified on the first page. Details of all SLoA are in the ''Technical Annex''.

ANSPs have to:

1. Besides implementing of low-level IFR routes (LLR) for rotorcraft operations, look into the needs to implement RNP0.3, RNP01 or RNAV1 SID and STAR per instrument RWY for rotorcraft operations. As well as ATS routes for rotorcrafts.
2. Establish the transition plan for PBN in ANS provision.

Regulators have to verify the transition plan for PBN in ANS provision.

Airspace Users have to equip aircraft with systems approved for RNP and/or RNAV operations.

*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.*

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5. ANNEXES

Annex 1 - Relevant mappings of the Level 3

Mapping of the L3 implementation Objectives to corresponding SESAR Essential Operational Changes, SESAR Solutions, Deployment Program families, ICAO ASBU, EASA EPAS, the Network Strategy Plan, the Airspace Architecture Study Transition Plan (AAS TP) Milestones and the SESAR Key Features.

EOC	Level 3 Implementation Objectives	SESAR Sol.	DP family	ICAO ASBUs	EPAS	NSP	AAS TP	KF
CNS	ATC21-Composite surveillance ADS-B/WAM	#114	-	ASUR-B0/1 ASUR-B0/2	RMT.0679 RMT.0519	SO8/3 SO8/4	-	EAI
	COM10 - Migration from AFTN to AMHS	-	-	COMI B0/7	-	-	-	EAI
	COM11.1 - Voice over Internet Protocol (VoIP) in En-Route	-	3.1.4 3.2.1	COMI B2/1	-	SO8/4	AM-1.3	EAI
	COM11.2 - Voice over Internet Protocol (VoIP) in Airport/Terminal	-	-	COMI B2/1	-	SO8/4	-	EAI
	ITY-ACID - Aircraft identification	-	-	-	-	SO8/2	-	EAI
	ITY-AGDL - Initial ATC air-ground data link services	-	6.1.1 6.1.3 6.1.4	COMI B0/4 COMI B1/2	RMT.0524	SO4/1 SO8/3	AM-1.1	EAI
	ITY-AGVCS2 – 8.33 kHz Air-Ground Voice Channel Spacing below FL195	-	-	-	-	SO8/1	-	EAI
	ITY-SPI - Surveillance performance and interoperability	-	-	ASUR B0/1 ASUR B0/3	RMT.0679 RMT.0519	SO8/3 SO8/4	-	EAI
	NAV10 - RNP Approach Procedures to instrument RWY	#103	1.2.1 1.2.2	APTA B0/1 APTA B1/1 NAVS B0/2	RMT.0639 RMT.0445	SO6/5	-	AATS
	NAV11 - Precision Approach using GBAS CAT II/III based on GPS L1	#55	-	NAVS B1/1	-	-	-	HPO
iN	AOM13.1 - Harmonise OAT and GAT handling	-	-	-	-	SO6/2	-	OANS
	AOP11 - Initial Airport Operations Plan	#21	2.1.4	NOPS B1/3	-	SO6/2	-	HPAO
	AOP17 – Provision/integration of DPI to NMOC	#61	-	NOPS B0/4	-	-	-	HPAO
	COM12 - NewPENS	-	5.1.2 5.2.1	COMI B1/1	-	SO2/3 SO2/4 SO8/3 SO8/4	-	EAI
	FCM03 - Collaborative flight planning	-	4.2.3	NOPS B0/2	-	SO4/2 SO5/1 SO5/6	AM-1.14	OANS
	FCM04.2 - STAM phase 2	#17	4.1.2	NOPS B1/1	-	SO4/3 SO5/4	AM-1.11	OANS
	FCM05 - Interactive rolling NOP	#20, #21	4.2.2 4.2.4	NOPS B1/2	-	SO2/1 SO2/2 SO2/3	AM-1.12	OANS

						SO2/4		
	FCM06 - Traffic Complexity Assessment	#19	4.4.2	NOPS B1/4	-	SO4/3 SO5/4	AM-1.13	OANS
	FCM09 - Enhanced ATFM Slot swapping	#56	-	NOPS B1/7	-	SO6/1	-	OANS
	INF08.1 - Information Exchanges using the SWIM Yellow TI Profile	#35, #46	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	AMET B2/4 DAIM B2/1 SWIM B3/1	-	SO2/4 SO2/5 SO5/2 SO5/5	AM-1.5	EAI
	INF08.2 - Information Exchanges using the SWIM Blue TI Profile	#28, #46	5.1.3, 5.1.4, 5.2.1, 5.2.2, 5.2.3, 5.6.2	SWIM B3/1, TBO B3/1	-	SO5/2SO5/5	AM-9.1	EAI
dS	INF07 - Electronic Terrain and Obstacle Data (e-TOD)	-	1.2.2	DAIM B1/3 DAIM B1/4	RMT.0703 RMT.0722	SO2/5	-	EAI
	INF09 - Digital Integrated Briefing	#34		DAIM B1/7, AMET B1/4	-	SO2/5	-	EAI
	ITY-ADQ - Ensure quality of aeronautical data and aeronautical information	-	1.2.2	-	RMT.0722 RMT.0477	SO2/5	-	EAI
U-s	-	-	-	-	-	-	-	-
vS	AOP14 – Remote Tower Services	#12, #71, #52, #13	-	RATS B1/1	RMT.0624	-	-	HPAO
ATp	AOP04.1 - A-SMGCS Surveillance (former Level 1)	#70	2.2.1	SURF B0/2	MST.029	SO6/6	-	HPAO
	AOP04.2 - A-SMGCS RMCA (former Level 2)	-	2.2.1	SURF B0/3	MST.029	SO6/6	-	HPAO
	AOP05 - Airport CDM	#106	2.1.1 2.1.3	ACDM B0/2 NOPS B0/4 RSEQ B0/2	-	SO6/4	-	HPAO
	AOP10 - Time Based Separation	#64	2.3.1	WAKE B2/7	-	SO6/5	-	HPAO
	AOP12 - Improve RWY and Airfield safety with CATC detection and CMAC	#02	2.1.2 2.5.1	SURF B1/3	MST.029	SP6/6	-	HPAO
	AOP13 - Automated assistance to Controller for Surface Movement planning and routing	#22 #53	2.4.1	SURF B1/4	MST.029	SO6/6	-	HPAO
	AOP15 - Safety Nets for vehicle drivers	#04	-	SURF B2/2	MST.029	-	-	HPAO
	AOP16 - Guidance assistance through airfield lighting	#47	-	SURF B1/1	MST.029	-	-	HPAO

	AOP18 - Runway Status Lights	#01	-	SURF B2/2	MST.029	-	-	HPAO
	ATC07.1 - Arrival management tools	-	1.1.1	RSEQ B0/1	-	SO4/1	-	AATS
	ATC19 - Enhanced AMAN-DMAN integration	#54	-	RSEQ B2/1	-	SO6/5 SO4/1	-	AATS
	ENV01 – Continuous Descent Operations	-	-	APTA B0/4	-	SO6/5	-	AATS
	ENV02 – Airport Collaborative Environmental Management	-	-	-	-	-	-	HPAO
	ENV03 – Continuous Climb Operations	-	-	APTA B0/5	-	SO6/5	-	AATS
	NAV03.1 – RNAV1 in TMA Operations	#62	-	APTA B0/2	RMT.0639 RMT.0445	SO6/5	-	AATS
	NAV03.2 – RNP1 in TMA Operations	#09, #51	1.2.3 1.2.4	APTA B1/2	RMT.0639 RMT.0445	SO6/5	-	AATS
	SAF11 - Improve runway safety by preventing runway excursions	-	-	-	MST.007 RMT.0570 RMT.0703	-	-	HPAO
dA	AOM19.1 - ASM tools to support A-FUA	#31	3.1.1	FRTO B0/2	-	SO3/2 SO3/3	AM-1.8	OANS
	AOM19.2 - ASM management of real-time airspace data	#31	3.1.2	FRTO B1/3 NOPS B1/5	-	SO3/2 SO3/3	AM-1.8	OANS
	AOM19.3 - Full rolling ASM/ATFCM process and ASM information sharing	#31	3.1.3	NOPS B1/5 FRTO B1/3	-	SO3/2 SO3/3	AM-1.8	OANS
	AOM19.4 – Management of Pre-defined Airspace Configurations	#31	3.1.4	NOPS B1/6 FRTO B1/4	-	SO3/2 SO3/3	-	OANS
	AOM21.2 - Free Route Airspace	#33, #66	3.2.1 3.2.4	FRTO B1/1	-	SO3/1 SO3/4	AM-1.6 AM-1.10 AM-5.1	AATS
	ATC12.1 - MONA, TCT and MTCD	#27, #104	3.2.1	FRTO B1/5	-	SO3/1 SO4/1	AM-1.15 AM-5.1	AATS
	ATC15.1 - Initial extension of AMAN to En-route	-	1.1.2	-	-	SO4/1	-	AATS
	ATC15.2 - Extension of AMAN to En-route	#05	1.1.2	RSEQ B1/1 NOPS B1/8	-	SO4/1	AM-1.3	AATS
	ATC17 - Electronic Dialog supporting COTR	-	3.2.1	-	-	SO3/1 SO4/1	AM-1.3	AATS
	ATC18 - Multi Sector Planning En-route – 1P2T	#63	-	FRTO B1/6	-	SO4/1	AM-4.3 AM-5.1	AATS
	ITY-FMTP - Apply a common flight message transfer protocol (FMTP)	-	-	-	-	SO8/3	AM-1.3	EAI
TBO	ATC02.8 - Ground based safety nets	-	3.2.1	SNET B0/1 SNET B0/2 SNET B0/3 SNET B0/4	-	SO4/1	-	AATS
	ATC02.9 - Enhanced STCA for TMAs	#60	-	SNET B1/2	MST.030	SO4/1	-	AATS

	ATC20 – Enhanced STCA with DAP via Mode S EHS	#60	-	SNET B1/1	-	SO7/2	-	AATS
	NAV12 – ATS IFR Routes for Rotorcraft Operations	#113	-	APTA B0/6	MST.031	SO6/5	-	AATS

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	✓	✓	○	-	○	○	○	✓	✓
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	✓	✓	✓	○	○	○	○	✓	✓

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
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	-	-	○	-	-	-	-	-	○
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	○	○	○	-	-	-	-	-	-

State	Airport	ICAO code	AOP04.1	AOP04.2	AOP05	AOP10	AOP11	AOP12	AOP13	ATC07.1	ENV01
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	✓	✓	○	-	-	-	-	-	✓
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	✓	✓	○	-	-	○	○	✓	○
TR	Istanbul Airport	LTFM	✓	✓	○	○	○	○	○	✓	
UA	Kyiv Boryspil	UKBB	○	○	○	-	-	-	-	✓	✓
UK	Birmingham	EGBB	-	-	○	-	-	-	-	-	✓
UK	London Luton	EGGW	-	-	○	-	-	-	-	-	○

State	Airport	ICAO code	AOP04.1	AOP04.2	AOP05	AOP10	AOP11	AOP12	AOP13	ATC07.1	ENV01
UK	Bristol	EGGD	-	-	-	-	-	-	-	-	○
UK	London City	EGLC	-	-	-	-	-	-	-	-	-
UK	Newcastle	EGNT	-	-	-	-	-	-	-	-	○
UK	Nottingham East Midlands	EGNX	-	-	-	-	-	-	-	-	○
UK	Glasgow	EGPF	-	-	-	-	-	-	-	-	○
UK	Edinburgh	EGPH	✓	✓	○	-	-	-	-	-	○

Annex 3. MPL3 Plan Roadmap with reference to AAS TP

EOC	Deployment Scenario	SESAR SOL	Impl. Objective	Objective Title	Decision type			Planned Implementation FOC-Reported progress											AAS Milestone	SESAR Key Feature
					Regulated	Committed	Local	←	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
ATp	Nil	Nil	ATC07.1	Arrival management tools				61%												Nil	AATS
ATp	Enhanced AMAN/DMAN integration	#54	ATC19	Enhanced AMAN/DMAN integration				Based on local decision												Nil	AATS
ATp	Nil	Nil	ENV01	Continuous Descent Operations				39%												Nil	AATS
ATp	Nil	Nil	ENV03	Continuous Climb Operations				Based on local decision												Nil	AATS
ATp	Enhanced TMA using RNP-based operations	#62	NAV03.1	RNAV1 in TMA Operations				23%												Nil	AATS
ATp	Enhanced TMA using RNP-based operations	#09, #51	NAV03.2	RNP1 in TMA Operations				7%												Nil	AATS
ATp	Enhanced GND ATCO awareness in AWO	#70	AOP04.1	A-SMGCS Surveillance (former Level 1)				70%												Nil	HPAO
ATp	Nil	Nil	AOP04.2	A-SMGCS RMCA (former Level 2)				56%												Nil	HPAO
ATp	DMAN synchronised with pre-departure sequencing	#106	AOP05	Airport CDM				53%												Nil	HPAO
ATp	Time-based separation for final approach	#64	AOP10	Time Based Separation				6%												Nil	HPAO
ATp	Airport safety nets	#02	AOP12	Improve RWY safety with CATC detection and CMAC				23%												Nil	HPAO

EOC	Deployment Scenario	SESAR SOL	Impl. Objective	Objective Title	Decision type			Planned Implementation FOC-Reported progress											AAS Milestone	SESAR Key Feature
					Regulated	Committed	Local	←	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
ATp	Auto. assist to ATCO for surface movement plan & routing DMAN synchronised with pre-DEP sequencing	#22 #53	AOP13	Auto. Assist. ATCO for Surface plan. and routing				0%												Nil	HPAO
ATp	Airport safety nets vehicle	#04	AOP15	Traffic sit. awareness and SNET for the vehicle drivers						Based on local decision										Nil	HPAO
ATp	Integrated surface management	#47	AOP16	Guidance assistance through AGL						Based on local decision										Nil	HPAO
ATp	Enhanced airport safety nets	#01	AOP18	Runway Status Lights (RWSL)						Based on local decision										Nil	HPAO
ATp	Nil	Nil	ENV02	Airport Collaborative Env. Management						Based on local decision										Nil	HPAO
ATp	Nil	Nil	SAF11	Improve RWY safety by preventing RWY excursions				66%												Nil	HPAO
ATp	D-TAXI service for CPDLC application	#23	Nil	Nil	No decision				No impl. objective yet. E.i no date yet.											Nil	HPAO
ATp	Virtual block control in LVPs	#48	Nil	Nil	No decision				No impl. objective yet. E.i no date yet.											Nil	HPAO
ATp	De-icing management tool	#116	Nil	Nil	No decision				No impl. objective yet. E.i no date yet.											Nil	HPAO
ATp	Reducing landing minima in LVP using enhanced flight vision systems (EFVS)	#117	Nil	Nil	No decision				No impl. objective yet. E.i no date yet.											Nil	HPAO
ATp	Continuous descent operations (CDO)	#11	Nil	Nil	No decision				No impl. objective yet. E.i no date yet.											Nil	AATS

EOC	Deployment Scenario	SESAR SOL	Impl. Objective	Objective Title	Decision type	Planned Implementation FOC-Reported progress	AAS Milestone	SESAR Key Feature
					Regulated / Committed / Local	← 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030		
ATp	Point merge in complex TMA	#107	Nil	Nil	No decision	No impl. objective yet. E.i no date yet.	*Nil*	*AATS*
ATp	AMAN and point merge	#108	Nil	Nil	No decision	No impl. objective yet. E.i no date yet.	*Nil*	*AATS*
CNS	CNS rationalisation	#103	NAV10	RNP App. Procedures to instrument RWY	Regulated	14%	*Nil*	*AATS*
CNS	CNS rationalisation	#55	NAV11	PA using GBAS CAT II/III based on GPS L1	Local	Initial objective, not monitored in LSSIP yet.	*Nil*	*HPAO*
CNS	Nil	Nil	COM10	Migration from AFTN to AMHS	Committed	64%	*Nil*	*EAI*
CNS	Nil	Nil	COM11.1	VoIP in En-Route	Committed	11%	*AM-1.3*	*EAI*
CNS	Nil	Nil	COM11.2	VoIP in Airport/Terminal	Committed	9%	*Nil*	*EAI*
CNS	Nil	Nil	ITY-ACID	Aircraft identification	Regulated	36%	*Nil*	*EAI*
CNS	Nil	Nil	ITY-AGDL	Initial ATC air-ground data link services	Regulated	36%	*AM-1.1*	*EAI*
CNS	Nil	Nil	ITY-AGVCS2	8.33 kHz A/G Voice Channel Spacing below FL195	Regulated	37%	*Nil*	*EAI*
CNS	Nil	Nil	ITY-SPI	Surveillance performance and interoperability	Regulated	40%	*Nil*	*EAI*
CNS	CNS rationalisation	#109	OD-3	Iris precursor	No decision	No impl. objective yet. E.i no date yet.	*AM-1.16*	*EAI*
CNS	Cooperative SUR ADS-B / WAM	#114	ATC21	ADS-B/WAM	Local	Initial objective, not monitored in LSSIP yet.	*AM-1.17*	*EAI*
CNS	AeroMACS	#102	Nil	Nil	No decision	No impl. objective yet. E.i no date yet.	*Nil*	*EAI*
CNS	CNS rationalisation	#110	Nil	Nil	No decision	No impl. objective yet. E.i no date yet.	*Nil*	*EAI*
dA	Airspace management and advanced FUA	#31	AOM19.1	ASM Tools to Support AFUA	Regulated	34%	*AM-1.8*	*OANS*

EOC	Deployment Scenario	SESAR SOL	Impl. Objective	Objective Title	Decision type			Planned Implementation FOC-Reported progress											AAS Milestone	SESAR Key Feature
					Regulated	Committed	Local	←	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
dA	Airspace management and advanced FUA	#31	AOM19.2	ASM Management of Real-Time Airspace Data				5%												*AM-1.8*	*OANS*
dA	Airspace management and advanced FUA	#31	AOM19.3	Full Rolling ASM/ATFCM and ASM Information Sharing				14%												*AM-1.8*	*OANS*
dA	Airspace management and advanced FUA	#31	AOM19.4	Management of Pre-defined Airspace Configurations				11%												*Nil*	*OANS*
dA	Free Route	#66 #33 PJ.06-01	OD-2	FRA ensuring connectivity with TMA	No decision			No impl. objective yet. E.i no date yet.												*AM-1.7*	*OANS*
dA	Free Route	#33, #66	AOM21.2	Free Route Airspace				67%												*AM-1.6 AM-1.10 AM-5.1*	*AATS*
dA	Sector team operations - en-route air traffic organiser. MTCD and conformance monitoring tool.	#27, #104	ATC12.1	MONA, TCT and MTCD				49%												*AM-1.15 AM-5.1*	*AATS*
dA	Nil	Nil	ATC15.1	Initial extension of AMAN to En-route				61%												*Nil*	*AATS*
dA	AMAN extended to en-route airspace	#05	ATC15.2	AMAN Extended to En-route Airspace				18%												*AM-1.3*	*AATS*
dA	Nil	Nil	ATC17	E. Dialogue, Automat.Assist to ATCO during COTR				32%												*AM-1.3*	*AATS*
dA	Multi-sector planning	#63 #70W2	ATC18	Multi Sector Planning En-route P2T				Based on local decision												*AM-4.3 AM-5.1*	*AATS*

EOC	Deployment Scenario	SESAR SOL	Impl. Objective	Objective Title	Decision type			Planned Implementation FOC-Reported progress												AAS Milestone	SESAR Key Feature
					Regulated	Committed	Local	←	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
dA	Nil	Nil	ITY-FMTP	Common flight message transfer protocol (FMTP)				77%												*AM-1.3*	*EAI*
dA	Optimised route network using advanced RNP	#10	Nil	Nil	No decision			No impl. objective yet. E.i no date yet.												*Nil*	*AATS*
dA	Basic EAP (extended ATC planning function)	#118	Nil	Nil	No decision			No impl. objective yet. E.i no date yet.												*Nil*	*AATS*
dS	Nil	Nil	INF07	Electronic Terrain and Obstacle Data (e-TOD)				21%												*Nil*	*EAI*
dS	Digitally enhanced briefing	#34	INF09	Digital Integrated Briefing				Based on local decision												*Nil*	*EAI*
dS	Nil	Nil	ITY-ADQ	Ensure quality of AIM data and inormation				10%												*Nil*	*EAI*
iN	Nil	Nil	AOM13.1	Harmonise OAT and GAT handling				45%												*Nil*	*OANS*
iN	Nil	Nil	FCM03	Collaborative flight planning				59%												*AM1.14*	*OANS*
iN	Enhanced short-term ATFCM measures	#17	FCM04.2	STAM phase 2				13%												*AM-1.11*	*OANS*
iN	Collaborative NOP	#20, #21	FCM05	Interactive rolling NOP				5%												*AM-1.12*	*OANS*
iN	Auto. support for traffic complexity assessment	#19	FCM06	Traffic Complexity Assessment				17%												*AM-1.13*	*OANS*
iN	CTOT to TTA for ATFCM purposes	#18	FCM07	CTOT to TTA for ATFCM																*AM-1.9*	*OANS*
iN	Enhanced ATFM slot swapping	#56	FCM09	Enhanced ATFM Slot swap																*Nil*	*OANS*

EOC	Deployment Scenario	SESAR SOL	Impl. Objective	Objective Title	Decision type			Planned Implementation FOC-Reported progress											AAS Milestone	SESAR Key Feature
					Regulated	Committed	Local	←	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
iN	Collaborative NOP	#21	AOP11	Initial Airport Operations Plan				13%												Nil	HPAO
iN	Airport integration into the network	#61	AOP17	Provision/integration of DEP planning info to NMOC				Based on local decision												Nil	HPAO
iN	Nil	Nil	COM12	NewPENS				17%												Nil	EAI
iN	Initial SWIM: infrastructure and profiles. Initial SWIM:MET information exchange.	#35, #46	INF08.1	Information Exchanges using the SWIM Yellow TI Profile				0%												AM-1.5	EAI
iN	Initial SWIM: flight information exchange	#28, #46 PJ.18-02b	INF08.2	Info. Exchanges using the SWIM Blue TI Profile																AM-9.1	EAI
iN	UDPP departure	#57	Nil	Nil	No decision			No impl. objective yet. E.i no date yet.												Nil	OANS
iN	Initial SWIM: flight information exchange	#67	Nil	Nil	No decision			No impl. objective yet. E.i no date yet.												Nil	EAI
iN	Initial SWIM: flight information exchange	#37	Nil	Nil	No decision			No impl. objective yet. E.i no date yet.												Nil	EAI
M3	Optimised low-level IFR routes for rotorcraft	#113	NAV12	ATS IFR Routes for Rotorcraft Operations				0%												Nil	AATS
TBO	Nil	Nil	ATC02.8	Ground based safety nets				53%												Nil	AATS
TBO	Enhanced safety nets	#60	ATC02.9	Enhanced STCA for TMAs				69%												Nil	AATS
TBO	Enhanced safety nets	#69	ATC20	Enhanced STCA with DAPs via Mode S EHS				Based on local decision												Nil	AATS

EOC	Deployment Scenario	SESAR SOL	Impl. Objective	Objective Title	Decision type	Planned Implementation FOC-Reported progress											AAS Milestone	SESAR Key Feature
					Regulated Committed Local	←	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
TBO	Initial trajectory information sharing (i4D)	#115	OD-1	EPP/ADS C	No decision		No impl. objective yet. E.i no date yet.											*AM-1.2*	*EAI*
TBO	CTA in medium density / medium complexity environment	#06	Nil	Nil	No decision		No impl. objective yet. E.i no date yet.											*Nil*	*AATS*
TBO	Arrival management into multiple airports	#08	Nil	Nil	No decision		No impl. objective yet. E.i no date yet.											*Nil*	*AATS*
TBO	Enhanced ACAS	#105	Nil	Nil	No decision		No impl. objective yet. E.i no date yet.											*Nil*	*AATS*
TBO	ACAS ground monitoring and presentation system	#100	Nil	Nil	No decision		No impl. objective yet. E.i no date yet.											*Nil*	*EAI*
TBO	Extended hybrid surveillance	#101	Nil	Nil	No decision		No impl. objective yet. E.i no date yet.											*Nil*	*EAI*

EOC	Deployment Scenario	SESAR SOL	Impl. Objective	Objective Title	Decision type			Planned Implementation FOC-Reported progress										AAS Milestone	SESAR Key Feature
					Regulated	Committed	Local	←	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
vS	Single remote TWR for medium traffic volumes. Remotely provided ATS for contingency situations at aerodromes. Remote TWR for two low density aerodromes. ATC and AFIS in a single low density aerodrome from a remote CWP.	#12 #71 #52 #13	AOP14	Remote Tower Services				Based on local decision											*Nil*	*HPAO*
vS	Virtual centre concept	PJ.16-03	OD-5	VC concept, CWP and service interface	No decision			No impl. objective yet. E.i no date yet.											*AM-4.5*	*EAI*

Annex 4. 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
AF ATM Family
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

BA Business Aviation
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
SDP	SESAR Deployment Program
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
SOL	SESAR Solution
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

SESAR
JOINT UNDERTAKING

founding members

EUROPEAN UNION

EUROCONTROL