SESAR

European ATM Master Plan Level 3

2016

Implementation View

Report 2016

EUROPEAN UNION

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EXECUTIVE SUMMARY

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

The European ATM Master Plan (MP) Level 3 Implementation Report provides a holistic view of the implementation of commonly agreed actions to be taken by ECAC States, in the context of the implementation of SESAR. These actions are consolidated in the form of "Implementation Objectives" that set out the operational, technical and institutional improvements that could be applied to the European ATM network to meet the performance requirements for the key ATM performance areas defined in the MP Level 1 – safety, capacity, operational efficiency, cost efficiency, environment and security.

What is the overall progress of SESAR implementation?

This 2016 Level 3 Report is based on the Master Plan Level 3 2016 Implementation Plan that included 44 implementation objectives. Four (4) out of 44 objectives are so called "initial" implementation objectives that were not monitored at local level in 2016, due to the fact that they are not yet activated.

Overall, the implementation progress of Master Plan Level 3 objectives at ECAC level has been satisfactory in 2016. In R&D terms, 2016 was a transition between SESAR 1 and SESAR 2020. In implementation terms, 2016 was a transition between finishing the implementation of pre-SESAR functionalities and shifting the focus to implementation of the (P)CP and other SESAR 1 functionalities. There are still some important pre-SESAR/baseline elements that are not fully implemented at ECAC level (AFP messages exchange, A-SMGCS surveillance, APW, MTCD, OLDI, transition to IP), but on average, implementation of the SESAR Baseline has reached almost 70% of completion throughout ECAC. On the other hand, (P)CP and SESAR 1 implementation is picking up speed and according to data reported through LSSIP, reached the average of 29% of completion in the ECAC States. It is expected that the SESAR Baseline will be fully implemented by the end of 2019.

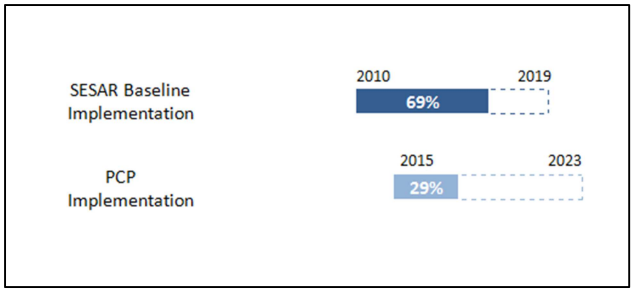

Figure i: Progress of Level 3 implementation objectives attributed to Baseline and PCP[1]

However, there are still around 30% of Level 3 implementation objectives that are either already beyond the initially planned completion dates, or are planned to be delayed. These need to be closely followed by appropriate authorities and clear mitigation measures need to be put in place. This is particularly important for

[1] Implementation progress indicators are based on the progress of MP L3 implementation objectives. It should be noted that progress of SESAR Baseline and PCP refers to the objectives that were part of MP L3, not to the full content of SESAR Baseline or PCP. Full list can be found in the Annexes of this document.

the items that are identified as important pre-requisites or enablers for (P)CP (without prejudice to SDM role). Without the pre-requisites deployed, there is a risk that major SESAR functionalities will be delayed for implementation (e.g. datalink delay impact on i4D implementation). All these risks feed into the risk chapter of the Master Plan Level 3 2017 Implementation Plan and will subsequently be followed at local level through the LSSIP documents.

What are the most important implementation issues per SESAR Key Feature?

a) Optimised ATM Network Services

The overall progress of the implementation objectives in this key feature is mostly in accordance with the implementation plan. Some planned delays are recorded for collaborative flight planning implementation objective (FCM03). The main reason for this delay (estimated 1 year delay) is the fact that there is a need for a major system upgrade to implement the functionality. Another, but less important reason for the longer implementation time, is that the objective is considered implemented when the Network Manager (NM) has integrated the received AFP messages in the operational NM system (this requires not only the capability of the local ANSP systems to generate and transmit AFP messages but also a testing and validation period with the NM).

Other functionalities mainly related to NOP and ATFCM are progressing good, both on the side of the NM and the ANSPs.

It should be noted that there are a few new objectives introduced last year which are at early phases of implementation. The progress of these functionalities (STAM Phase 2, Traffic Complexity Assessment, Rolling ASM/ATFM processes) was not assessed due to immaturity of reported information (most stakeholders still haven't defined concrete implementation plans).

b) Advanced Air Traffic Services

A clear success implementation story in this key feature is the implementation of Direct Routing and Free Route concept. Both implementation objectives recorded a significant increase in the number of States/ANSPs that completed the implementation in 2016 (33% in case of Direct Routing, and 15% in case of Free Route). Both functionalities will be achieved by the planned date, if not even before. This is despite some scattered delays in implementation of system requirements related to Free Route (APW, MTCD and OLDI).

Another improvement in this key feature is the implementation of AMAN tools. ANSPs have recalibrated their implementation plans to account for this functionality that is now in the implementation plans of 29 European airports (against only 15 last year). Implementation will be achieved by the end of 2019, according to set deadlines. Some planned delays are recorded for the objective that prescribes the extension of AMAN horizon to first adjacent ATC unit, but these delays are not significant, and they are mostly due to the fact that these ANSPs intend to implement the extended AMAN functionalities to both first adjacent sector and an en-route environment at the same time.

Some implementation issues are identified in the implementation of navigation (NAV) objectives, in particular with the objective related to the implementation of the approach with vertical guidance

(NAV10) that follows the deadlines of ICAO resolution 3711. Although this is a non-mandatory deadline, there is an uncertainty regarding the publishing of the EASA PBN IR so the stakeholders show some reluctance in the implementation. These issues should be resolved once the PBN IR is published. This will also require the recalibration of the objective to align with the European approach.

c) High Performing Airports

Developments in the airports area in 2016 show that there are still significant delays in implementing the PCP pre-requisites to AF2 related to A-SMGCS surveillance (A-SMGCS Level 1) and A-SMGCS Runway Monitoring and Conflict Alerting (A-SMGCS Level 2). The implementation of A-SMGCS surveillance is particularly important as this is the baseline implementation objective without which other A-SMGCS functionalities cannot be deployed. There are six (6) PCP airports that still have not implemented this functionality.

Basic A-CDM implementation also shows some delays against the deadline (12/2016). Out of 25 PCP airports, only 14 have implemented this important pre-requisite to date. However, remaining airports are either going to become an A-CDM airport in 2017, or already functioning as an Advanced TWR Airport which means that they are connected to the network and provide the DPI information (SESAR Solution #61).

The 2016 reporting exercise also showed that there is a need to re-assess the applicability of the Time Based Separation (TBS) implementation objective. It seems that the commitment and feasibility of using this functionality at airports is still not there. So far only a very small population of airports (seven (7)) is planning to implement this functionality.

Electronic Flight Strips (EFS) implementation has picked up pace (10 airports in applicability area already completed the objective), most probably due to the funding opportunities through the PCP framework, as there are quite a few projects awarded in this area.

d) Enabling Aviation Infrastructure

Based on the 2016 reporting on the implementation objectives in this key feature, the following challenges should be addressed:

- **CNS infrastructure**

  The existing implementation objectives in this area address some baseline improvements, and the current absence of a stable future strategy for CNS results in non-synchronised and slow implementation of these elements. In such context, the CNS Strategy, including the aspects of rationalisation and definition of the “critical path” and currently being prepared by the SESAR JU, is much needed to unlock progress in the CNS area.

  For instance in the COM area, VoIP implementation is within its prescribed deadlines, but the progress is very slow (no State has achieved this objective in 2016). Also, FMTP implementation based on the Regulations (EC) 633/2007 and 283/2011 is delayed three (3) years. In addition, a risk of delay is assessed for AGVCS2.

A similar situation exists in the surveillance area. The performance requirements for the surveillance infrastructure are evolving as prescribed in SPI and ACID implementation objectives that are technology agnostic, without exactly defined characteristics of the ground infrastructure constituents. According to 2016 information, both of these objectives show significant risks of delay in implementation. In addition, the SPI Regulation is currently being amended which brings the amount of uncertainty as well.

- **Addressing the risk of further delay on Datalink implementation**

  Year 2016 was a pivotal year for Data Link Services (DLS) implementation. The SESAR Joint Undertaking (SJU) finalised the ELSA Consortium Study addressing the recommendations made by EASA in their report from 2014 on datalink's technical issues. In addition, the SESAR Deployment Manager (SDM) was named the project manager for Datalink implementation and a DLS recovery plan was defined. In the meantime, global performance of the datalink network improved thanks to initial deployment by CSPs of multi-frequency in the most congested areas. This deployment shall be pursued under the coordination of the CEF 2016 DLS Cluster Path 1 project (16 ANSPs and 2 CSPs). In spite of a good collaboration among all the stakeholders, the target deadlines for this Implementation project remain very challenging. Any risk of further delay should be carefully assessed monitored and mitigated as DLS is an important enabler for i4D.

- **Creating the basis for SWIM**

  As the information management moves towards the implementation of SWIM (yellow and blue profile), there are number of implementation objectives that set the baseline for the efficient implementation of SWIM. These are mainly Aeronautical Data Quality (ADQ) requirements set in the associated implementing rule, and some other requirements such as the e-TOD, IPv6 implementation and also deployment of a common data exchange model AIXM5.1. The analysis in this report shows that the ADQ implementation is delayed for approximately 3 years, pushing it to 2020. IPv6 and common data model based on AIXM5.1 should be deployed by end of 2019 in most of ECAC States. E-TOD implementation is also delayed approximately 1 year, towards the end of 2019. This basically means that the foundation for SWIM will be set with some delays that may impact the timely implementation of SWIM functionalities.

- **Synchronised and interoperable evolution of the ATM system**

  Although the ATM system is not seen as a part of aviation infrastructure in the classical sense of the definition, it is considered as the crucial infrastructure in the operational terms. From the larger ECAC perspective, the ATM systems should evolve in synchronised and interoperable manner according to the Single Sky principles. Today, the evolution of the ATM systems is largely organised around a few major technological initiatives involving different ANSPs. These are COOPANS, 4-flight and iTEC. These alliances are based on the common technology provider rather than on geographical, FAB or any other operational principle. The impact of this approach to technology deployment in Europe should be assessed in terms of synchronisation, interoperability and the impact on airspace de-fragmentation (main reasons for creating FABs).In addition, there could be many benefits for Network Manager in defining well-coordinated plans of stakeholders major system upgrades, since these implementations can introduce significant delays in the Network, and in many cases can also affect the neighbouring States.

The map below illustrates the current approach to FDPS evolution in the ECAC area.

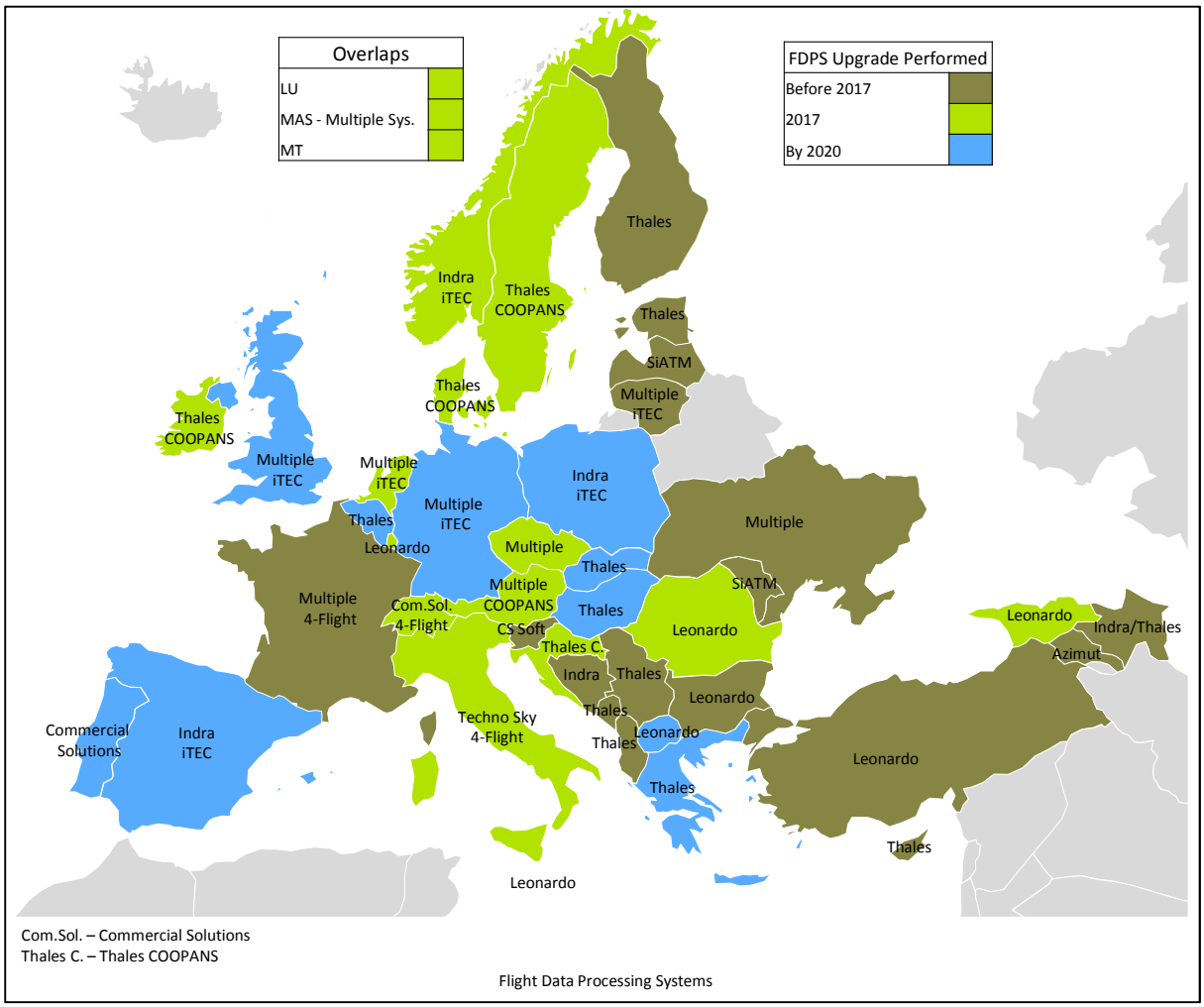

Figure ii: Approach to technology in ECAC area

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1 INTRODUCTION

The Level 3 of the European ATM Master Plan

The European ATM Master Plan (hereafter referred to as 'the Master Plan') is the main planning tool for setting the ATM priorities and ensuring that the SESAR Target Concept[1] becomes a reality. The Master Plan is an evolving roadmap and the result of strong collaboration between all ATM stakeholders. As the technological pillar of the SES initiative, SESAR contributes to achieving the SES High-Level Goals and supports the SES regulatory framework.

The Master Plan details not only a high-level view of what is needed to be done in order to deliver a high-performing ATM system, but also explains why and by when. It therefore sets the framework for the development activities performed by the SESAR Joint Undertaking (SJU) in the perspective also of the deployment activities to be performed by all operational stakeholders under the coordination of the SESAR Deployment Manager and in accordance with the Deployment Programme to ensure overall consistency and alignment.

The Master Plan is structured in three levels available through the European ATM portal (www.atmmasterplan.eu); the Level 3 "Implementation view" contains the Implementation Plan enriched with elements from the Implementation Report fed by elements coming from reporting processes, such as the LSSIP[2] (Local Single Sky ImPlementation) as shown in Figure 1.

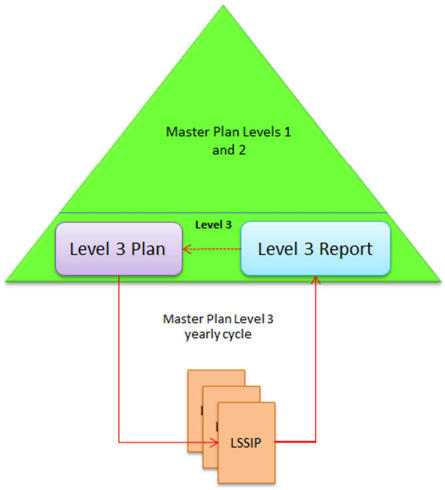

Figure 1: Master Plan Level 3 yearly cycle

The Implementation Objectives constitute the backbone of the Level 3 and provide all civil and military implementing parties (ANSPs, Airport Operators, Airspace Users and Regulators) with a basis for short to medium term implementation planning. It also serves as a reference for States/National Supervisory Authorities (NSAs) to fulfil their roles regarding the supervision of safe and efficient provision of air navigation services as well as the timely implementation of SESAR.

Together Master Plan Level 3 Implementation Plan and Report based on LSSIP processes constitute mechanism that enables the ECAC wide implementation monitoring and planning of the Master Plan – recording benefits, alternative solutions implemented, success stories, problems in implementation, etc.

Master Plan Level 3 2016 Implementation Report

The structure of 2016 Master Plan Level 3 Report consists of:

- **Executive Summary** that highlights the most important findings of the report.
- **Strategic View** is the view that provides overview of implementation progress in 2016, per SESAR Key Feature/major ATM changes, and gives an outlook of future developments. This view also includes the geographical aspect, assessment per FAB, indicating most important technical developments and expected performance benefits these improvements will bring to FAB structures.
- **Deployment View** in the view that provides detailed analysis of the implementation progress per Level 3 implementation objective. The analysis is provided in the new standardised template that provides a comprehensive analysis and relevant references.

[1] As described in Chapter 4.1 of the Executive View of the European ATM Master Plan @ https://www.atmmasterplan.eu/downloads/202

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

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

The main information sources for the production of this document remain LSSIP State reports. These reports are complemented with the EUROCONTROL CNS business intelligence database, CAPEX information extracted from RP2 Performance Plans, OLDI information extracted from EUROCONTROL FMTP database, PBN map tool, Network Manager tools and individual stakeholder sources.

The implementation progress in this report is assessed against the implementation dates set in the Master Plan Level 3 2016 Implementation Plan. These Full Operational Capability (FOC) dates represent the dates agreed by the ATM community and they indicate the date by which implementation of the concept or technology should be completed. This means that every implementation beyond the FOC dates set in the Level 3 objective, potentially results in missed performance benefits, both at local and Network level. It should be however noted that the Level 3 of the Master Plan also takes into account local conditions. National stakeholders involved in this process can decide which technical concepts are the most promising for their own operating environment, with the exception of regulated and mandatory items included in the Level 3 (items based on the Implementing Rule).

It must be noted that the Level 3 addresses the full scope of the Master Plan mature and deployable elements as Implementation Objectives, some of which relate to the PCP and its Deployment Programme. The MP Level 3 Report aggregates the progress reported in year-1 in LSSIP by ECAC States, on every active Implementation Objective.

Based on SDM's Deployment Programme, the reporting on PCP deployment follows a different timescale and is made on elements, which, although related to certain Implementation Objectives, are described with a different granularity and for a different purpose. The MP Level 3 covers the entire ECAC geographical scope, which is another reason why the aggregation of results on PCP-related implementation Objectives may provide results that may be different, but complementary, to the SDM reporting.

Although delivered to SESAR Joint Undertaking, the target audience of this report is the whole ATM community. The report aims at wide range of the ATM professionals, from technical experts to executives – assessing both very technical implementation issues at individual implementation objective level, but also provides more general, ECAC wide overview of progress.

2 STRATEGIC VIEW

The three fully integrated levels of the Master Plan

The operational view of the Master Plan as described in its Level 1[3] provides the framework that binds together the three levels of the Master Plan with the ultimate goal of realising the SESAR Target Concept.

The realisation of the SESAR Target Concept is supported by SESAR through the implementation of a number of Operational Changes following the strategic orientations described by the four Key Features.

Operational Changes provide performance benefits to one or more of the four types of operating environment, i.e. airport, en-route, TMA and network.

An Essential Operational Change is defined as an ATM operational change that provides significant network performance improvements to the operational stakeholders. An Essential Operational Change is pre-identified in the Master Plan and its performance improvement is validated during the SESAR development phase. When mature and demonstrating both economic (Business case) and operational performance it is proposed for deployment.
If these essential operational changes require synchronised deployment to achieve the improved performance at network level and they are mature for deployment, they may be proposed as ATM functionalities in common projects as defined in Regulation (EU) 409/2013.

SESAR 1 comprises:

- Essential Operational Changes, which are included in the Pilot Common Project (PCP);
- New Essential Operational Changes, defined as those beyond the PCP as well as "safety critical" additional operational changes;
- Operational Changes that are not currently considered essential.

For the sake of efficient description of the implementation results, a grouping of the implementation objectives into "**Major ATM Changes**" was introduced in the Level 3 Report 2015, to and to assess the strategic aspect of their future evolution. These "Major ATM Changes" include several Essential Operational Changes that are logically grouped into implementation blocks. This concept is carried over to 2016 Report. Mapping presented on next pages shows how all these elements fit together into one overall

The four SESAR Key Features:

Optimised ATM network services

An optimised ATM network must be robust and resilient to a whole range of disruptions. It relies on a dynamic, online, collaborative mechanism, allowing for a common updated, consistent and accurate plan that provides reference information to all ATM actors. This feature includes activities in the areas of advanced airspace management, advanced dynamic capacity balancing and optimised airspace user operations, as well as optimised network management through a fully integrated network operations plan (NOP) and airport.

Advanced air traffic services

The future European ATM system will be characterised by advanced service provision, underpinned by the automated tools to support controllers in routine tasks. The feature reflects this move towards automation with activities addressing enhanced arrivals and departures, separation management, enhanced air and ground safety nets and trajectory and performance-based free routing.

High-performing airport operations

The future European ATM system relies on the full integration of airports as nodes into the network. This implies enhanced airport operations, ensuring a seamless process through collaborative decision-making, in normal conditions, and through the further development of collaborative recovery procedures in adverse conditions. In this context, this feature addresses the enhancement of runway throughput, integrated surface management, airport safety nets and total airport management.

Enabling aviation infrastructure

The enhancements of the first three Features will be underpinned by an advanced, integrated and rationalised aviation infrastructure. It will rely on enhanced integration and interfacing between aircraft and ground systems. Communications, navigation and surveillance (CNS) systems, SWIM, trajectory management, Common Support Services and the evolving role of the human will be considered in a coordinated way for application across a globally interoperable ATM system. The continued integration of general aviation and rotorcraft and the introduction of remotely-piloted aircraft systems (RPAS) into the ATM environment is a major activity in this feature.

[3] As described in Chapter 4 of the Executive View of the European ATM Master Plan @ https://www.atmmasterplan.eu/downloads/202

picture of the Master Plan. It should be noted that the mapping includes new proposed Level 3 implementation objectives subject for approval of Level 3 Plan Edition 2017.

Similar to last year, Level 3 Report 2016 also considers FAB implementation aspects at its strategic level. This complements the analysis per major ATM change as it brings the geographical aspect to the report.

FAB analysis was completed through EUROCONTROL LSSIP mechanism. States participating in FAB initiatives were asked to coordinate the FAB chapter of their LSSIP documents – leading to coordinated view of SESAR implementation from the FAB perspective.

Optimised ATM Network Services

Major ATM Change	Pre-SESAR	(P)CP	New Essential Operational Changes / *Operational Changes*
ATFCM	**ATFM slot exchange** **Basic network operations planning** • FCM03-Collaborative flight planning **STAM** • FCM04.1-STAM Phase 1	**Automated support for traffic complexity assessment** • FCM06-Traffic complexity assessment **CTOT to TTA for ATFCM purposes** • FCM07-CTOT to TTA for ATFCM purposes **Enhanced STAM** • FCM04.2-STAM Phase 2	**UDPP** • FCM09-Enhanced ATFM Slot Swapping
NOP	**Basic network operations planning** • FCM05-Interactive Rolling NOP	**Collaborative NOP** • FCM05-Interactive Rolling NOP	
Free Route & Advanced FUA	**Civil/military airspace and aeronautical data coordination** • AOM13.1-Harmonise OAT and GAT handling • AOM19.1-ASM support tools to support A-FUA	**ASM and A-FUA** • AOM19.1-ASM support tools • AOM19.2-ASM Management of real time airspace data • AOM19.3-Full rolling ASM/ATFCM process **Free route (*)** • AOM21.1-Direct Routing • AOM21.2-Free Route Airspace	

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

Advanced Air Traffic Services

Major ATM Changes	Pre-SESAR	(P)CP	New Essential Operational Changes / *Operational Changes*
Enhanced arrival sequencing	**Basic AMAN** • ATC07.1-AMAN • ATC15.1-Initial extension of AMAN to En-Route	**AMAN extended to en-route airspace** • ATC15.2-Extension of AMAN to En-route	**AMAN/DMAN integration including multiple airports** ***Airborne Separation Assistance System (ASAS) spacing*** ***Controlled Time of Arrival (CTA)***
PBN	**Introduction of PRNAV** • ENV01-Continuous Descent Operations • ENV03-Continous Climb Operations (NEW) • NAV03.1-RNAV-1 in TMAs • NAV10-APV Procedures • ATC02.8-Ground based safety nets (MSAW and APM)	**Enhanced TMA using RNP-based operations** • NAV03.2-RNP1 in TMAs (NEW)	**Advanced RNP** **Trajectory-based tools** ***Enhanced Safety Nets*** • ATC02.9-Enhanced STCA for TMAs (NEW) **Additional objective:** • NAV12 - Optimised low-level IFR routes in TMA (NEW)
Free Route	• ATC02.8-Ground based safety nets (APW) • ATC17-Electronic Dialog supporting COTR	**Free route** • AOM21.1-Direct Routing • AOM21.2-Free Route Airspace • ATC12.1-MONA, TCT and MTCD	**Sector team operation** • ATC02.9-Multi Sector Planner (NEW) **Trajectory-based tools** ***Enhanced Safety Nets***
Remote Tower			***Remote Tower*** • AOP14-Remote Tower Services (NEW)

High Performing Airport Operations

Major ATM Changes	Pre-SESAR	(P)CP	New Essential Operational Changes / *Operational Changes*
Collaborative Airport	**Initial airport CDM** • AOP05-Airport CDM **Additional Objectives:** • ENV02-Collaborative Environmental Management	**Airport operations plan** • AOP11-Initial Airport Operations Plan • FCM05-Interactive Rolling NOP	**Collaborative airport**
Surface management	**A-SMGCS L1 and L2** • AOP04.1-A-SMGCS Surveillance • AOP04.2-A-SMGCS Runway Monitoring and Conflict Alerting (RMCA) **Additional Objectives:** • SAF11-Prevent Runway Excursions	**Automated assistance to controller for surface movement planning and routing** • AOP13-Automated Assistance to Controller for Surface Movement Planning and Routing **Airport safety nets** • AOP12-Improve RWY safety with ATC clearance monitoring **DMAN synchronised with pre-departure sequencing** **DMAN integrating surface management constraints**	**Integrated surface management** **Integrated surface management datalink** ***Ground Situational Awareness*** ***Enhanced Airport Safety Nets*** ***Airport Safety Nets Vehicles***
Enhanced / Optimised operations in the vicinity of the runway	**Crosswind reduced separations for arrivals** **Operations in LVC**	**TBS for final approach** • AOP10-Time based separation	**LVPs using GBAS** ***Approach & Departure Separations***

Enabling Aviation Infrastructure

Major ATM Changes	Pre-SESAR	(P)CP	New Essential Operational Changes / *Operational Changes*
Pre-SWIM & SWIM	**IP network** • ITY-FMTP-FMTP over IPv6 **B2B services** **Information reference and exchange models** • INF07-eTOD • ITY-ADQ-Aeronautical Data Quality	**Common Infrastructure Components: SWIM registry, PKI** • INF08.1-iSWIM Yellow TI Profile **SWIM technical infrastructure and profiles** • INF08.1-iSWIM Yellow TI Profile **Aeronautical information exchange** • INF08.1-iSWIM Yellow TI Profile **Meteorological information exchange** • INF08.1-iSWIM Yellow TI Profile **Cooperative network information exchange** • INF08.1-iSWIM Yellow TI Profile **Flight information exchange** • INF08.1-iSWIM Yellow TI Profile • INF08.2-iSWIM Blue TI Profile • FCM08-Extended Flight Plan	***Digital Integrated Briefing***
Data Link	**A/G datalink** • ITY-AGDL-A/G Data-link	**Initial trajectory information sharing (i4D)**	**Information sharing and business trajectory** **Mission trajectory**
CNS Rationalisation	**ADS-B, WAM** • ITY-ACID-Aircraft Identification • ITY-SPI-Surveillance performance and interoperability **GNSS, GBAS, SBAS** ***Communications infrastructure*** • COM10-Basic and enhanced AMHS • ITY-AGVCS2-8,33KHz below FL195	***Communications infrastructure*** • COM11-Voice over IP (*) • COM12-NewPENS	**CNS rationalisation**

(*) Not mandated by the PCP Regulation but enabling some SESAR 1 operational changes

Air Traffic Flow and Capacity Management (ATFCM)

The objective of the Air Traffic Flow and Capacity Management (ATFCM) is to optimise traffic flows in a way that minimises delay and make best use of the airspace and the air traffic control capacity while enabling airlines to operate safe and efficient flights.

The ATFCM activities are divided into three phases: strategic, pre-tactical and tactical. Each of these phases contains number of important activities coordinated through NMOC.

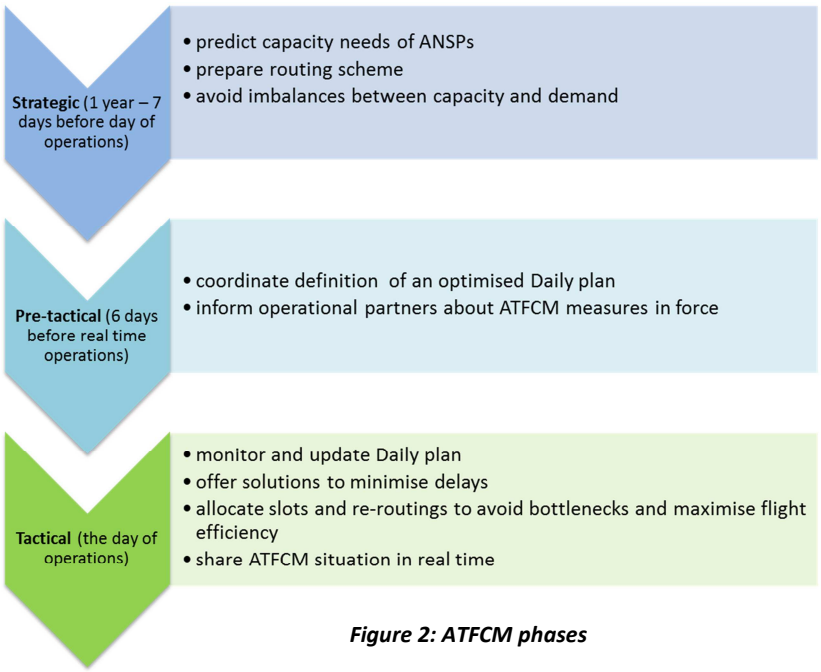

Figure 2: ATFCM phases

A lot of these activities are covered by active implementation objectives in the Master Plan Level 3 2016 Implementation Plan: **FCM03** (Implement collaborative flight planning), **FCM04.1** (STAM Phase 1), **FCM04.2** (STAM Phase 2), **FCM06** (Traffic complexity assessment) and **FCM09** (Enhanced Slot Swapping). In addition, achieved Level 3 objective **FCM01** (Enhanced tactical flow management) and initial objective **FCM07** (CTOT to TTA) also fall into this Major ATM Change.

Implementation status at the end of 2016

Progress of FCM03, FCM04.1, FCM04.2 and FCM06 objectives as reported in LSSIP 2016, is shown on **figure 3** (applicability area only – as defined in Level 3 2016 Implementation Plan).

Implementation of collaborative flight planning (FCM03) is slow, in particular taking into account that the objective is a pre-SESAR one and that it has suffered several postponements of its FOC date over the last years. It is expected that 2017 will see a surge in implementation, getting close to 80% completion rate.

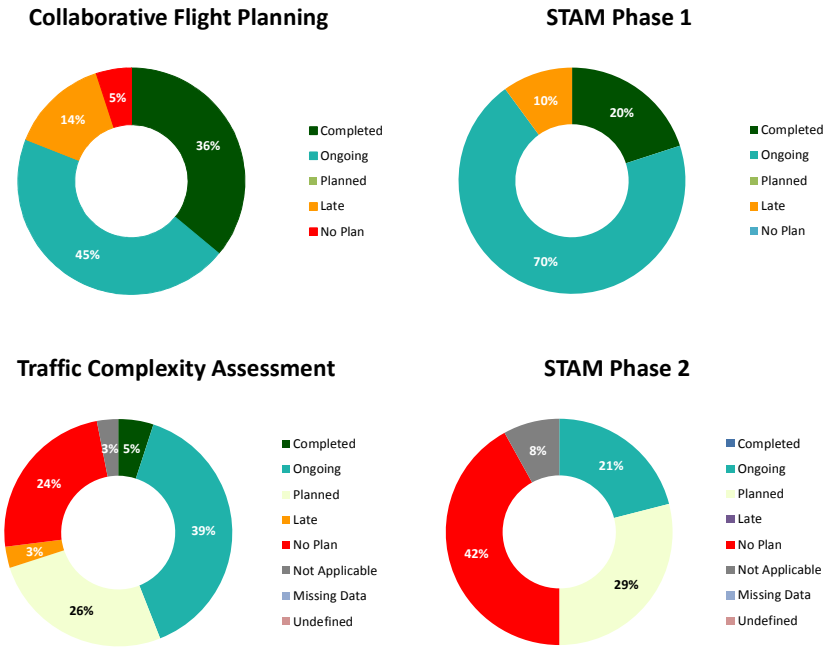

Figure 3: Progress of implementation for FCM03, FCM04.1, FCM04.2 and FCM06 as reported in LSSIP 2016

In 2016, the STAM Phase 1 implementation is progressing well and will be achieved on time. STAM Phase 2 implementation is still at early stages with around half of ECAC States having started or defined plans for implementation.

A series of improvements were made in flight plan processing by IFPS, including the extended flight plans to support the Flight Plan Interoperability Programme, FPL distribution via Business-to-Business (B2B) Publish/Subscribe service. The B2B Web Services are expanded to address Flight update information allowing, for instance, ANSPs to provide Departure Planning Information (DPI) messages, First System Activation (FSA) updates and Regulation Proposal to NMOC.

The flight data profile accuracy was improved by reducing the time, vertical, and lateral deviation window triggering a flight profile update and as such increasing the accuracy of the actual profile.

Besides NATS, a second ANSP (MUAC) has completed the implementation of traffic complexity assessment tool (FCM06). 15 additional ANSPs have now started the implementation of this tool.

Enhanced Slot Swapping implementation (FCM09) is one of the NM priorities and progresses on time with scheduled deadlines. To support flight efficiency initiatives a number of changes were made to support Free Route.

SUCCESS STORY: ENHANCED ATFM SLOT SWAPPING AND USE OF TARGET TIMES

In the past, the air traffic management (ATM) system in Europe allowed little flexibility to airspace users (AUs). Take for example ATFM slot swapping: in 2013, 1548 swaps over 9.6 million flights represented less than 0.2% of all flights. More flexibility, i.e. the ability of the ATM system to accommodate AUs' changing business priorities today (100-200 swaps per day), results in a better recovery process with substantial reductions of operational and cost impacts. Flexibility and equity (in the sense that one AU's prioritisation does not negatively impact another's) are key considerations. Enhanced ATFM slot swapping is one of those concepts that brings both of these considerations to the table. It provides significant benefits for the whole network. Average cost saved per single ATFM slot swap is calculated to be 4900 EUR, which currently amounts to 7-8 M EUR savings per year (according to NM sources). Savings of 500 M EUR are estimated over next 20 years. No investment costs are necessary for AUs.

In April 2016 NM added in each Slot Allocation/Revision Message the associated Target Time, which provided the basis for future evolutions towards Target Time operations.

Future developments

In short term, NM will concentrate on developing functions enabling network impact assessment and scenario management, with a target date for implementation in 2017.

The NM technical solution supporting STAM Phase 2 is planned to be delivered on the n-CONECT platform starting in 2017, and followed by a stepped operational deployment until 2019/2020.

NM has planned to implement enhanced monitoring techniques by 2018+. These include the detection of local overloads through the use of occupancy counts and traffic complexity assessments, combined with a continuous monitoring of impact at network level.

Many ANSPs have plans for implementing traffic complexity assessment tools by 2021 – such as NATS with Flow Optimisation and DSNA as part of their Salto project.

Regarding enhanced ATFM slot swapping, the next steps to be taken by the NM will be to analyse the benefits and risks of: allowing flights to share delay between maximum three (3) other flights using 'multiple-swaps'; and facilitating more long and short haul slot swapping by making it possible to swap pre-allocated with allocated ATFM slots. The use of B2B Web Services will be further expanded in line with SWIM yellow profile services requirements.

CONCLUSION	**COLLABORATIVE FLIGHT PLANNING IMPLEMENTATION DELAYS SHOULD BE ADDRESSED AND SUPPORT FOR IMPLEMENTATION FROM NM GIVEN TO THE LOCAL STAKEHOLDERS.**

STAKEHOLDERS REG ASP APT AU NM MIL IND

Network Operations Plan (NOP)

The Network Operations Plan is a consolidated network flow and capacity overview, enabling operational partners to anticipate or react to any events and to increase their mutual knowledge of the situation from the strategic phase to the real-time operation phase and into post operations analysis. All this is achieved by using a number of tools that support network operations.

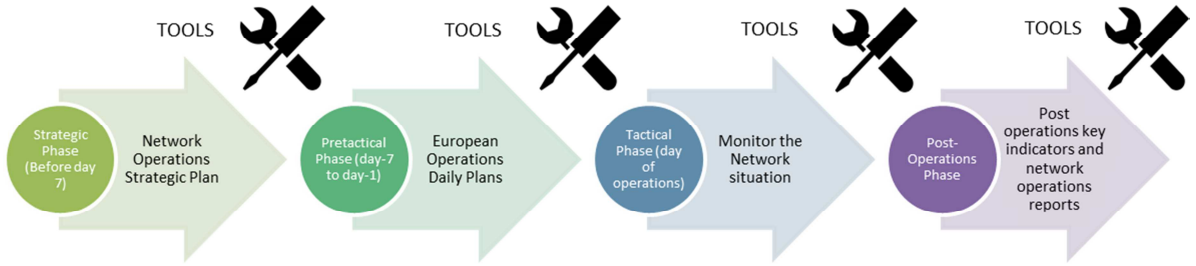

Figure 4: NOP phases

The operations planning process consolidates forecasts and plans from all partners involved in ATM operations (ANSPs, airports, AUs, MIL) and from the EUROCONTROL units in charge of flow, capacity, and airspace management. Starting with the strategic planning of capacities, the process moves to an operational level with the development of derived seasonal, weekly and daily plans (the so-called 'NOP Coordination'). Currently applicable network operations plan is the European Network Operations Plan 2017-2019/21.

The related ESSIP Objective is **FCM05** and the implementation date is **12/2021** in Master Plan Level 3 2016 Implementation Plan..

Network Operations Planning contains six main elements:

- ✓ Local and Network Operational Planning
- ✓ Route Network and Airspace Structure Development
- ✓ Airspace Management (ASM)
- ✓ ATM (ATS/ASM/ATFCM) Procedures
- ✓ Airspace Modelling
- ✓ Airspace Simulations

SUCCESS STORY: ENHANCED NOP FUNCTIONALITIES AND NETWORK MANAGER USER FORUM

In 2016 additional information and functionalities were made available in NOP Portal such as:

- Provision of improved access and more complete information to the Initial Network Plan (INP);
- Specific planning information for Transition Plans;
- Improved accessibility to the Network Operation Handbook documentation area;
- Notification to users for INP and the European Airspace Use Plan (EAUP) changes;
- Interface for AIREP sharing in the event of Volcanic Ash crisis.

The NM User Forum gives Europe's ATM actors a unique chance to discuss operational issues with their peers and to work together on finding solutions to common challenges and to improve overall network operations. This is usually done in the broader context of the Network Manager's helping partners achieve their operational performance objectives. The Forum is primarily intended for managers and operational staff involved in aircraft operations, ATM provision, air-side operations at airports and Computerised Flight Plan Provision (CFSP).

Implementation status at the end of 2016

The first steps of the interactive Rolling NOP were implemented through the deployment of the NOP portal and through the NM B2B interfaces. The service was then further improved with enriched airspace and flight

information (e.g. with to the DDR2 developments) and the access to the NOP data was progressively extended through NM B2B. In 2015, NM enhanced the B2B services by introducing the Publish/Subscribe mode. This was used to improve the notification process of the AUP/UUP publications and will be possibly extended to other B2B services. DPI was also made available through NM B2B services. The first APOC implementation took place at Heathrow. An initial implementation of the AOP/NOP data integration was delivered by NM through B2B services in 2015, with further validations completed in 2016.

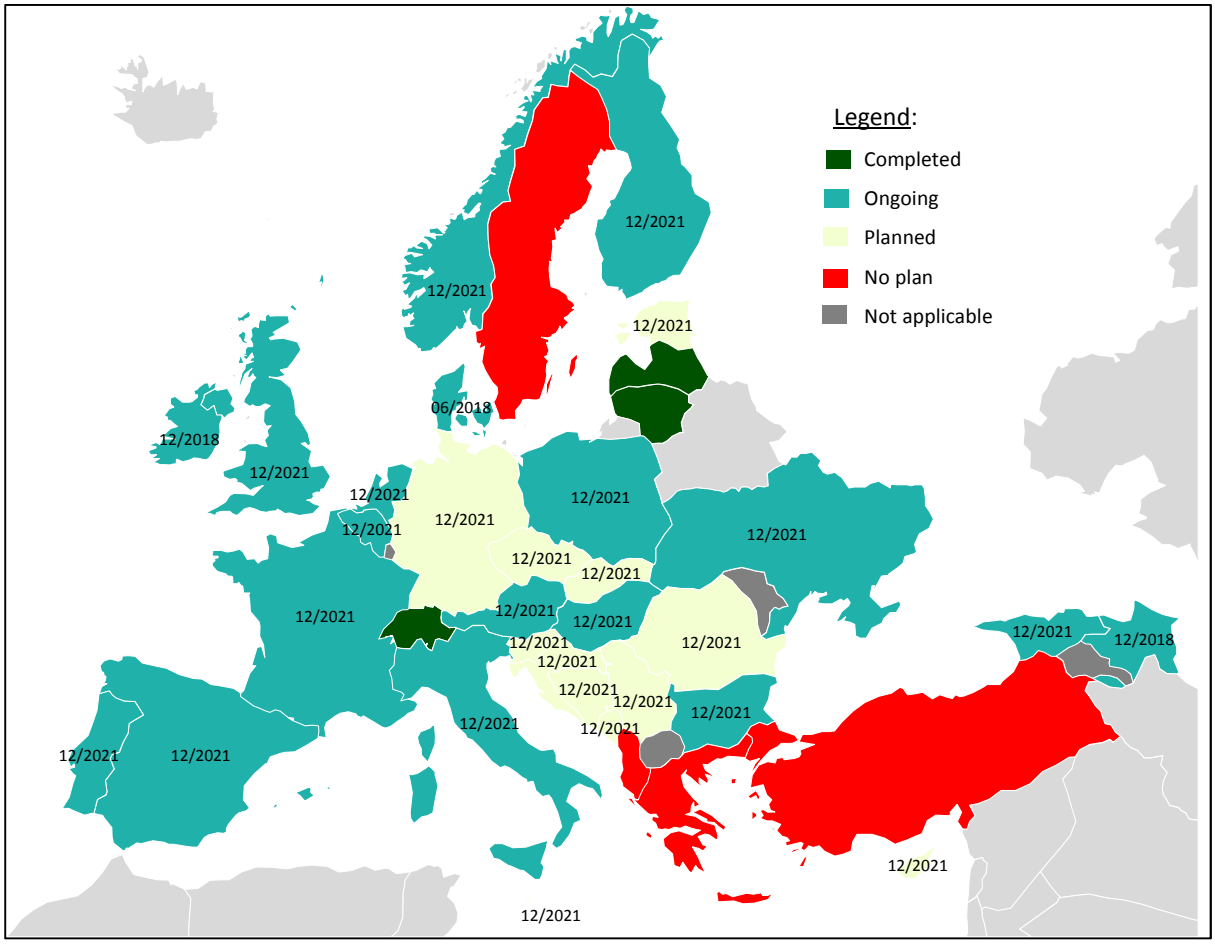

Figure 5: Progress of implementation for FCM05 objective as reported in LSSIP 2016

Future developments

In 2017, NM will continue to develop the 'Rolling/Dynamic Network Plan' which aims at displaying network situational information updated in real time, instead of a daily Plan publication and teleconference. It will address hotspots, network events, ATFCM measures and ATFM Information Messages and will be made available via B2B services and via the n-CONECT platform in 2017. NOP will evolve towards "one stop shop" with "look ahead" capabilities, for NM to communicate & exchange with all relevant stakeholders and further develop "Common Network Awareness" and "Collaborative Network planning".

NM has initiated a project to implement a pilot of the AOP/NOP integration with the involvement of three major airports (LHR, CDG, FRA) in the 2016-2019 timeframe. A specific focus will be put on data interfaces improving predictability and the resulting rolling plans on NM and airports side, together with the provision of guidance materials for future airport implementations.

As from 2017, the implementation of next significant NOP evolutions will take place on the future n-CONECT platform.

STAKEHOLDERS REG ASP APT AU NM MIL IND

Enhanced Arrival Sequencing

Enhanced arrival sequencing is referred in the PCP IR, under AF 1.1. Although PCP IR refers only to extended AMAN, which includes en-route operations in selected ACCs, arrival sequencing includes the basic Arrival Management (AMAN) tools as well. Thus, enhanced arrival sequencing from the Master Plan Level 3 perspective includes:

- Basic Arrival Manager (AMAN) tools (applicability date 31/12/2019) to improve sequencing and metering of arrival aircraft in selected TMAs and airports (Level 3 Objective **ATC07.1**);
- Information exchange tools in adjacent/subjacent ACCs (applicability date 31/12/2017), in support of Basic AMAN operations (Level 3 Objective **ATC15.1**).
- Extended AMAN (applicability date 31/12/2023) to en-route airspace (Level 3 objective **ATC15.2**).

Extending the AMAN horizon may in many cases affect the airspace design, and it is therefore essential that all stakeholders, including military authorities are consulted.

Air Traffic Control (ATC) services in the TMAs implementing AMAN operations shall coordinate with Air Traffic Services (ATS) units responsible for adjacent en-route sectors. Arrival management information exchange (AMA) or other generic arrival message may be used, as well as SWIM orientated integrations utilizing the Information Service Reference Model defined by SESAR.

Capacity

Improved airport capacity. Optimal use of TMA capacity.

Operational Efficiency

Optimised arrival sequencing. Reduction in holding and in low level vectoring, by applying delay management at early stage of flight. Improved arrival flow.

Environment

Reduced holding and low-level vectoring, as well as applying delay management at early stage of the flight, has a positive effect on environment in terms of noise and CO2 emissions.

SUCCESS STORY: AMAN @ PALMA DE MALLORCA

ENAIRE has successfully deployed the AMAN (Arrival MANager) Arrival Manager at the Palma de Mallorca TMA. This action joins the commissioning of this functionality already carried out in Madrid TMA in July 2013, and in Barcelona TMA in March 2015.

This tool, integrated in the Automated System of Air Traffic Control (SACTA), provides assistance to air controllers to facilitate the sequencing and separation of traffic in the aerodrome approach phase.

These actions introduced by ENAIRE improve the planning of arrivals, which will allow coping with the future traffic growths, thanks to the increase of capacity, as well as an improvement of the safety. The implementation of these new functionalities contributes to offer high level of quality in the air navigation services provided by ENAIRE.

Implementation status at the end of 2016

According to 2016 LSSIP reporting, 18 airports in the ECAC area have implemented basic AMAN functionality. These are represented on the **figure 6** below. The two (2) Italian PCP airports – Roma Fiumicino and Milano Malpensa – have indicated no plans to implement basic AMAN, as it will be comprised in the implementation of Extended AMAN. Some airports have indicated implementation delays elaborated in Deployment View of this report.

Regarding Extended AMAN (ATC15.1 and ATC15.2), only one (1) State completed the full extended AMAN as defined in the PCP regulation, both in downstream ACC and neighbouring ACCs, while additional seven (7) States have implemented the extended AMAN to first downstream ACC. Implementation is quite slow due to more complex requirements often requiring coordination with neighbouring ANSPs.

Map below shows the current implementation status, where basic AMAN functionality is represented by airport and extended AMAN (both downstream and adjacent ACCs) by State.

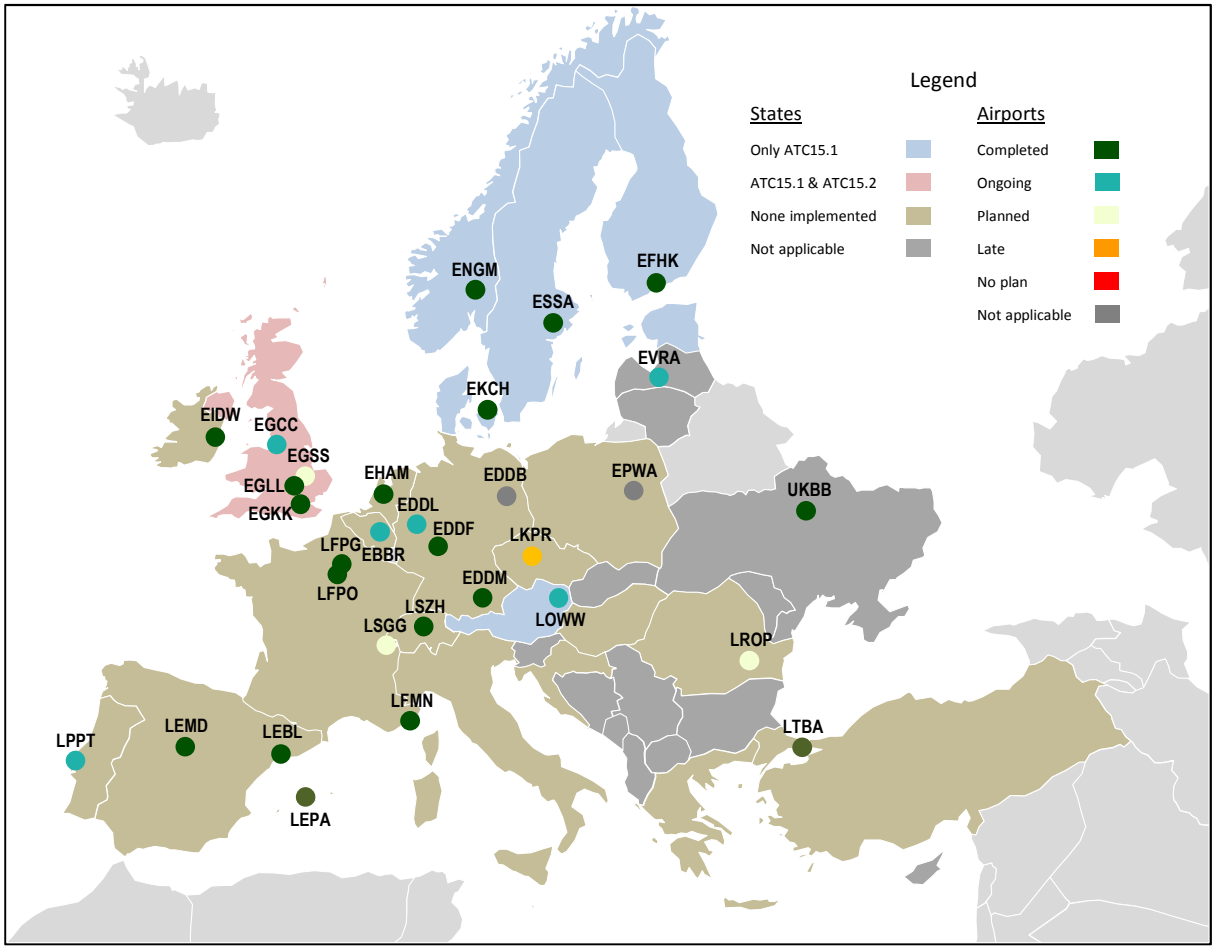

Figure 6: Basic AMAN (airports) and Extended AMAN (States) - status of implementation as reported in LSSIP 2016

Future developments

Based on the plans reported by the Stakeholders in LSSIP 2016, Brussels Airport (BRU) and Riga Airport (RIX) and Dusseldorf Airport (DUS) should complete the implementation of basic AMAN by end 2017.

Based on the plans reported by the Stakeholders, seven (7) ANSP have envisaged completing the implementation of Extended AMAN functionality to first downstream ACC (ATC15.1) in 2017. Two (2) of these seven (7) are also planning to implement extension to adjacent ACCs (ATC15.2). These are DSNA (France) and Skyguide (Switzerland).

CONCLUSION	**IMPLEMENTATION OF AMAN HAS PICKED UP SPEED, AND MORE AIRPORTS ARE COMMITTED TO IMPLEMENTATION (29 IN 2016 AGAINST 19 IN 2015).**

STAKEHOLDERS REG ASP APT AU NM MIL IND

Performance Based Navigation

Performance Based Navigation (PBN) is part of the PCP IR sub-functionality 1.2: Enhanced TMA using RNP-based operations. Regarding the Master Plan Level 3 2016 Report, the concept includes both the implementation of Precision Area Navigation – RNAV1 (Level 3 Objective **NAV03**) and the implementation of Accuracy Position & Velocity (APV) Procedures (Level 3 Objective **NAV10**). In addition, during the pre-SESAR phase, precision (P)-RNAV approaches combined, where possible, with continuous descent/climb operation techniques (**ENV01**).

The implementation of RNAV1 procedures (FOC: 2024) is an interim step through a global RNAV environment based on the Performance Based Navigation. It is up to the individual States, airports and aircraft operations to evaluate the business need for RNAV according to local circumstances.

The purpose of the implementation of APV procedures (FOC: 2017) is to be the transition from conventional non-precision approach (NPA). It refers to the implementation of RNAV (GNSS) APV procedures based on APV/Baro (an approach with barometric vertical guidance) and/or APV/SBAS (an approach with geometric vertical guidance), which may be restricted by the coverage limitation of EGNOS satellite signal within the concerned airspace.

Benefits

- ✓ flexible route structures which allow for more efficient flight paths and result in reduced fuel burn and emissions
- ✓ access to airspace and runways that are limited or not achievable by conventional navigation aid (NAVAID) infrastructure
- ✓ improved safety through more straight-in instrument approaches with vertical guidance
- ✓ increased airspace capacity
- ✓ increased airport accessibility
- ✓ more efficient operations
- ✓ reduced infrastructure costs (for example the reduction of sensor-specific (e.g. VOR or non-directional radio beacon (NDB)) conventional procedures and routes enables a reduction in legacy infrastructure)
- ✓ reduced environmental impact

SUCCESS STORY: PBN ROTORCRAFT OPERATIONS UNDER DEMONSTRATION (PROUD)

The PBN Rotorcraft Procedures under Demonstration (PROuD) purpose was to demonstrate improvements in rotorcraft operations, particularly for Helicopter Emergency Medical Services and Search and Rescue, through the implementation of Performance Based Navigation (PBN) procedures for approach, departure and IFR low-level routes in European scenarios, challenging for weather conditions, visibility limitations or geographical configuration.
PROuD, through campaigns for a total of approximately 80 test flights performed in Switzerland and Norway, demonstrated in a live trial environment, how the adoption of PBN flight procedures improves the safety and reliability of operations and landing site accessibility in challenging environments such as in adverse weather conditions or mountainous areas. It implies significant improvements for the general population in the experience of medical assistance by air.

Implementation status at the end of 2016

According to 2016 LSSIP reporting, 20 States in the ECAC region have implemented RNAV1. Regarding the implementation of APV procedures, 10 States have reported it as completed in the end of 2016. In order to get into some more granularities and look at the implementation of APV from the airport perspective, PBN map tool of EUROCONTROL was used to produce the map below (**figure 7**). This figure shows status of RNAV1

implementation at State level, and implementation of APV procedures by airport.

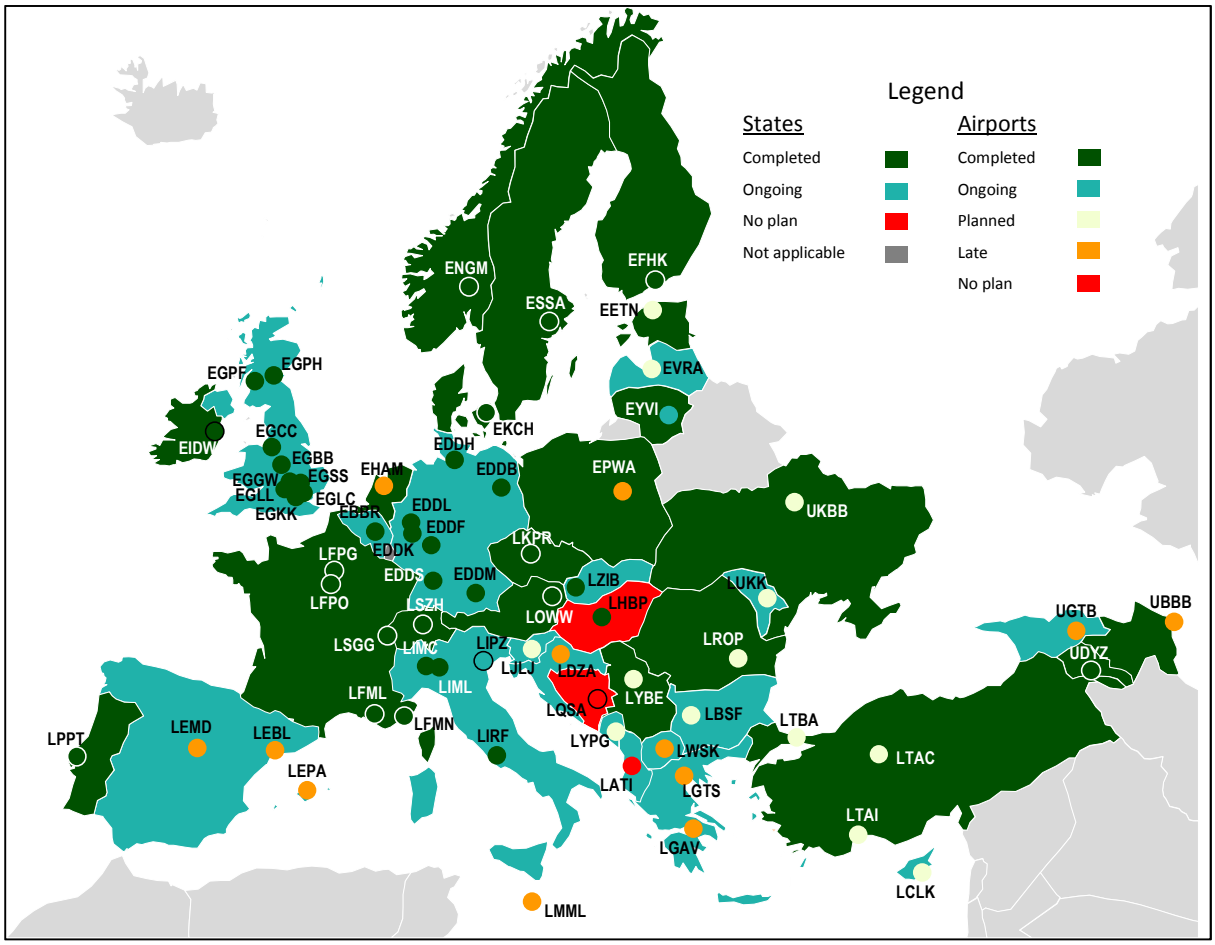

Figure 7: RNAV1 (States) and APV (Airports) status of implementation as reported in LSSIP 2016 and PBN map tool

Continuous descent operations (CDOs) have been deployed in a number of airports/TMAs mostly following local initiatives. There was no European-wide mandate and implementation has progressed slowly due to the difficulty of handling mixed-mode operations, especially in complex and busy TMAs.

Future developments

Future developments in this area are pretty much dependent on the PBN Implementing Rule. Publishing of this legislation was delayed several times now, which might have caused some reluctance in implementation at the Stakeholders side. Indications show that PBN IR should be published in 2017. It will introduce legal requirement for stakeholders to implement PBN. Overall, Europe's airspace concept is evolving to include the use of advanced RNP in en-route and terminal operations, and RNP APCH on the approach to all runways.

At the Level 3 of the Master Plan, NAV03 objective will be split into NAV03.1 (RNAV01) and NAV03.2 (RNP01 in TMA operations) to achieve better alignment of Master Plan Level 3 and the SDM Deployment Programme. In addition new (NAV12) implementation objective on optimised low-level IFR routes in TMA which enable an optimised use of the airspace and improve connectivity between the airports included into the TMA.

All NAV related objectives will be re-calibrated and checked against the PBN Implementing Rule as soon it is published to ensure the alignment with this regulatory requirement.

CONCLUSION	**ENSURE ALIGNMENT OF MASTER PLAN LEVEL 3 WITH THE UPCOMING PBN IR ONCE PUBLISHED.**

STAKEHOLDERS REG ASP APT AU NM MIL IND

Free Route (incl. ASM and FUA aspects)

The PCP IR requires the deployment of Free Route within Member States airspace of the ICAO EUR region at and above FL 310 PCP s AF 3.2). Free Route can be implemented via Direct Routing and or Free Routing Airspace (FRA) with 2 different applicability dates:

- Direct Routing Airspace is an airspace (applicability date 01/01/2018) within which direct routes (DCT's) are published (objective **AOM21.1**)
- Free Route Airspace (applicability date01/01/2022) 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. Within this airspace, flights remain subject to air traffic control (objective **AOM21.2**).

The Free Route concept is closely linked to the evolution of Airspace Management (MP L3 objectives **AOM19.1, AOM19.2 and AOM19.3**) and the implementation of Advanced Flexible Use of Airspace (PCP sAF 3.1). In that context, Free Route and especially FRA is expected to bring significant flight efficiency benefits and a choice of user preferred routes to airspace users. As a major step to full trajectory based operations the FRA concept also 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. The implementation of FRA is coordinated through the NM European Route Network Improvement Plan (ERNIP) and the Network Operations Plan following the Strategic Objectives and Targets set in the Network Strategic Plan and in the Network Manager Performance Plan.

The challenge of Free Route implementation relies on seamless operations across different ATSU supported by interoperable systems and advanced flight planning processing systems.

It should be noted that PCP IR specifies system requirements for FRA need to be implemented: MTCD/CDT and conformance monitoring (**ATC12.1**); and APW (**ATC02.8**). The progress of these elements can be found in Deployment View of this document.

Implementation status at the end of 2016

According to 2016 LSSIP reporting, 18 ECAC States have fully completed the implementation of Free Route Airspace. Remaining States are all in the planning and execution phase. There seems to be an overwhelming support for implementation of this major ATM change as brings benefits to all stakeholder, particularly to Airspace Users. According to current planning information provided, most of the ECAC States will be operating FRA by 2020 (around 75% of the States).

17 ECAC States have reported completion of direct routing implementation objective. It is envisaged that this implementation objective will become achieved at ECAC level next year, as most of the States report that full completion will be achieved by end of 2017.

The implementation in many aspects depends on activities of Network Manager and their ability to support stakeholders in the implementation. **Figure 8** shows the status of implementation based on the NM info. It should be noted that majority of DCTs in EGPX and EGTT are operated 24h.

CONCLUSION	**VERY GOOD PROGRESS IN IMPLEMENTATION OF BOTH FREE ROUTE AND DIRECT ROUTING. THIS MOMENTUM SHOULD BE KEPT AND SUPPORTED BY ALL INVOLVED STAKEHOLDERS.**

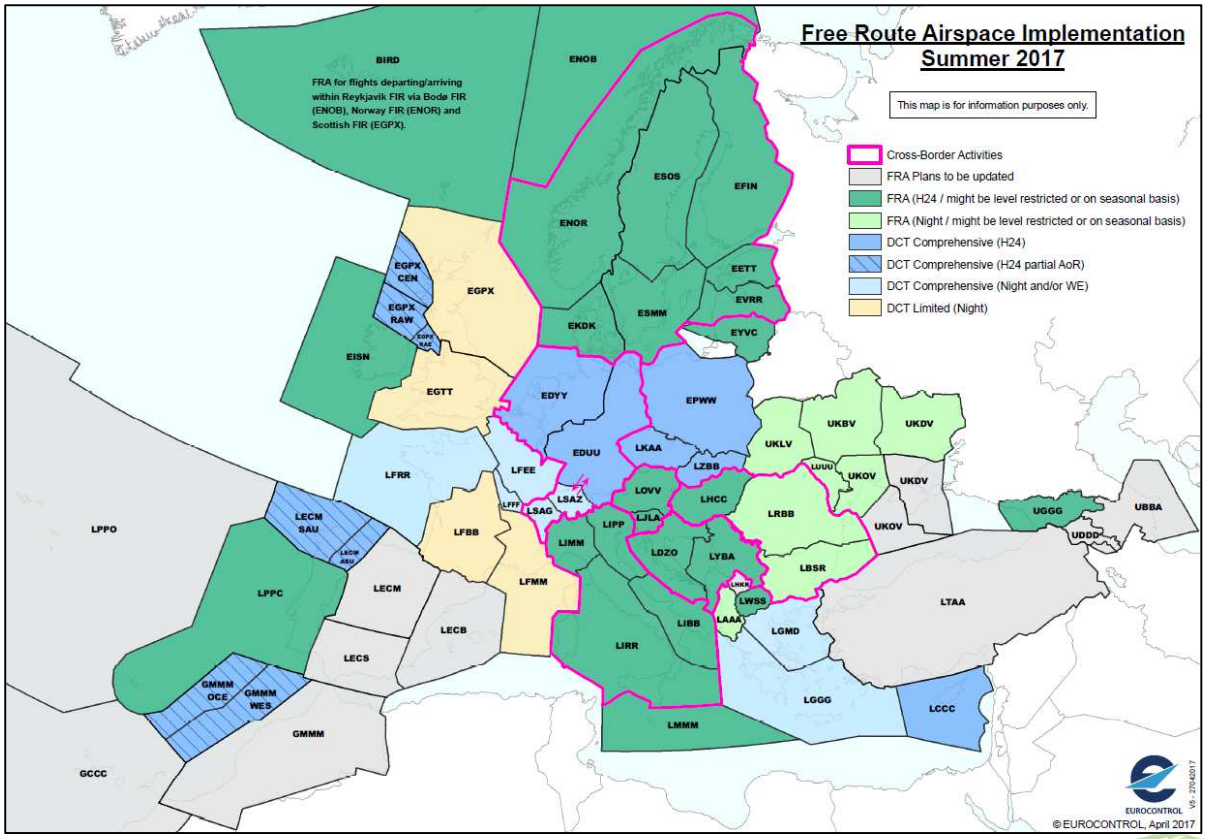

Figure 8: FRA implementation summer 2017 (source NM)

SUCCESS STORY: FLIGHT EFFICIENCY AND FREE ROUTE, AN INTEGRATED RESPONSE TO EUROPEAN "GOING GREEN" POLICIES

According to the EU Regulation 716/ 2014, with the scope of improving flight efficiency, to reduce aircraft's fuel consumption and the environmental impact of flight operations, to allow a more flexible use of the airspace and, not least, to deliver better compliance with the airspace users' needs in terms best flight profiling, on the 8th of December 2016 (much earlier than the scheduled deadline from EU), in the Italian airspace, above FL335, FREE Route Airspace concept has been implemented. This was the final step of a multiannual program started in 2013; phase 1, on December 2013, enabled the availability of dedicated direct and near direct routings for overflights operating at night and during the weekends in the Italian airspace above FL335 and the extension of the temporal availability of some ATS routes. Phase 2, in January 2015, lowered the dedicated routing.

"Free Route Italy (FRAIT)" is an operational concept of Air Traffic Management (ATM) that enables airspace users to fly as close as possible to what they consider the optimal trajectory, without the constraints of fixed route network structure (that above FL335 is now deleted) and characterized by the use of direct routes; Free Route is available for overflights as well as for arrival and departing traffic.

"Free Route Italy (FRAIT)" was made possible by a continuous coordination with the Network Manager to share and validate the new concept of operations, and thanks to the coordinated deployment of Flexible Airspace Management and Free Route functionality, as shown in the PCP (Pilot Common Project) to support the implementation of the European Air Traffic Management Master Plan.

"Free Route Italy (FRAIT)" implementation program demonstrates that when several efficient air traffic procedures are integrated and applied to a single flight, we see the potential for reductions in delays, fuel usage and emissions; it also makes evident that not only do Air Navigation Service Providers (ANSPs) have to contend with the competing commercial interests of the airlines themselves: making changes or improvements to the routes they can fly means collaborating with governments and military, as well as working within the limits of differing processes, rules and regulations.

Future developments

According to information reported through LSSIP 2016, five (5) additional States will complete FRA improvement in 2017. These are Albania, Georgia, Germany, Malta and Turkey.

STAKEHOLDERS REG ASP APT AU NM MIL IND

Remote Tower

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

Currently, the Level 3 implementation objective dealing with this concept is still in preparation phase. However, due to significant benefits that this concept brings, it is featured as a major ATM change in the Master Plan Level 3 2016 Implementation Report.

Cost Efficiency

The Remote & Virtual Tower Concept shall contribute to the overall cost reduction of the European gate-to-gate ATM, by reducing costs for performing ATS at low to medium density airports. Cost-Effectiveness is improved by the remote service provision to a single airport and the consequent reduction on the number of ATCOs. Remote ATS facilities will be cheaper to maintain, able to operate for longer periods and enable lower staffing costs (through centralised resource pools) and training/re-training costs, by large scale effects. It will also significantly reduce the requirement to operate and maintain actual control tower buildings and infrastructure, leading to further cost savings, as well as eliminating the need to build replacement towers. Minimising economic losses includes losses of revenues, for example airport taxes and charges, operating costs such as staff and compensation, reduced losses for the customers of airspace users and reduced costs for the local, regional or European economy. When providing the remote tower service for two low density aerodromes the cost benefits (compared to Single Remote Tower) are higher due to the sharing of facilities and resources. It can also improve the uniformity of service provision at low 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).

LFV – Saab partnership in Remote Tower (RTC) implementation

The introduction of Remote and Digital Towers will provide a sustainable change to the way the Air Traffic Services are provided at an airport. The use of digital technology provides a disruptive development for ANSPs but also for the airports they serve. Remote Towers enables ANSPs to elaborate on the business models like providing services on demand or ad-hoc which is difficult when operating with a limited staff at a particular airport. Continued enhancements in the RTC may provide new ways to roster the staff and serve more than one airport at the time or be licensed to three or more airports. When LFV and Saab met ANSPs, Airports, regulators or even airlines talking about Remote Towers services and its potential it was obvious that the challenges are not technical but rather linked to the overall acceptance of new methods, the risk of lengthy and costly regulatory processes and how to train the next generation of air traffic controllers. That led to the formation of a joint venture between LFV, being the main ANSP in Sweden and Saab as technology company with the purpose to drive the deployment end continued development of Remote Towers for both the European and the global market and thus expand the value of the Remote Tower product to include operational, regulatory understanding and support as well as provision of state of the art technology. The objective is to shorten the time to decision and propel the introduction of digital solutions. The new JV, called Saab Digital Air Traffic Solutions, will even become an ANSP in itself in case the customers want's a full service offer, a digital ANSP. The global interest is growing and a significant change is that also larger complex airports are looking into Remote Tower Services for both business continuity services and contingency services. "

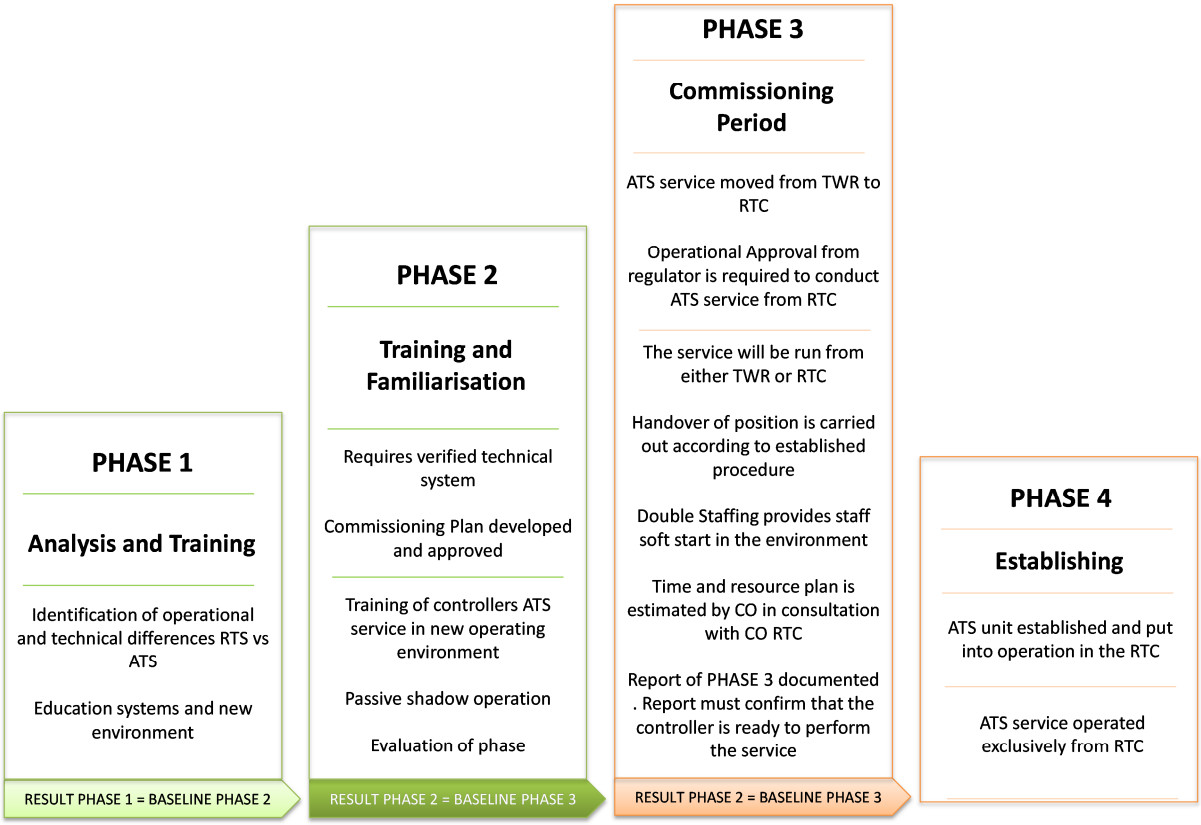

Figure 9: Step-by step approach – safe implementation of RTC

The implementation of Remote Tower in LFV is divided into 4 phases. The first phase is theoretical training on how the system works. Second phase is to train and follow traffic from RTC (live environment). The third phase is actual Air traffic controlling from RTC but only at short intervals. This is a way to raise the ATCO experience during a couple of weeks. We need an approval from the NSA in order to perform phase 3. The last phase is the closure of the old tower and establishment of the RTC as an exclusive place to provide ATS.

Future developments (Avinor Remote Tower Programme)

In addition to the further proliferation of remote tower services by LFV in Sweden per above, Avinor ANS, the main Air Navigation Service Provider of Norway has decided to introduce remote tower services to 15 designated aerodromes from a single tower centre located in Bodø. The initial operation will be based on "one aerodrome/one operator" concept; evolving in to the multiple remote tower concept as experience is gained. Industrialisation of the multiple concepts is part of this initiative. The majority of aerodromes to be remotely operated are FIS aerodromes, but for three of the designated aerodromes, air traffic control services will be provided. This particular remote tower solution will enter operational status in 2018. The implementation plan indicates that those 15 aerodromes will all be remotely serviced before the end of 2020.

CONCLUSION	**AS THE SUPPORT FOR RT BUILDS IN ATM COMMUNITY IN EUROPE, IT SHOULD BE CONSIDERED TO ADD A LOCAL IMPLEMENTATION OBJECTIVE IN THE MP L3 PLAN, IN ORDER TO MONITOR THESE DEVELOPMENTS ACROSS ECAC. IMPLEMENTATION OBJECTIVE AOP14 IS PROPOSED TO BE INCLUDED AS A LOCAL OBJECTIVE IN THE MASTER PLAN LEVEL 3 2017 PLAN.**

Collaborative Airport

The Airport Collaborative Decision Making (A-CDM) project integrates processes and systems aiming at improving the overall efficiency of operations at European airports. This in turn allows the ATM Network to run more fluently. A-CDM is about partners – airport operators, aircraft operators, ground handlers, air traffic control and the Network Manager – working together more efficiently and transparently in how they work and share data. It allows better decision making, based on more accurate and timely information, with all airport partners having the same operational picture.

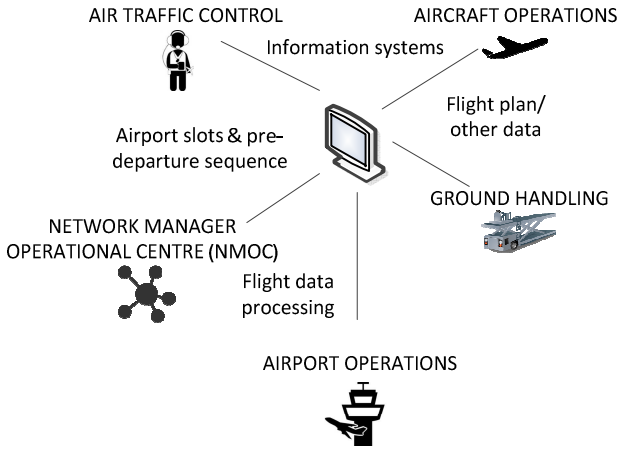

Figure 10: A-CDM concept

The A-CDM Manual gives a thorough view on the concept and its implementation. The related Level 3 implementation Objective is **AOP05** and the implementation date is **12/2016**. Related level 3 implementation objective on integration of Airport Operations Plan (AOP) into NOP is also relevant in this area (**AOP11**). In addition, Level 3 implementation objective **ENV02** provides the collaborative approach to environment issues are the airport.

SUCCESS STORY: APOC

The SESAR APOC concept is a means by which the efficiency of overall airport operations may be addressed. It is seen as being the primary support to the airport decision-making process. It permits stakeholders to communicate and coordinate, to develop and dynamically maintain joint plans and to execute those plans in their respective areas of responsibility.

Benefits:

- Implementing an APOC will make for a gain in efficiency, which will lead to a reduction in operational costs and the creation of more capacity; all due to the optimisation of resources.
- Since this concept is based on shared information, airport management will benefit from punctuality gains.
- It will also lessen the negative impact of adverse weather conditions, as the decision-making process allows for anticipation and a redistribution of resources, so facilitating a more rapid recovery phase.

The deployment of the SESAR APOC concept is currently ongoing at two of the largest airports in Europe, Charles De Gaulle and Heathrow.

With the integration of more and more airports in the network, it becomes particularly important to compile a record of the differences between the A-CDM implementation decisions across airports. It is equally pressing to highlight the supporting rationale which explains some of the differences when they occur. These differences affect airlines in particular, who report increasing difficulty in adapting their operations to the various CDM processes. Combined efforts should be made to contain these differences and ensure consistency among A-CDM projects to the extent possible. This is the reason for creating A-CDM harmonisation inventory. The work on the harmonisation inventory will be input to new version of the A-CDM implementation manual.

Benefits for Network Manager

- ✓ More up to date and accurate information leading to better network planning
- ✓ Enables more effective use of slots which reduces ATFM delays
- ✓ Improved predictability of events during a flight
- ✓ Increased flight efficiency
- ✓ Optimisation of trajectory planning
- ✓ Better traffic distribution
- ✓ More freedom of choice

Benefits for Airspace User

- ✓ Reduction of airlines delays costs in disrupted situations, without jeopardising airport and network performance;
- ✓ Structural Delay Savings (savings by reducing structural delay, buffer time that the companies add to the planned flight time, in order to accommodate statistically foreseeable delays.)
- ✓ More flexibility, allowing airlines to take their business requirements into account.
- ✓ Reduction of flight cancelations
- ✓ Taxi-time reduction
- ✓ Fuel cost-reduction and environmental benefits

Implementation status at the end of 2016

In the end of 2016, A-CDM was fully implemented in 20 airports in Europe. Figure below also shows the Advanced ATC Tower airports, which are implementing A-CDM in reduced scope. This implementation corresponds to SESAR Solution #61.

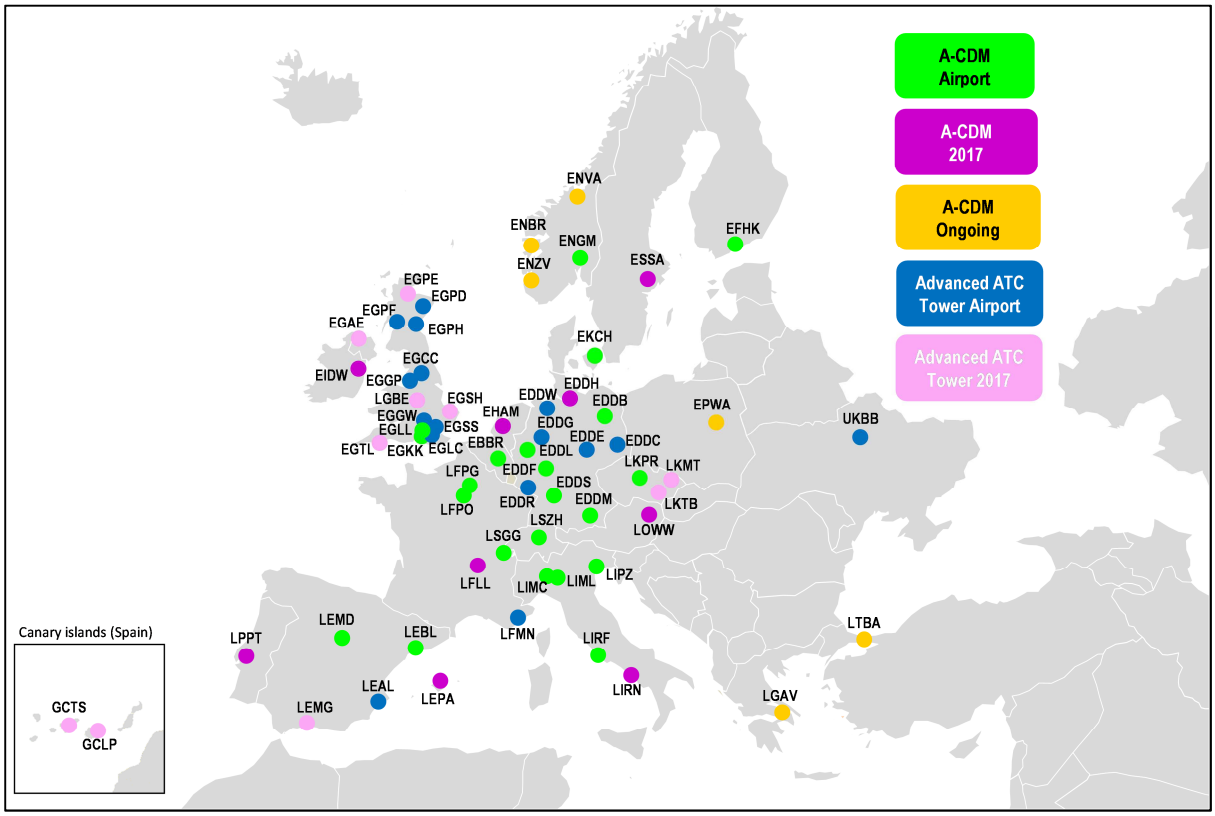

Figure 11: A-CDM and Advanced ATC Tower implementation in 2016 and 2017 expectations

Future developments

It is planned that nine (9) additional airports will implement A-CDM by the end of 2017. Similarly for Advanced ATC Tower, eight (8) airports will be operational in 2017.

STAKEHOLDERS REG ASP APT AU NM MIL IND

Surface Management

At busy airports across the Europe the management of arrival and departures coupled with efficient and safe movement on the airport surface is a crucial part of managing an on-time airport. Improving those airport surface operations is one of the key SESAR initiatives. Surface Management provides critical situational awareness, visibility, alerts, and decision support – enabling the airport to keep its stakeholders aware of the status of the operation and availability of key resources.

The technical solutions considered in this 'Major ATM Change' and represented at Level 3 of the Master Plan, includes different Airport Surface Movement Guidance and Control System (A-SMGCS) services, such as surveillance (**AOP04.1)**, RMCA (**AOP04.2**), CATC and CMAC (**AOP12**) and planning and routing service (**AOP13**). In addition, there is one Level 3 implementation objective related to implementation of runway safety action plans for runway excursions (**SAF11**). This action plan includes number of best practices for all national stakeholders, aimed at improving runway safety and surface management in general.

Safety
Support to the controller in detecting potentially hazardous conflicts or infringements of runways and route deviations on taxiways and apron areas. Provides critical situational awareness, visibility, alerts, and decision support.

Capacity
Reduction of delay and improving traffic throughput in low visibility conditions.

Operational Efficiency
More efficient control of surface traffic.

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

SUCCESS STORY: RUNWAY STATUS LIGHTS @ PARIS CDG AIRPORT, A FIRST IN EUROPE

Paris-CDG is one of the busiest airports in Europe with 4 runways, 3 control towers, 1,500 flights per day. To further reduce the risk of runway incursions, in 2016, Paris-CDG airport, DSNA, the French air navigation service provider, and its partners – Group ADP, the Paris Airports operator – have deployed Europe's first runway status lights. This SESAR Solution is a fully automated safety system using ground surveillance radar, which provides crews and vehicle drivers with immediate, accurate and clear indication when the runway is unsafe to cross, enter or take-off. It is estimated that 50% to 70% reduction of the most serious runway incursion occurrences can be expected thanks to this system.

This project is the result of close cooperation between all of the platform partners, and RWSL at Paris-CDG has already proved its value. The RWSL system improves significantly the situational awareness of pilots and vehicle drivers.'

The RWSL has entered into service H24 on the Northern inner runway (09R/27L). It will also be deployed on the Southern inner runway (08L/26R) before the end of March 2017.

RWSL is a type of autonomous runway incursion warning system (ARIWS) as defined in ICAO Annex 14 aerodromes. Also deployed in the USA and in Japan, France participated, together with Japan, the USA and other worldwide experts in criteria harmonization promoted by ICAO to ensure worldwide and consistent operational use where implemented.

Implementation status at the end of 2016

Table 1: Implementation of airport safety nets as reported in LSSIP 2016

PCP Airports			Airport Safety Nets Services			
State	**Code**	**Airport**	**A-SMGCS surveillance**	**A-SMGCS RMCA**	**CATC and CMAC**	**Planning and Routing**
AT	LOWW	Vienna	☑	☑	12/2020	12/2020
BE	EBBR	Brussels	☑	☑	☑	12/2017
DK	EKCH	Copenhagen	☑	☑	12/2020	12/2023
FR	LFMN	Nice	☑	06/2017	12/2020	12/2023
FR	LFPG	Paris, Charles de Gaulle	☑	☑	06/2019	12/2023
FR	LFPO	Paris Orly	☑	☑	06/2020	12/2023
DE	EDDB	Berlin Brandenburg	n.a.	n.a.	n.a.	n.a.
DE	EDDF	Frankfurt Main	☑	12/2017	12/2020	12/2023
DE	EDDL	Düsseldorf	08/2018	12/2018	12/2020	12/2023
DE	EDDM	Munich	☑	☑	12/2020	12/2023
IE	EIDW	Dublin	☑	☑	12/2020	n.p.
IT	LIMC	Milan Malpensa	06/2018	12/2018	12/2019	n.p.
IT	LIRF	Rome Fiumicino	12/2019	12/2020	12/2020	n.p.
NL	EHAM	Amsterdam	☑	☑	12/2020	n.p.
NO	ENGM	Oslo	☑	☑	n.p.	n.p.
ES	LEBL	Barcelona	☑	12/2019	12/2020	12/2023
ES	LEMD	Madrid Barajas	☑	12/2019	12/2020	12/2023
ES	LEPA	Palma de Mallorca	☑	12/2019	12/2020	12/2023
SE	ESSA	Stockholm Arlanda	☑	12/2018	12/2020	n.p.
CH	LSZH	Zurich	☑	☑	12/2018	12/2022
TR	LTBA	Istanbul Ataturk	☑	☑	n.p.	n.p.
GB	EGCC	Manchester	12/2019	02/2020	12/2020	n.p.
GB	EGKK	London Gatwick	☑	☑	☑	n.p.
GB	EGLL	London Heathrow	12/2018	12/2018	12/2020	12/2023
GB	EGSS	London Stansted	12/2017	12/2017	12/2020	n.p.

☑ completed, n.p. – no plan yet, n.a. – not applicable, m.d. – missing data

Future developments

The information reported through LSSIP 2016 indicates that implementation objective related to A-SMGCS surveillance function may be achieved at ECAC level in 2017. That would mean that 80% of the airports in the applicability area (47 ECAC airports) will have this functionality. This will enable them to consider further services that build on this enabling infrastructure.

CONCLUSION	**DELAYS IN IMPLEMENTATION OF A-SMGCS SURVEILLANCE CAN POTENTIALLY IMPACT THE TIMELY IMPLEMENTATION OF OTHER SUBSEQUENT A-SMGCS FUNCTIONALITIES.**

STAKEHOLDERS REG ASP APT AU NM MIL IND

Enhanced operations in the vicinity of runway

The operations in the vicinity of the runway, namely those referring to the approach phase, can be optimised by a series of improvements in the operational process. Keeping the safety levels, these improvements will offer benefits in terms of capacity, contributing as well for savings in terms of costs and mitigation of the environmental impacts, providing benefits to airlines, ANSPs and airports.

The technical solutions considered in this 'Major ATM Change' and represented at Level 3 of the Master Plan, include Time-Based Separation (**AOP10**) in the (P)CP phase. Time-Based Separation (TBS) consists in the separation of aircraft in sequence on the approach to the runway using time intervals rather than distances. A TBS system requires a sequencing tool based on merging the wind profile measurement and heuristic techniques.

Capacity
Improvement of aircraft landing rates and a potential reduction of capacity constraint at an airport by alleviating, avoiding and complying with environmental restrictions.

Cost efficiency
Reduction of fuel consumption and potentially reduced environmental mitigation costs.

Environment
Reduction in fuel burn, emissions, noise and atmospheric emissions due to reduced holding times and lower drag and trust facilitated by these functionalities.

SUCCESS STORY: OPTIMISED DESCENT PROFILES (ODP) - "GREEN" FLIGHT DESCENTS ACROSS EUROPE

ODP was a joint project of European air navigation service providers (ANSPs) and airlines conducted in the framework of SESAR Integrated Flight Trial and Demonstration Activities and co-funded by the SESAR Joint Undertaking.
The aim of the project was to develop more efficient descent profiles and reduce the environmental impact in busy and complex airspaces and across borders without compromising safety and capacity aspects.
The optimum arrival is a continuous descent. In highly-frequented airspaces, which are shaped by national borders and handover points, this optimum is not always possible. Existing arrival flows can, however, often be improved. Instead of fixed waypoints, precise level windows can be defined in the flight management system of the aircraft. Another way of improving vertical flight efficiency is to remain at cruising altitude for a longer period of time before descending, since fuel consumption is lower at higher levels. The project also used flexible seasonal or runway dependent handover procedures.

A total of 11,467 demonstration flights to nine airports in Europe were conducted. On an annual basis, these optimised flows have the potential to generate fuel savings of 3,400 tonnes, which equals more than 10,700 tonnes of CO2 emissions according to calculations by EUROCONTROL. Half of the 33 analysed flows have already been permanently implemented; seven are published in the Aeronautical Information Publication. Real savings achieved with the project's demonstration flights amounting to 86 tonnes of fuel and a reduction of 270 tonnes of CO2 emissions.

Implementation status at the end of 2016

The map below shows the implementation status at the end of 2016 for the Time-Base Separation. So far, London Heathrow (LHR) is the only airport where both procedures are applied. However, it should be noted that the PCP requires TBS implementation at 15 PCP airports by 2024 (remaining airports showed on the map below are not in the applicability are of this Level 3 implementation objective), which gives stakeholders some

time to get organised and include it in their investment plans. In addition, there are some on-going discussions about the relevance of TBS in some airports where the local CBA fails to be as positive as expected.

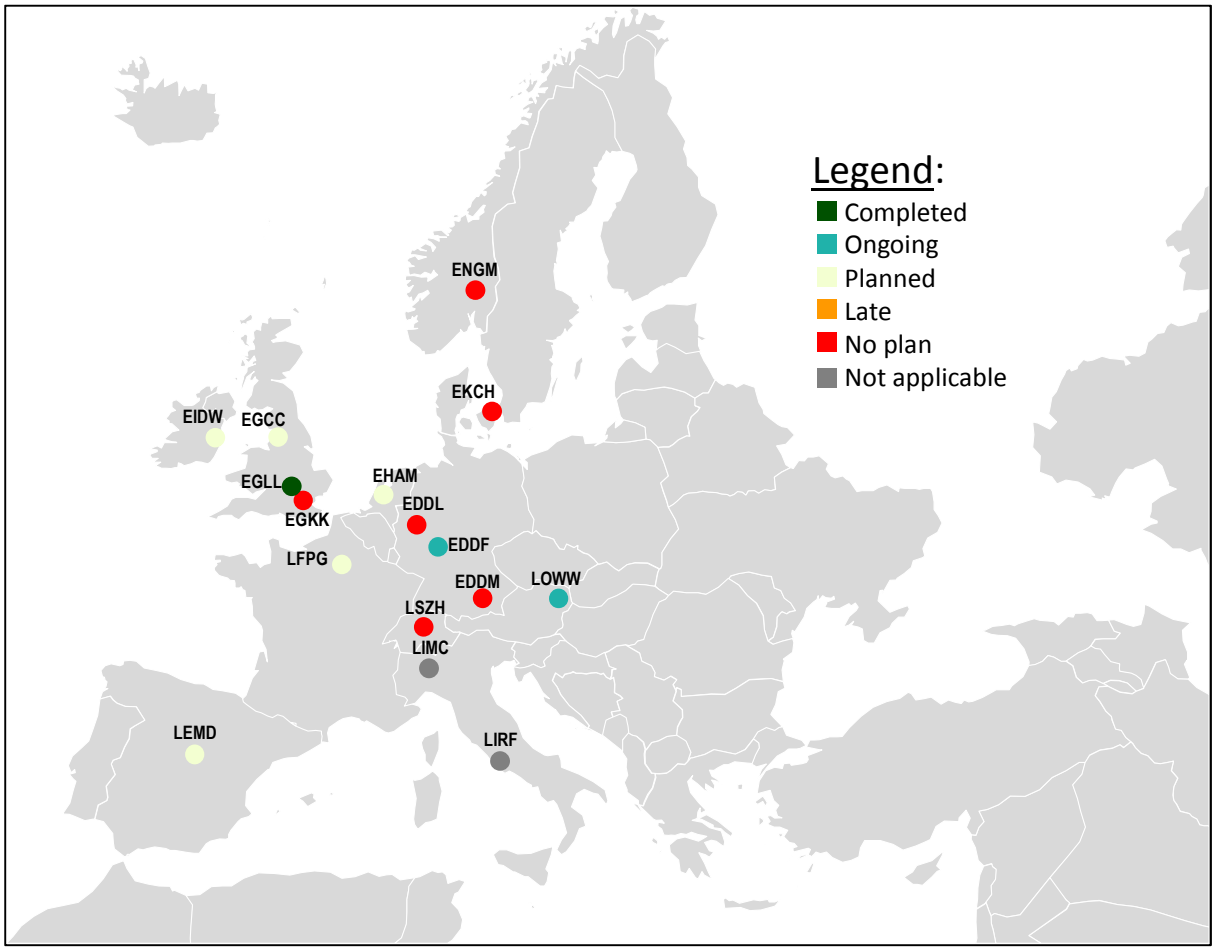

Figure 12: TBS implementation as reported in LSSIP 2016

Future developments

According to reported information, not a single airport is planning to complete the TBS implementation in next three (3) years. Half of the PCP airports don't even have a plan for implementation. Therefore, the applicability of this implementation objective should be evaluated in the upcoming PCP review.

CONCLUSION	**CONSIDER REVIEWING TBS APPLICABILITY TO AIRPORTS, AS THERE SEEMS TO BE LOW LEVEL OF SUPPORT FOR THIS FUNCTIONALITY.**

The SESAR 1 programme has validated a Solution (#55) for precision approaches using ground-based augmentation of satellite navigation systems (GBAS) CAT II/III. This solution could unlock potential benefits in terms of capacity, since GBAS has limited or no protection areas compared to ILS, but also could enable a future rationalisation of airport infrastructure. Therefore, the objective on approaches using GBAS is in the pipeline, and might be considered for inclusion in Level 3 in short term.

STAKEHOLDERS REG ASP APT AU NM MIL IND

Pre-SWIM & SWIM

SWIM represents a complete paradigm change in how information is managed along its full lifecycle and across the whole European ATM system. Building on the best practices from different information communities, the aim of SWIM is to provide information users with relevant and commonly understandable information. This means making the right air traffic management information available at the right time. SWIM brings the industry based information technology approach of Service Orientated Architecture (SOA) to the European ATM system, whereby all ATM stakeholders are accessing; sharing and processing ATM information through services and SWIM-enabled applications, fully aligned with the ICAO Manual on SWIM Concept. Initial SWIM covers the governance, security, technical infrastructure and profiles, SWIM foundation, ATM Information Reference Model (AIRM) and Information Service Reference Model (ISRM).

A number of MP L3 objectives contain provisions for implementing technological solutions that facilitate the transition towards initial SWIM operations. These elements relate to infrastructure (transition to IPv6 as required by **ITY-FMTP** objective), common data model (as required by **ITY-ADQ** and **AOM19.1** to enable network wide exchanges). These elements are considered as pre-SWIM elements. Master Plan Level 3 2016 Implementation Plan also includes two (2) initial SWIM objectives on yellow profile (**INF08.1**) and blue profile (**INF08.2**). Both of these objectives are initial ones, meaning no reporting was performed against them in 2016 LSSIP monitoring exercise. In addition objective **FCM08** on Extended FPL is linked to SWIM implementation.

In line with the SWIM concept - **the SWIM Registry Service** aims at improving the visibility and accessibility of ATM information and services available through SWIM. This enables service providers, consumers, and regulatory authorities to share a common view on SWIM. The SWIM Registry enables direct ATM business benefits to all of its stakeholders by:

- Allowing providers (mainly those sharing information over SWIM) to increase visibility (and consequent adoption) of their services. This also stimulates the reusability of services by other providers. The Registry also supports the providers in managing their relationship with consumers as well as their dependencies with other services, standards and regulations.
- Improving the efficiency of consumers (mainly those getting information from other stakeholders over SWIM) in identifying the right provider and reducing their effort in setting up everything required prior to start using a service.
- Facilitating a collaborative evolution of services by enabling all relevant stakeholders to share a common view and participate in the lifecycle of these.

SUCCESS STORY: SKYGUIDE VIRTUAL CENTRE

The aim of the VC programme is to transform skyguide into a service-based organisation by creating a single unit (albeit in multiple locations) with fully harmonized methods and operations, information, procedures, technical means and equipment. It proceeds in a socially and politically acceptable manner and by supporting the ATM industry in Europe in developing into a modularised network of competitive service providers. The VC programme delivers in tranches.

The first one – completed in 2016 - included all initiatives to achieve harmonized operations, based on fully stripless Human Machine Interface as well as optimised sectorisation for the managed airspace.

The second – on–going – tranche includes all initiatives to achieve a combined airspace cross centres on FL375 and above, based on a combined Swiss technical service based on service oriented architecture, integrating new services and legacy components. One hot data centre will serve two control centre.

The third one aims at lowering the cross centre combination of sectors down to FL245 and finalising the service oriented technical infrastructure.

The purpose of the last tranche is to implement new operational concepts and external services (e.g. Coflight Cloud Services) according to availability and economic efficiency.

Implementation status at the end of 2016

The results show that almost all ANSPs in the ECAC region have already upgraded their infrastructure to support the IPv6 protocol. Regarding AIXM 5.1 implementation, most of the ECAC ANSPs will implement this model in 2019 while ADQ implementation seems to be delayed.

Table 2: Implementation of PRE-SWIM elements in ECAC region as reported in LSSIP 2016

State[4]	IPv6	AIXM 5.1	ADQ
AL	☑	2019	2017
AM	2018	n.a.	2017
AT	☑	2017	2018
AZ	☑	2018	2017
BA	2019	2019	2019
BE	☑	☑	2017
BG	☑	2018	2017
CH	☑	☑	2024
CY	☑	☑	2018
CZ	☑	2019	2018
DE	☑	2017	2018
DK	☑	☑	2018
EE	☑	☑	2018
ES	☑	2019	2019
FI	2017	☑	2019
FR	2018	2017	2022
GE	☑	2019	n.a.
GR	2019	2019	2017
HR	☑	☑	2018
HU	☑	☑	2017
IE	☑	2018	2018

State	IPv6	AIXM 5.1	ADQ
IT	☑	2019	2020
LT	☑	2018	2017
LU	☑	n.a.	2018
LV	☑	2019	2017
MAS	☑	☑	n.a.
MD	☑	n.a.	2017
ME	☑	2019	2021
MK	2019	n.a.	n.a.
MT	2019	n.a.	2018
NL	☑	2018	2017
NO	2019	☑	2018
PL	☑	2019	2017
PT	2019	2018	2017
RO	☑	n.a.	2021
RS	☑	2019	2021
SE	☑	☑	2019
SI	☑	2019	2018
SK	☑	☑	2018
TR	☑	n.p.	n.a.
UA	2018	2019	n.a.
UK	☑	☑	2022

☑ completed; n.p. no plan yet; n.a. not applicable

Future developments

The two (2) initial SWIM Level 3 objectives on yellow profile (**INF08.1**) and blue profile (**INF08.2**) will remain initial/non-monitored objectives in the Master Plan Level 3 2017 Implementation Plan, as it was assessed that maturity level is not appropriate yet for monitoring the local stakeholder implementation.

Because of the problems arisen from delays in ADQ IR implementation and intention to publish ADQ2 IR, there seems to be an urgent need to resolve this situation as many stakeholders indicate existence of national projects aimed at modernisation of aeronautical information management.

CONCLUSION	**ADQ IMPLEMENTATION ISSUES HAVE TO BE ADDRESSED AS SOON AS POSSIBLE AS THEY CAN IMPACT ON SWIM IMPLEMENTATION.**

[4] Main ANSP of the State

Data Link

The Data Link Services (DLS) Implementing Rule (adopted on 16 January 2009 by the European Commission and amended by Commission Implementing Regulation 2015/310) lays down requirements for the coordinated introduction of data link services based on air-ground point-to-point data communications, a two-way communication between an aircraft and a ground communication entity.

The Controller-Pilot Data Link Communication (CPDLC) application provides air-ground data communication for the ATC service. It enables 4 data link services (DLIC, ACM, AMC and ACL) that provide for the exchange of communication management and clearance/information/request messages which correspond to voice phraseology employed by air traffic control procedures. The controllers are provided with the capability to issue ATC clearances (level, heading, speed, directs etc.), radio frequency assignments, and various requests for information. The pilots are provided with the capability to respond to messages, to request/receive clearances and information, and to report information. A “free text” capability is also provided to exchange information not conforming to defined formats.

The associated implementation objective, based on the IR, was created in 2010 (**ITY-AGDL**).

Implementation status at the end of 2016

According to LSSIP data nine (9) ANSPs (LFV, Austrocontrol, Hungarocontrol, MUAC, DFS, IAA, Skyguide, Naviair and ANS Czech Republic) deployed AGDL service as described in the implementation objective.

The LSSIP data also shows that the stakeholders have started to adjust their plans which implies a delay in the estimated achievement date from 02/2018 (in 2015), to 12/2019 (in 2016). This is not compliant with the current DLS IR and this impact should be assessed, as the DLS is an important enabler for many SESAR and PCP elements.

In regards to aircraft capability, latest equipage surveys show that aircraft capability levels had strong increase over the years and have reached the level of around 40% in 2016. This is based on the Prisme CNS business intelligence dashboard of EUROCONTROL.

Future developments: DLS Recovery Plan – Path I & Path II

The SDM issued in October 2016 the DLS Recovery Plan aiming at identifying the relevant actors, milestones and next activities needed to be undertaken in order to achieve the full DLS implementation in Europe avoiding inappropriate investments.

In this line, the DLS Recovery Plan was structured in two different but very much related paths:

- Path I – Implementation of the DLS transitional solution: aiming at identifying the deployment activities needed to meet EU (IR) 2015/310 and ELSA’s recommendations, focusing, in particular, on the envisaged transitional solutions (Model B or Model C with Multi-frequency (MF) as per ELSA study terminology).
- Path II – Preparatory activities towards the target solution: aiming at identifying the steps towards the envisaged target solution (Model D), through the implementation of ELSA’s recommendations in order to grant the required performance needed to achieve full AF6 implementation.

Path I Implementation Project is born from the DLS Recovery Plan as a deployment project mainly focused on the implementation of multi-frequency by February 2018 coinciding with the deadline of EU 2015/310. This Implementation Project is led by ENAIRE and co-led by ENAV. It has different design activities (WP2 (A/G network design), WP3 (G/G network design), WP4 (Support systems design) and WP5 (Interfaces design) and it also has different deployment and operational activities (WP6 (Deployment of the previously defined and agreed architecture), WP7 (Operational acceptance) and WP8 (Operational transition). It has also another WP (WP9 (Analysis of the future evolution to the model "D")) which is aim at bridging the progress of Path I, implementation of multi-frequency, with Path II, definition of the model “D”.

This Path I Implementation Project has two different streams: Stream 1 and Stream 2. These 2 streams were intended to address the specific technical solutions which are being put in place in the BLUEMED FAB (Stream

2) and in the rest of Europe (Stream 1). In order to coordinate these 2 streams, the Implementation Project also contains an additional WP (WP10 (Interoperability between Stream 1 and Stream 2)) which will ensure an appropriate coordination between those different technical implementations, especially, in the borders of countries belonging to Stream 1 and countries belonging to Stream 2.

So far, there is a good coordination among all the stakeholders including CSPs, SITA and ARINC, even considering the challenging deadlines that this Implementation Project will have to fulfil. SDM together with ENAIRE and ENAV as project leaders of this Implementation Project are closely monitoring the progress of all the WPs and also have a very good and proactive coordination aiming at a successful implementation of multi-frequency.

The DLS Implementation Project Path 2 aims at supporting SDM in the identification and provision of an overall deployment picture of the Target Solution (in order to grant the required performances needed to achieve the full AF6 implementation), accordingly with ELSA Project Recommendations and SDM Recovery Plan. In particular, activities performed in Path 2 have two kinds of features:

1. They will support SDM in:

- addressing the ELSA Recommendations: GND-02, GND-03, GND-05, GND-07 and GND-08;
- the definition and identification of the Service Areas;
- the definition of Service Design and Technical architecture at European level;
- the elaboration of a Business Case study for the Target Solution (or Model D).

2. They will complete the following tasks in close coordination with SDM, which will monitor the activities (accordingly with the need to ensure consistency with DP2016):

- the analysis of the Services to be provided by the Model D;
- the definition of a European Common DLS Governance.

This Project aims also at providing an overall deployment picture, through the identification of the activities that are expected to be addressed towards the implementation of the Target Solution, enabling to reach Initial Trajectory Information Sharing (i4D), according to DP 2016 Addendum 1.

Moreover, as part of the architecture definition, the following points will be addressed:

- identification of improvements on legacies DL infrastructures;
- use of PENS to connect G/G (BIS) routers;
- interoperability (IoP) improvements of the ATN DL Networks operated by different entities.

CONCLUSION	**AGDL IMPLEMENTATION SEEMS TO BE SHIFTING TOWARDS 12/2019 ACCORDING TO LSSIP INFORMATION.**

CNS rationalisation

Development of the CNS rationalisation part of the infrastructure key feature is one of the main priorities for the ATM Master Plan update 2018. For analysis purposes this strategic view is split into three (3) subparts, surveillance (SUR), navigation (NAV) and communication (COM).

The SES vision for ground SUR foresees, in en-route and terminal areas, the combination of ADS-B with independent Surveillance, the latter provided by Monopulse Secondary Surveillance Radar (MSSR), Mode S or Wide Area Multilateration (WAM). The focus is on performance-based modernisation and rationalisation of the European ATM Network surveillance. It covers both ground surveillance (such as ADS-B, multilateration and Mode S) as well as airborne surveillance applications.

At Master Plan Level 3, two implementation objectives deal with this subject, Surveillance Performance and Interoperability (**ITY-SPI**) entirely based on the implementing rule mentioned in above text, and Aircraft Identification (**ITY-ACID**)

The NAV part is addressed through PBN major ATM change, as the Level 3 implementation objectives also include actions on infrastructure (**NAV03** and **NAV10**).

In the pre-SESAR phase, the main driver for the COM part is the SES interoperability Regulation IR (8.33kHz below FL195 **ITY-AGVCS2** and Datalink **ITY-AGDL**) and the support for the deployment of new technologies such as AMHS (**COM10**). In the PCP timeframe the baseline will be enriched with new features Voice over IP (**COM11**) and New PENS (**COM12**). These features are potential enablers for the PCP implementation (VoIP) or essential prerequisites for the successful implementation of the PCP (e.g. New PENS).

SUCCESS STORY: ELECTRONIC VISIBILITY VIA ADS-B (EVA)

General Aviation (GA) and military aircraft usually fly in airspace where there are no air traffic management services. This type of airspace is known as Class G airspace, which is a mixed environment where it is every pilot's responsibility to see and avoid other aircraft.

Unfortunately, it can be really difficult for a pilot to see a small or fast moving aircraft early enough to comfortably avoid a potential conflict. Systems that display traffic information and give warnings of potential airborne conflicts can make a significant improvement to the ability of a pilot to visually detect nearby aircraft. Such systems are reliant on all aircraft being electronically conspicuous. These systems are not yet in widespread use by GA mainly because of the current high cost of the available electronic conspicuity technologies, whilst the scarcity of these low cost devices means early adopters of this technology may perceive limited benefit.

Project EVA (Electronic Visibility via ADS-B) was a two year SESAR co-funded demonstration project that aimed to promote widespread adoption of electronic conspicuity by:

1. Identifying pragmatic solutions that make ADS-B affordable to GA aircraft owners, and,

2. Providing a large-scale demonstration to show GA pilots how traffic information systems can improve efficacy of their visual scan.

More than 70 GA pilots and observers flew more than 50 flight profiles in the UK and Germany equipped with various Electronic Conspicuity and traffic devices. The pilots flew carefully planned sorties where one crew member used a traffic display to assist their visual scan while the other crew member had no assistance. Observers took note of the time differences to visually acquire other aircraft with and without electronic assistance

The project team assisted with the development of proportionate, risk based regulation at the national level, which helped remove unnecessary costs of using ADS-B technology on GA aircraft. This activity between UK CAA, GA community and resulted in the publication of the UK CAA's CAP1391 – Electronic Conspicuity, and provides a specification and means for the approval of such products.

Implementation status at the end of 2016

The map below shows integrated implementation progress of both SPI and ACID Level 3 implementation objectives, based on LSSIP 2016 information. It can be observed that States in south – southeast Europe have

implemented all action related to both objectives. Some of the States have implemented SPI for the civil part, awaiting Military stakeholders. Most of the States in ECAC region are currently implementing both implementation objectives with a view to finalising it by the planned FOC dates, 2020 (SPI) and 2025 (ACID).

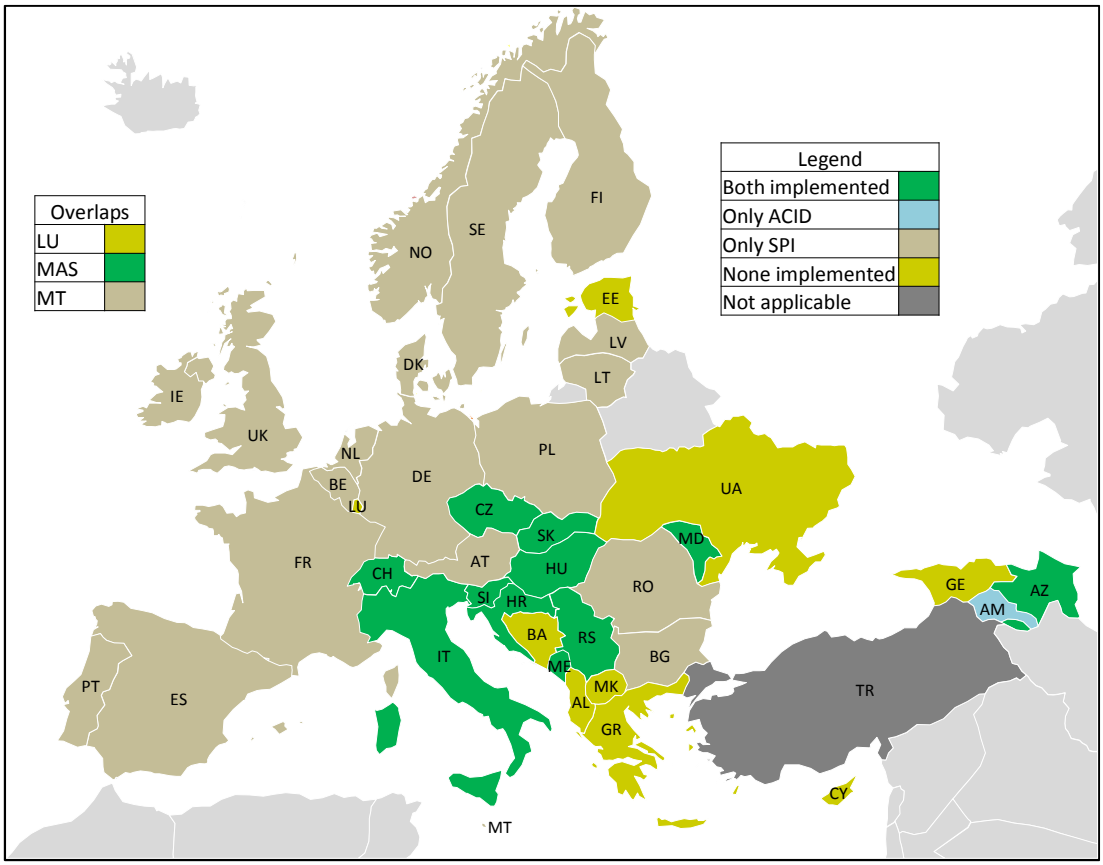

Figure 13: SPI and ACID implementation in Europe (Civil ANSP)

The information about the ADS-B out flight capabilities are taken from EUROCONTROL CNS business intelligence database. The percentage of total number of flights in 2016 which have declared capabilities related to 1090 MHZ ADS-B out amounts to 46%. This is an increase of 11% comparing to 2015.

Regarding COM implementation, basic AMHS implementation is very advanced (76% of States completed). Some risks of delay are identified for AGVCS2 and as stated in separate view, for Datalink. VoIP is progressing on time but very slow, and newPENS is still an initial implementation objective.

The overall progress in CNS area does is not yet integrated into one strategy synchronising the improvements in COM, NAV and SUR area to enable future ATM operations. It rather appears as a separate evolution in 3 separate fields.

Future developments

The 2018 ATM Master Plan shall provide the much needed details on a CNS strategy in Europe in an integrated way. Last year's report already pointed out the need for a well-defined CNS strategy. The cost and performance considerations will drive an evolution and rationalisation of the current infrastructure in which, where and when relevant, legacy systems will be progressively replaced by practicable and new, more efficient technologies.

CONCLUSION	**THERE IS A CLEAR NEED FOR A STRATEGY DEALING WITH THE CNS INFRASTRUCTURE, PARTICULARLY THE RATIONALISATION PART. IT IS EXPECTED THAT THE 2018 UPDATE CAMPAIGN WILL ALLOW INCORPORATING SUCH STRATEGY IN THE MASTER PLAN.**

FAB Focus Areas

BALTIC (Lithuania, Poland)

Optimized ATM network services

- ✓ Both ANSPs will implement automated ASM support system with the capability of AIXM 5.1 B2B data exchange with NM by end of 2017
- ✓ Both OLDI and MONA implementation FAB coordinated and to be implemented by 2018 and 2021, respectively
- ✓ Tactical flow management services implemented by both ANSPs
- ✓ The automatic exchange of the AFP messages implemented by Lithuania, Poland to complete in 2017(testing in progress)

Advanced air traffic services

- ✓ Joint Baltic FAB project: Free Route implementation: Direct Routing is implemented in Poland.
- ✓ FRA (DCT) above FL245 was implemented in December 2015 and above FL095 in December 2016 in the whole Vilnius FIR.
- ✓ PRNAV is fully implemented by both ANSPs
- ✓ APV procedures implementation is in progress at number of airports within FAB. By the end of 2018 is expected completion for both ANSPs
- ✓ AMAN capabilities are not implemented at major airports in the FAB. However, Poland plans to implement extended AMAN to an en-route environment

High performing airport operations

- ✓ Vilnius Airport implemented A-SMGCS level 1 and level 2, Warsaw Airport is planning for 2019
- ✓ Airports CDM is planned for 2018 at Vilnius Airport and 2017 at Warsaw Chopin Airport
- ✓ None of the airports in Baltic FAB are included in the PCP airport list for mandatory implementation of AF2 requirements

Enabling aviation infrastructure

- ✓ Both ANSPs implemented Basic AMHS capabilities
- ✓ Both ANSPs implemented FMTP
- ✓ AGDL implementation will be completed 02/2018 for both ANSPs
- ✓ In 2017, both ANSPS will implement AIXM 5.1 B2B data exchange with NM

Safety 	Baltic FAB Safety KPIs of reported SMIs of >= 80% and RIs of >= 80% were achieved efficiency for Lithuania and Poland. Present level will be maintained as minimum but efforts will be addressed to minimize number of incidents.
Capacity 	En-route ATFM delay at national level KPI varies from 0,00 (KPI – 0,01) to 0,19 (KPI – 0,26) Baltic FAB actual for 2015 was 0,16 (KPI - 0,21) . Capacity is presently sufficient and ATM–system will be further developed so that capacity can be increased within short notice if capacity demand grows.
Cost Effficiency 	Cost efficiency will be improved along with the developments of the Operational Efficiency programs.
Security 	ANSPs are committed to protect their organisations and systems from cyber threats.
Operational efficicency 	Full FRA implementation foreseen for Baltic FAB in 2021. In Poland it would be implemented in the end of 2018.
Environment 	Horizontal en-route flight efficiency in 2015 was little bit lower, than foreseen KPI (1,64% vs 1,50%). However, implementation in the end of 2015 of initial stage of the Free Route Concept - DCT in Baltic FAB states should have positive impact on this KPI for the rest years of the 2nd reference period.

BLUE-MED (Cyprus, Greece, Italy, Malta)

Optimized ATM network services

- ✓ Free Route project will ensure coordination of FRA implementation as foreseen in EC 716/2014

Advanced air traffic services

- ✓ Free Route project will ensure coordination of FRA implementation as foreseen in EC 716/2014

High performing airport operations

- ✓ There's no coordination in place regarding airport domain

Enabling aviation infrastructure

- ✓ ADQ project will ensure compliance with EU Reg. 73/2010

The major projects include the Free Route Operations, ATFCM and Cross-border optimisation, PBN Implementation at FAB level, Air Ground Data Link coordinated deployment the BLUE GNSS project, the BLUE MED FAB IP Network Implementation, the FAB's Flight Efficiency Plan. Other activities, all in alignment SES Regulations, include Aeronautical Data Quality, a FAB-wide Surveillance Maintenance Plan and the ATM System upgrade. In addition a number of initiatives in the Safety Domain, Human Resources and Performance Plan monitoring will be undertaken. All the above mentioned projects and initiatives have the objective of achieving the capacity, safety, efficiency, economic performance and environmental benefits that the European Commission desires to result from the implementation of the Single European Sky.

Safety 	A dedicated Safety working group has been established in order to ensure the correct application of the Safety work plan as defined in BLUE MED Definition Phase.
Capacity 	The ATFCM and Cross-border optimisation, the BLUE GNSS project and Free Route Operations projects, together with PBN Implementation Roadmap, will enhance capacity both in terminal and en route sectors.
Cost Effficiency 	All the operational and technical projects, in particular the FEP project, aim at optimising cost-efficiency.
Security 	ANSPs are committed to protect their organisations and systems from cyber threats
Operational efficicency 	A continuous efficiency in operations is ensured through, among others, a number of technical projects, such as AGDL, IP network, surveillance maintenance plan, ATM system upgrade.
Environment 	The Flight Efficiency Plan developed by BLUE MED ANSPs allows for a reduction in flight time, fuel consumption and carbon dioxide emissions by aircrafts. This activity aims at developing a periodic report on the BLUE MED Flight Efficiency improvements, to be shared with the Airspace Users.

DANUBE (Bulgaria, Romania)

Optimized ATM network services

- ✓ Upgrade and integrate the automated ASM support system with the capability of AIXM 5.1 B2B data exchange with NM in 2017
- ✓ Automatic exchange of AFP messages to be implemented in 2016 by BG and in 2017 by RO

Advanced air traffic services

- ✓ Night FRA implemented at national level in both BG and RO as of 14th November 2013
- ✓ South East Europe Night Free Route Airspace within Bulgaria, Hungary, and Romania (SEEN FRA) to be implemented on 30th March 2017
- ✓ Finish COTR implementation by end 2018
- ✓ PRNAV implemented in RO, in BG – in 2017
- ✓ APV procedures at number of airports in the FAB, estimated completion by end 2019 (RO and BG)
- ✓ MONA function operational in both ANSPs, complementary OLDI messages to be implemented by 2018

High performing airport operations

- ✓ Basic AMAN considered for implementation at Bucharest Airport
- ✓ Extended AMAN considered in BG for Istanbul APT
- ✓ A-SMGCS Level 1&2 at Bucharest APT (2017) and Sofia APT (2017). None of the Airports in the FAB is in the list of APTs for mandatory implementation of PCP AF2 functionalities

Enabling aviation infrastructure

- ✓ Migration to AMHS completed
- ✓ FMTP implemented by both ANSPs
- ✓ Define a common WAM initiative project to provide seamless coverage in FAB
- ✓ AGDL implementation to be completed in 2018
- ✓ VCCS delivered by Frequentis under common procurement

Safety 	Enhanced safety through air ground datalink delivery of standard and unambiguous messages, communications back up, redundancy and avoidance of frequency interference in the use of cross border radio coverage. Participation in New PENS, providing data sharing service enhancements via the common IP-based network across the FAB and the European Region has direct effect on safety (coordination and action synchronization). Furthermore, improved integrity of the radar data using parameters from the aircraft. Improving the systems ensuring safety.
Capacity 	The effect on capacity and safety of Free Route airspace was determined based on the report of the DANUBE FAB FRA real time simulation completed in November 2015 at EEC Bretigny. Enhanced capacity, flexibility and availability of communication system thanks to common procurement of VCCS and air ground datalink implementation. Increased traffic capacity for En-Route and Terminal Traffic through improved interoperability and ATM systems upgrades.
Cost Effficiency 	Free route airspace will contribute towards the achievement of EU-wide cost-efficiency target, through maintaining the workload levels and high throughput. This will make a further contribution towards the optimised use of airspace. Optimised cost-efficiency due to large scale procurement at FAB level and usage of Internet off the shelf technologies on standard hardware; reduction of OPEX. New PENS will provide cost and effort efficiencies to implement new IP applications and services (e.g. SESAR developments) by delivering an infrastructure compliant with upcoming concepts and services (e.g. SWIM).
Operational efficicency 	Increased capacity and sector controlling efficiency thanks to air ground datalink. Providing data sharing service enhancements via the common IP-based network across the FAB and the European Region has direct effect on safety and operational efficiency (coordination and action synchronization).
Environment 	In terms of the EU wide performance targets, FRA will enable full benefit and contribution to the EU-wide environment target, and will make a further contribution towards the optimised use of airspace Extension of Free Route operations outside the night period will enable full benefit and contribution to the EU-wide environmental target.

DK-SE (Denmark, Sweden)

Optimized ATM network services

- ✓ Danish ANSP will implement AIXM 5.1 B2B data exchange with NM by 2017. Swedish ANSP has no operational need to implement this function
- ✓ Both DK-SE FAB ANSPs have completed COTR implementation
- ✓ The automatic exchange of the AFP messages will be implemented in 2017 (DK) and 2018 (SW)
- ✓ MONA function is operational in both ANSPs, and OLDI will be implemented by 2018

Advanced air traffic services

- ✓ Joint FAB project: FRA implemented for and above FL285 in DK-SE FAB
- ✓ Basic AMAN implemented at Copenhagen and Stockholm Arlanda Airports. Extended AMAN implemented in both States.
- ✓ PRNAV implemented in both SE and DK
- ✓ APV procedures implemented in SE, published in AIP. In DK, PBN IR is awaited, subject to local decisions.

High performing airport operations

- ✓ A-SMGCS Level 1 and 2 implemented at Copenhagen Airport. Stockholm Arlanda airport implemented Level 1 (level 2 to be implemented in 2017).
- ✓ A-CDM will be implemented at Stockholm Arlanda in 2017 and it is already implemented at Copenhagen Airport.
- ✓ Stockholm Arlanda and Copenhagen Airports are included in list of airports for mandatory implementation of PCP AF2 functionalities

Enabling aviation infrastructure

- ✓ Migration to AMHS completed
- ✓ FMTP implemented by both ANSPs
- ✓ Define a common WAM initiative project to provide seamless coverage in FAB
- ✓ AGDL implementation to be completed in 2020
- ✓ VCCS delivered by Frequentis under common procurement

Safety 	A joint SMS is under development–shared between Naviair, LFV & NUAC HB.
Capacity 	The arrival delay for ARN & CPH is close to zero. RP2 targets for AFTM delays will be met.
Cost Effficiency 	Within the DK-SE FAB we have established a Joint Programme Office with the purpose to identify, plan & realize joint harmonization initiatives that will streamline & harmonize technical/operational implementation of joint development & implementation plans. The objective is to achieve the capacity, safety, efficiency, economic performance and environmental benefits that the European Commission desires to result from the implementation of the Single European Sky. DK/Naviair have been able to reduce en-route charges for 2015 (-11,3%) & 2016 (-2,3%). Sweden have been able to reduce en-route charges four years in a row now, 2015 (-4.6%) and 2016 (-4.9%), LFV has contributed to this.
Operational efficicency 	NEFRA was implemented on 23/6 2016 (except Norway).This will expand into Borealis FRA covering Ireland, UK, Iceland, Norway, Finland, Estonia, Latvia and DK-SE FAB (Sweden and Denmark). A number of initiatives have been taken to ensure airspace development from a holistic perspective.
Environment 	Being part of NEFRA (phase 1) the flight can be planned at the discretion of the AO covering multiple FIRs. ARN makes CDO, while CPH is focused on using CCO.

FABCE (Austria, Bosnia and Herzegovina, Czech Republic, Croatia, Hungary, Slovak Republic, Slovenia)

Optimized ATM network services

- ✓ Hungary has a LARA in operation, Croatia will follow (2017). All other FABCE ANSPs plan to deploy LARA or an equivalent system by the end of 2018.
- ✓ The implementation of collaborative flight planning messages shows a heterogeneous status, whereas the weakest point turns out to be the full AFP implementation .
- ✓ STAM Phase 1 is planned to go into operation at FABCE level on April 2017 (except SK, BA). STAM Phase 2 is still under discussion.
- ✓ Interactive rolling NOP is planned through upgrades of the automated ASM support systems with the capability of AIXM 5.1 B2B data exchange with NM
- ✓ TFC complexity assessment - is tackled at FABCE level within the DAM/STAM study.

Advanced air traffic services

- ✓ Free Route Airspace - forming part of a main FABCE project. Two main cross-border initiatives have been implemented in 2016, respectively early 2017 at H24 basis: SAXFRA- SLO/AUT and SEENFRA - HUN/ROM/BUL
- ✓ Basic AMAN - Vienna planned for implementation by end 2018. And Extended AMAN (2023).
- ✓ MTCD function is considered a prerequisite for Free Route Airspace application. MTCD is already widely implemented; TCT is left to the ANSPs depending on local conditions.
- ✓ Having identified this objective as extremely beneficial for FRA application, the operational deployment is foreseen at those Units, which are capable do so and where relevant, by end 2018.

High performing airport operations

- ✓ ASMGCS Level 2 is implemented in Praha and Vienna. Budapest has implemented Level 1, and Level 2 planned by end 2017. Although not part of the applicability area, Zagreb plans Level 2 before end 2018.
- ✓ A-CDM implemented in Praha, planned in Budapest by end 2017 and Zagreb (2017/18). Vienna status is locally fully implemented, missing only DPI message transmission, planned for mid 2018.
- ✓ TBS Applicable for Vienna; project has started, and in conjunction and based on AMAN implementation, it will be operational by end of 2021.
- ✓ Improve runway and airfield safety with ATC clearances monitoring: planned for Praha and Vienna in time.

Enabling aviation infrastructure

- ✓ AMHS completed in AT, SI and SK. Ongoing in HU, HR and BA; late in CZ (2018)
- ✓ Voice over IP: all FABCE states are ongoing and plan this objective in time by 2020.
- ✓ Extended Flight Plan: Roadmaps for TOPSKY will foresee a later implementation, e.g. 2024.
- ✓ AGDL completed in AT, CZ and HU. Ongoing HR and SI, planned for BA and late for SK (2019)
- ✓ ACID (Mode S and partly A-WAM) - applied in all FABCE states. Remaining actions to reach 100% of coverage are conceived until 2019, for BA in 2020.
- ✓ AGVCS2: All FABCE states do plan the FRQ conversions in time until end of 2018.

Safety 	A safety approach to the Network operations is ensured through the FAB CE Safety Sub-committee and its cross domain Safety activities. The FAB CE Safety Management Roadmap specifies that the FAB CE ANSPs share inter alia experience regarding Just Culture. Just Culture implemented locally, taking into account the national legislation.
Capacity 	In close cooperation with NM, capacity enhancements are permanently identified and implemented. FABCE is going to reach the RP2 targets for ATFM Delays throughout the whole period.
Cost Effficiency 	Shared technical platforms, common use of Networks and maintenance, reduced NAV equipment, and others→ X-Bone, common HW Procurement (FAB CE Project 17). The goal is to upgrade the X-bone routers in accordance with X-bone Annual General Meeting decision GM4-D11, and to accomplish the first FAB CE common procurement and lay down procedural foundations for the further common procurement activities.
Security 	Integration of Security Event Management and Security Information Management into one service providing better quality and security of communication systems and higher resistance against potential threats.
Operational efficicency 	Two main projects of the FABCE Program Management deal actively with operational efficiency: Airspace Planning and Design (FRA) including aligned operational procedures, and Flexible Use of Airspace (ASM / STAM).
Environment 	Flight efficiency through Free Route applications improves steadily, based on the above mentioned ops efficiency projects.

FABEC (Belgium, France, Germany, Luxembourg, Netherlands, Switzerland)

Optimized ATM network services

- ✓ ASM support systems (LARA or locally developed) deployed in FR, BE, CH, MUAC and DE. Planned for NL (2018).
- ✓ STAM Phase 1 is completed in MUAC. Ongoing in the remaining.
- ✓ Common principles, rules and procedures for OAT handling and OAT/GAT interface available in CH, DE and NL. Ongoing for FR and BE (2018). N/A in LU and MUAC.
- ✓ The traffic complexity assessment is completed in MUAC, ongoing in FR and NL (2017), DE (2021) and CH and planned for BE (2018). N/A in LU.
- ✓ Collaborative flight planning is deployed in CH, DE, NL and LU. Ongoing for MUAC and FR (2018). No plan for BE.

Advanced air traffic services

- ✓ FRA ongoing for DE (2017), MUAC (2020), FR (2021) and CH (2022). Not applicable for LU, BE and NL.
- ✓ Basic AMAN ongoing for Düsseldorf and Brussels (2017). Planned for Geneva (2019), N/A in Brandenburg, implemented in remaining. Extended AMAN ongoing for FR and CH (2017), DE (2018) and MUAC (2023). Planned for NL (2023) and no plan for BE. N/A in LU.
- ✓ Development and implementation of RNAV arrival and departure procedures for RNAV 1 completed in FR, CH and NL. Ongoing for BE (2019) and DE (2023). N/A for LU and MUAC.
- ✓ APV procedures implemented in DE and CH. Late in BE (2017), FR (2018) and NL (2019). N/A in LU and MUAC.

High performing airport operations

- ✓ A-SMGCS Level 1 late in Düsseldorf and Toulouse (2017) and Marseille (2019), implemented in remaining. Level 2 ongoing in Frankfurt, Lyon, Nice and Toulouse (2017). Late in Düsseldorf (2018) and Marseille (2019). Implemented in remaining.
- ✓ A-CDM late in Lyon and Amsterdam (2017) and in Nice (2018). Implemented in remaining.
- ✓ Initial airport operations plan is planned for Brussels (2017), Amsterdam and Nice (2018) and Marseille (2021). No plan for Toulouse and ongoing for remaining airports.

Enabling aviation infrastructure

- ✓ Migration to AMHS FOC date was extended and is completed in BE, LU, DE and MUAC, ongoing in CH (2017) and NL and FR (2018).
- ✓ AGDL implemented in DE, CH, BE and MUAC, late in FR (2020) and N/A in NL and LU.
- ✓ Implementation of FMTP provisions late in DE (2017) and FR (2018), completed in remaining.
- ✓ Surveillance performance and interoperability completed in CH, NL and MUAC. Ongoing in DE, FR and BE (2020). Late in LU.

Safety 	In terms of Safety, irrespective of traffic growth, the ambition of FABEC ANSPs is to reduce the risk per flight so that the overall number of accidents and incidents per year with an ATM ground contribution does not increase and can, in fact, even decrease.
Capacity 	Given the current high variability in the traffic demand and many implementations of new ATM systems in FABEC ANSPs (stripless system, ERATO, 4Flight or iCAS …), Reference Period 2 (RP2) will remain a challenging period for FABEC. In order to progressively close the gap with the network breakdown reference value, FABEC ANSPs will continue to develop ATFCM techniques and tools, increase their roster flexibility or implement new airspace structure. All these initiatives should allow FABEC to meet its target towards the end of RP2.
Cost Effficiency 	In the FABEC performance plan the performance area Cost-Efficiency in the second regulatory period is challenging and the determined unit cost targets have been reduced twice: once in July 2015, another time early 2017. In this respect, the FABEC partners are dealing with the pressure from economic regulation in a responsible manner and have reduced the initial gap with the EU average trend for the en-route determined unit cost targets. For the en-route segment a positive trend is especially visible for the remaining regulatory period (2017 to 2019), taking into account, inter alia, the increase in traffic achievements and forecasts. The outlook for the terminal segment is also promising, as the planned traffic volume increases while costs decrease.
Security 	The performance ambition for Security is to ensure that there is no increase in the risk of having ATM-related security incidents, taking into account the technological evolution of the underlying systems. This will be achieved through incident prevention and through system resilience to attacks. Because of the rapid development of system-wide information management (SWIM) and its specific nature, FABEC is already focusing on cybersecurity.
Operational efficicency 	A FABEC performance analysis is ongoing with Performance Review Unit (PRU) to improve the methodology used for measuring these new RP2-environmental indicators called ASMA (Arrival Sequencing and Metering Area) Time and Taxi Out Time.
Environment 	To deal with environment and savings linked to CO2 reduction, the FABEC performance plan is working on Horizontal Flight Efficiency (HFE) improvement. HFE is monitored all along the year to identify potential areas of improvement in order to achieve the FABEC KPA (horizontal en-route flight efficiency of the actual trajectory) target set to 2.96% in 2019.

NEFAB (Norway, Finland, Estonia, Latvia)

Optimized ATM network services

- ✓ All NEFAB ANSPs will implement automated ASM support system with the capability of AIXM 5.1 B2B data exchange with NM by end of 2017
- ✓ All NEFAB ANSPs have nearly implemented the COTR (Avinor missing ASP08 & ASP09 due to ongoing system upgrade). Latvia has completed ITY-COTR.
- ✓ The automatic exchange of the AFP messages will be implemented by the end of 2020 in all NEFAB ANSPs. Latvia has implemented the automatic exchange of AFP messages.

Advanced air traffic services

- ✓ Joint FAB project: NEFAB Free Route Airspace across the FAB above FL135 in Norway and above FL95 in Finland, Estonia and Latvia. Airspace scenarios and simulations were supported by EUROCONTROL.
- ✓ Basic AMAN implemented for major airports in Norway and Finland. Latvia plans to implement Basic AMAN in RIX within 2017.
- ✓ PRNAV almost fully implemented, LGS partly. LGS plans to implement RNAV procedures by end 2018.

High performing airport operations

- ✓ All main airports have implemented A-SMGCS level 1 and level 2; at Helsinki level 2 will become operational during 2017.
- ✓ Airports CDM implemented fully by Helsinki and Oslo airports; others follow in line with the FOC.
- ✓ DPI messages exchanged between Network Manager and both Helsinki and Oslo Airport.

Enabling aviation infrastructure

- ✓ All 4 ANSPs have technical readiness to replace X.25 with TCP/IP.
- ✓ Due to institutional and technical reasons AGDL implementation is late for all ANSPs.
- ✓ Estonia, Norway and Latvia implemented FMTP provisions; Finland plans FMTP to become operational during 2017.
- ✓ Latvia, Norway and Finland are PENS users.
- ✓ Estonia and Latvia moved from AFTN to AMHS (COM 10), Finland implemented basic AMHS in October 2016

Safety 	NEFAB Safety KPIs SMI of 95% and RI of 95% were achieved. Level of Effectiveness of Safety management was Level C for EANS, Finavia and LGS, and D for Avinor. Present level will be maintained as minimum but efforts will be addressed to minimize number of incidents.
Capacity 	The en-route ATFM delay in NEFAB in 2016 was 0.07 min per flight which meets the FAB-wide KPI (0.12). The performance at national levels varied from 0.0 to 0.11. Capacity is presently sufficient and ATM systems are developed with regard to the growing capacity demand.
Cost Effficiency 	Cost efficiency will be improved along with the developments of the Operational Efficiency programs.
Security 	ANSPs are committed to protect their organisations and systems from cyber threats.
Operational efficicency 	NEFAB Free Route Airspace implemented in NEFAB States in November 2015 is connected with the FRA in DK/SE FAB. Most enhancements to enable seamless cross-border FRA operations between both FABs were implemented in June 2016 and will be finalised in May 2017. The area is being further expanded in the Borealis FRA programme through establishing interfaces with FRA areas in UK/Ireland FAB and Iceland. This will be perceived by airspace users as continuous FRA area across nine states maximising the benefits for customers.
Environment 	In NEFAB airspace airlines can select between the fixed route network and free route operations. The NEFAB Free Route Airspace enables users to flight-plan and fly user-preferred trajectories. NEFAB Horizontal en route flight efficiency of the actual trajectory (KEA) in 2016 was 1.73%. The Union target requires inefficiencies in actual trajectories decrease to 2.60% by 2019.

SOUTH-WEST (Portugal, Spain)

Optimized ATM network services

- ✓ Implementation of AIXM 5.1 B2B data exchange with NM is planned in both States, Portugal by 2017 and Spain by 2018;
- ✓ COTR implementation has been completed in Spain (2016) and is late in Portugal (2018);
- ✓ The automatic exchange of the AFP messages is going to be completed in both States (2017);
- ✓ OLDI implementation is already finished in Spain (2016). Portugal has already in operational use the OLDI basic procedures. The full implementation of this objective is planned by end 2018 with the upgrade of LISATM (V9). Spanish and Portuguese ANSPs have planned the implementation of MTCD and MONA functionalities by 2021;
- ✓ Interactive rolling NOP implementation will be deployed in SW FAB by 2021

Advanced air traffic services

- ✓ FRA full implemented in Portugal (2009) and partly completed (FRASAI project) in Spain; Current plans consider extending FRA concept to both, the whole SW FAB airspace and in a cross-border perspective. The overall project is planned to be implemented by end 2021;
- ✓ Basic AMAN is already implemented in applicable Spanish airports and late in Lisbon;
- ✓ Extended AMAN implementation will be deployed by the Spanish and Portuguese ANSPs by 2023;
- ✓ PRNAV implemented in Portugal and planned in main Spanish TMAs (2023);
- ✓ APV procedures have been implemented in Portugal (2016) and late in Spain (2020).

High performing airport operations

- ✓ A-SMGCS L1 implementation is completed in main three Spain airports. At Lisbon airport the implementation is almost completed
- ✓ A-SMGCS L2 late in Madrid, Barcelona and Palma (2019), and ongoing in Lisbon (2017);
- ✓ A-CDM already completed in Madrid and Barcelona. Late in Lisbon and Palma (2017);
- ✓ The implementation of Initial Airport Operations Plans is planned by both Spanish and Portuguese ANSPs by 2020 and 2021 respectively;
- ✓ Time based separation is planned at Madrid airport by 2023;
- ✓ Improve runway and airfield safety with ATC clearances monitoring is planned at applicable Spanish airports by 2020.

Enabling aviation infrastructure

- ✓ AGDL planned in Spain (2018) and Portugal (2019);
- ✓ Implementation of FMTP completed in Spain and late in Portugal (2019);
- ✓ Aeronautical Data Quality is planned in Portugal by 2017 and late in Spain by 2018;
- ✓ Surveillance performance and interoperability implementation is planned by SW FAB (2020);
- ✓ The Aircraft identification based on Mode S will be completed in SW FAB by end 2019;
- ✓ The implementation of Voice over Internet Protocol is ongoing and it will be finished by both States by 2020;
- ✓ AGVCS2 will be fully deployed in SW FAB by 2020.

Safety 	The SW FAB Performance Plan establishes qualitative targets on Just Culture, consisting of common plans and policy statements at SW FAB level, in particular on policy, occurrence reporting and investigation areas. SWFAB ANSPs shall work together to find common areas of interest and development of Just Culture during RP2. The result is intended to be reflected in a common just culture policy enhancement plan at SW FAB level. SWFAB NSAs also plan to cooperate, in the FAB SW framework, in order to improve the safety culture.
Capacity 	SW FAB has developed their capacity plans in close collaboration with the NM. Efforts on capacity are focused on the sectorisation optimisation, improvement of the capacity through interfaces with France, PBN implementation, Free Route and staffing levels. In order to match the challenging targets in the traffic growth scenario forecasted for RP2, operational measures and technology enablers will also be deployed to comply with the European regulations and the European ATM Master Plan.
Cost Effficiency 	Significant efforts in cost savings have been undertaken by Portugal and Spain in previous years, contributing to the EU-Wide cost-efficiency decrease during RP1. Efforts must continue in order to achieve a good level of cost-efficiency at the end of RP2 according to the EU-wide targets.
Security 	Spain ensures compliance with the regulations for the protection of critical infrastructures and national and international recommendations (ICAO, National Civil Aviation Safety Committee) by providing to ENAIRE infrastructures and staffing with an adequate temporary and geographic protection based on the different alert levels set by the State. Specifically, the focus is on assessing risk levels and acting accordingly, carrying out awareness campaigns on security and cybersecurity, and increasing collaboration with the Security Forces to strengthen the security of ANSP installations and systems.
Operational efficicency 	SW FAB has development the SW FAB Operational Board Common Plan 2017-2021, that is in the final approval process, in order to realize the objectives tasked to it by the SW FAB State Agreement. The SW FAB OB CP is a rolling plan which contains an overview of those activities planned to be implemented by the ANSPs in the years ahead that most contribute to enable optimum use of airspace, taking into account air traffic flows in the airspace under the responsibility of Spain and Portugal and among the surrounding airspaces.
Environment 	SW FAB ATS route network redesign is an important means to optimise the organisation and the use of airspace, ensuring a network continuum, and represents one of the greatest opportunities to optimize horizontal efficiency in terms of both KEP and KEA indicators. The route network improvements deal with lateral and vertical interconnectivity, including interconnectivity with SW FAB adjacent areas, and require the implication of many actors, as well as a considerable coordination: civil/military, agreements within the FAB and with other FABs and ANSPs outside the SW FAB. The objective is to improve the efficiency of SW FAB airspace by the implementation of Airspace Efficiency Plans which facilitate users an optimization of flown distances that allow reducing CO2 emissions and save fuel.

UK- IE (Ireland, United Kingdom)

Optimized ATM network services

- ✓ AIXM 5.1 B2B data exchange with NM is partly completed in the UK (2021) and planned in IE (2017)
- ✓ COTR implementation is completed in both States
- ✓ The automatic exchange of the AFP messages is ongoing in IE (2017) and late in the UK (2020)
- ✓ OLDI implementation is planned in the UK (2018) and N/A in IE. MONA function complete in IE and partly completed in the UK (2021)

Advanced air traffic services

- ✓ FRA is implemented in IE and ongoing in the UK (2021)
- ✓ Basic AMAN ongoing in Manchester, planned in Stansted, Implemented in Heathrow, Dublin and Gatwick. Extended AMAN implemented in the UK and no plan for IE.
- ✓ PRNAV implemented in IE and ongoing in the UK (2023)
- ✓ APV procedures implemented in UK and late in IE (2019)

High performing airport operations

- ✓ A-SMGCS Level 1 and 2 implemented in Stansted, Gatwick, Edinburgh and Dublin. Late in Manchester (planned for Level 2), Birmingham and Heathrow
- ✓ A-CDM completed in Gatwick and Heathrow, ongoing in Manchester and Edinburgh, planned in Dublin, late in Stansted, Luton and Birmingham
- ✓ Dublin, Manchester, Gatwick, Heathrow and Stansted in list for mandatory implementation of PCP AF2 functionalities

Enabling aviation infrastructure

- ✓ Migration to AMHS completed in IE, ongoing in the UK (2017)
- ✓ AGDL implemented in IE, planned in the UK (2018)
- ✓ Implementation of FMTP provisions completed in IE and late in UK (2021)
- ✓ Implementation of AIXM 5.1 B2B data exchange with NM is partly completed in the UK (2021) and planned in IE (2017)

Safety 	A UK/Ireland FAB Joint Safety Management Arrangements document has been developed by the IAA and NATS and accepted by the NSAs of Ireland and UK. This provides for a harmonised approach to safety management and safety assurance across the ANSPs and has been used on all FAB projects since their development.
Capacity 	The IAA and NATS have operated a FAB Joint Network Management solution since 2013. Based at NATS' Swanwick Centre, the Flow Management Position provides network management services for the FAB airspace. This joint solution continues to optimise the capacity of airspace in the vicinity of the FIR boundary and has permitted a more effective streaming of traffic flows between the FAB ANSP partners.
Cost Effficiency 	The UK/Ireland FAB partners will, during RP2 (2015-2019), reduce the average cost per flight of ATM service provision by close to 20%. Additionally, total cumulative customer savings enabled by the FAB are expected to exceed €336 Million by 2020 (including the value of enabled cuts to fuel burn & CO2 emissions).
Security 	Both UK/Ireland FAB partner ANSPs operate to global industry best practices and in full compliance with all European and National security legislation.
Operational efficicency 	The ANSP partners in the UK/Ireland FAB operate to the highest levels of operational efficiency and will continue to do so in order to enhance safety, lower costs, reduce delays and cut emissions in compliance with the challenging targets of the FAB RP2 performance plan.
Environment 	Changes in airspace design and operational procedures by the UK/Ireland FAB partners will facilitate the savings of 330,000 tonnes of fuel and a reduction of 1.06 Million tonnes of CO2 emissions by 2020.

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3 DEPLOYMENT VIEW

How to read Deployment View assessments?

Stakeholders – Stakeholders included in this field are all those who are included in implementation objective, those which have the dedicated SLoAs to complete.

FOC – Full Operational Capability date as defined in the MP L3 2016 Implementation Plan. The FOC date is defined as the date by which full operational capability should be achieved by all stakeholders.

Estimated achievement – The date of estimated achievement is calculated as the year when objective implementation reaches 80% of completion in the applicability area.

Table 3: Understanding progress assessment status

Status	Progress assessment
On Time	Implementation progress is on time. No delays 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 implementation objective.
Planned delay	The estimated achievement date is beyond the FOC date. Stakeholders already envisage delays in 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 in the past.
Achieved	Objective has fulfilled the achievement criteria (80% completion in the applicability area). For some objectives (PCP/SES/ICAO ASBU related) the objective may be monitored until 100% achievement.
Closed !	Objective can be declared as closed because it is replaced or renamed, or it is considered as no longer relevant nor contribution to the European ATM Network Performance.

Applicability area – As defined in the MP L3 2016 Implementation Plan.

SESAR Key Feature – This reference shows the SESAR Key Feature under which implementation objective belongs.

PCP sub-functionality – This reference shows the functional relationship between implementation objective and PCP sub-functionality. This link does not mean that implementation objective fully covers the PCP functionality (e.g. it can be part of the functionality, enabler or pre-requisite). Therefore the overall progress of the objective cannot be in any way taken as a progress of PCP sub-functionality.

EOC/OC – This reference shows the Essential Operational Change/Operational Change where the implementation objective fits.

ICAO ASBU – This reference shows the link between implementation objective and ICAO ASBU.

OI steps – This reference shows the link between Operational Improvement steps and implementation objectives. MP L3 2016 Implementation Plan shows the level of coverage of the OI step with particular objective.

CAPEX – This reference shows the link between State CAPEX as reported in the RP2 Performance Plans and implementation objectives. If the implementation objective is included in CAPEX of at least one State in the FAB, then the reference to this FAB will appear in the Master Plan Level 3 2016 Implementation Report.

Completion Rate evolution – The graphs shows past (if applicable) and future evolution of the implementation objective completion rate. The scale of each graph is adapted to particular case (non-standardised) to show the estimation when objective reaches 80% of completion. In some cases when estimated achievement date is not provided by the States (e.g. plans for implementation are yet to be defined), 80% mark is not reached. For these objectives estimated achievement at ECAC level is not available yet.

Main 2016 developments – This section summarises the main developments in objective implementation based on the reported LSSIP information and expert judgement/analysis. In some cases this information is complemented by the information from Network Manager and Prisme Fleet database for aircraft equipment information.

Map – The maps highlight the progress of implementation at State or Stakeholder level (as relevant) and reflect the progress reported through LSSIP 2016. New type of maps based on the percentages was used in Level 3 Report 2016. The progress scale used in the map is the following:

Table 4: Understanding LSSIP implementation progress

"Progress"	Definition	Computed percentage
Completed	The development or improvement aimed by a SLoA is fulfilled in accordance with the MP L3 Plan Finalisation Criteria. Relevant info should be provided confirming the completion, e.g. completion date, reference(s) to a publication(s), evidences of compliance with relevant national or EC regulations, EUROCONTROL released data, an audit confirming compliance or completion etc. For those Objectives where the implementation depends on adjacent countries, an SLoA can be reported "Completed" if the implementation is at least achieved with **one** adjacent country.	**100%**
Ongoing	Implementation has **kicked off** but is not yet fully completed and the planned implementation date is **within** the SLoA finish date.	**1-99%**
Planned	A planned schedule and proper (approved and committed budgeted) actions are specified **within** the SLoA finish date for completion (last Checkpoint is within the SLoA finish date) but not yet kicked off (SLoA/Objective covered by stakeholder's Business Plan). Relevant information must be explained.	**0%**
Late	An SLoA shall be reported "Late" in the case when there is a **firm commitment** to implement the SLoA (e.g. budget and schedule approved) but foreseen to be achieved **after** the SLoA finish date, and relevant information must be explained.	**0-99%**

"Progress"	Definition	Computed percentage
No Plan	1) The Stakeholder has not yet defined a project management/implementation plan for this SLoA with assigned financial and human resources but has the intention to implement it for the next year or 2) The Stakeholder cannot develop a project management/Implementation plan with relevant financial or human resources for the implementation of this SLoA due to (local/national) austerity measures, but has the general intention to implement it or 3) The Stakeholder is in the scoping phase where he is developing a feasibility study including a cost benefit analysis etc. and hence has not yet finally decided on a project management/Implementation plan to implement an SLoA. For any case, the Stakeholder must provide a justification.	**0-99%**
Not Applicable	1) The Stakeholder is not part of the MP L3 Plan 'Applicability Area'; or 2) The Stakeholder is part of the MP L3 Plan 'Applicability Area', however: • The Stakeholder does not provide the required service for this SLoA i.e. Military not providing ATC services to GAT or in the case of MUAC providing only upper area control services; or • The Stakeholder has reviewed the SLoA and there is no intention to implement it because it is not justified particularly in terms of the cost/benefit ratio or there are national/local restrictions in terms of environment, legislation which prevent the Stakeholder to implement it; or • The Stakeholder is implementing alternative solutions to the one described in the SLoA (e.g. not distributing information via a leaflet, but via other electronic means). For any case, the Stakeholder must provide a justification.	-
Missing Data	Lack of data from a Stakeholder makes it impossible to define "Progress". If following the closure of the LSSIP Database, at the end of the yearly LSSIP cycle, the information required is missing in the LSSIP Database, then the Contact Person will put the "Progress" 'Missing Data'.	**0%**

List of MP L3 implementation objectives

Table 5: List of MP L3 implementation objectives

AOM13.1 Harmonise OAT and GAT handling

Stakeholders
- ANSPs
- Military
- Regulators

FOC 12/2018

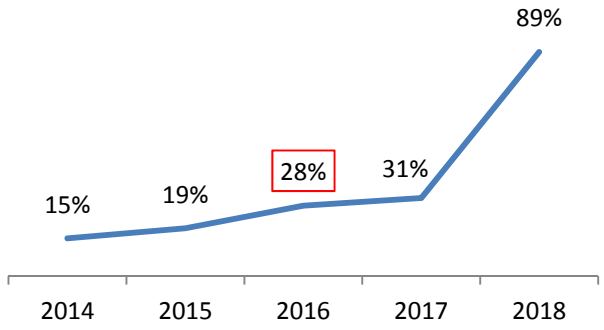
Estimated achievement 12/2018

On time

Applicability Area
All ECAC States, except AL, LV, LU, MAS, MT and MD

SESAR Key Features	Optimised ATM Network Services
EOC/OC	-
ICAO ASBU	No corresponding ASBU
OI Steps	AOM-0301
CAPEX	FABEC

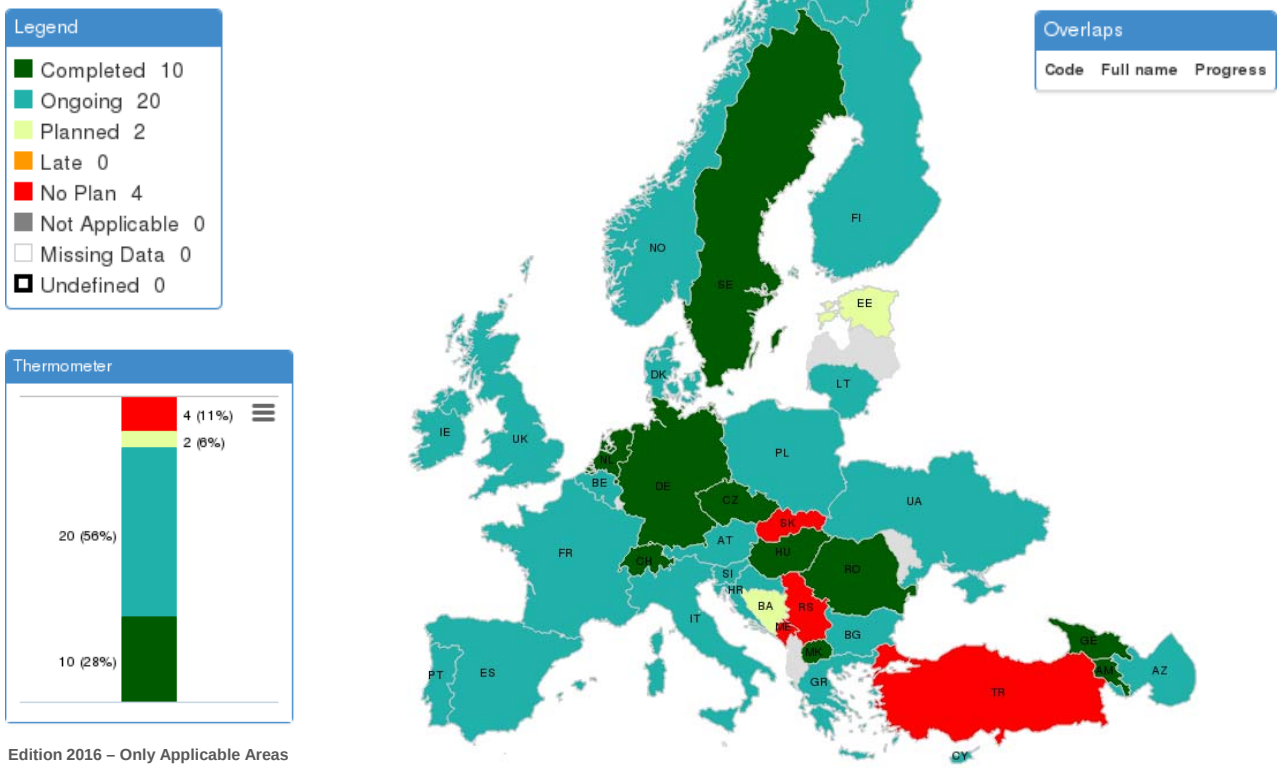
Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

Even though the FOC is approaching none of the States declares at this moment expected delays in implementation. Majority of the States that are declaring 'planned' or 'on-going' status report the estimated achievement to be reached in 2018. Two (2) more States (GE, AM) declared this Objective as 'completed' (now ten (10) States in total). Ten (10) States that declared 'on-going' Status reached the implementation level between 50 and 99%. One (1) State (IE) changed the status from 'no plan' to 'on-going'. Six (6) more States declared completion of all MIL SLoAs. The main reason for declaring this objective as 'not applicable' is lack of OAT traffic in the airspace of the States. In case of 'no plan' status the main reasons are legislative (lack of proper legislation passed) or linked to lack of decision on implementation of EUROAT.

AOM13.1-Harmonise Operational Air Traffic (OAT) and General Air Traffic (GAT) handling



Edition 2016 – Only Applicable Areas

AOM19.1 ASM tools to support A-FUA

Stakeholders
- ANSPs
- Network Manager

FOC 12/2018

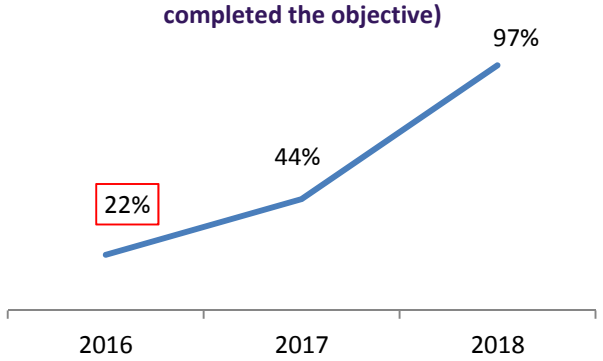
Estimated achievement 12/2018

On time

Applicability Area
All ECAC States except Armenia, FYROM, Malta, Luxembourg and Moldova

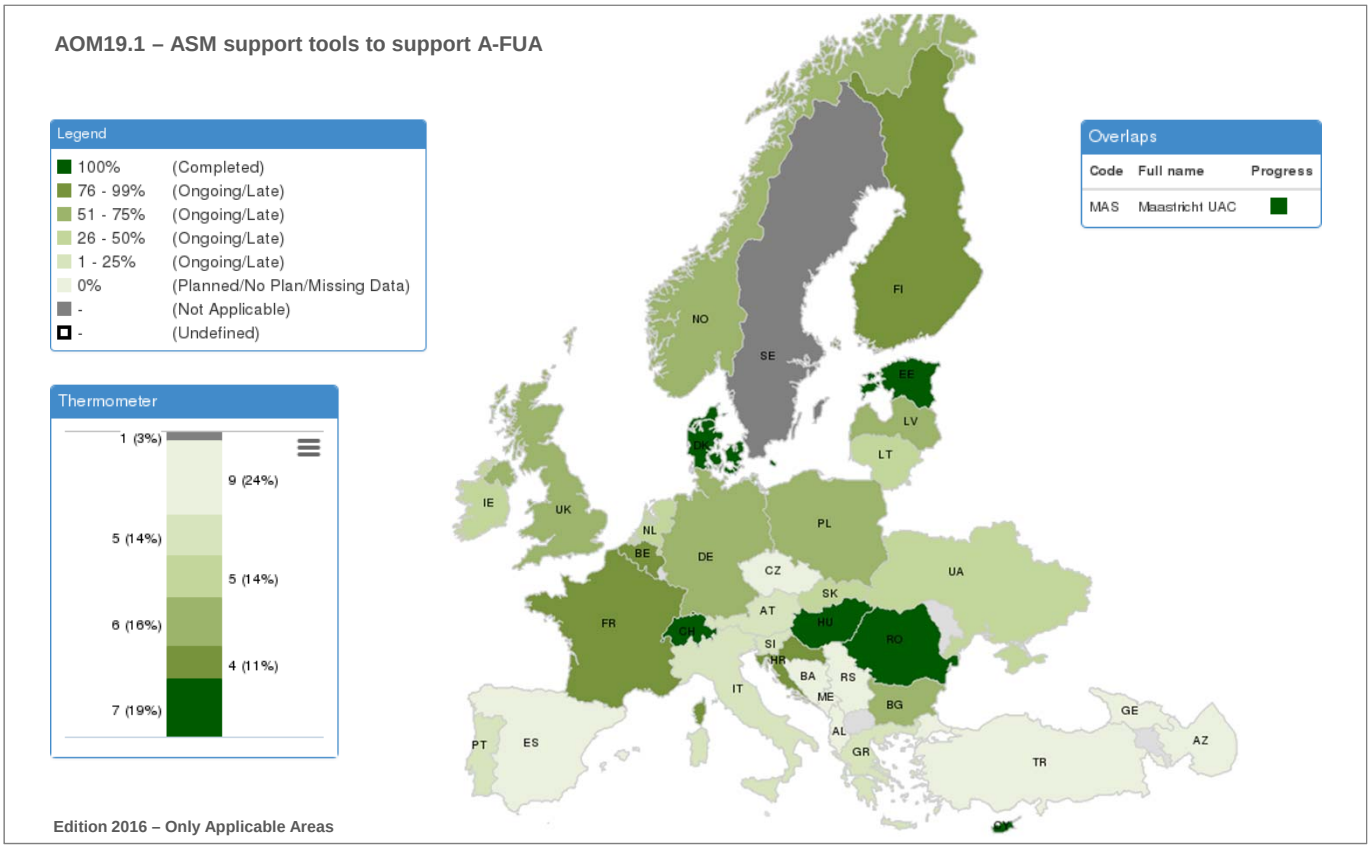
SESAR Key Features	Optimised ATM Network Services
PCP Sub-Functionality	S-AF3.1 ASM and Advanced FUA
ICAO ASBU	B0-FRTO, B1-FRTO, B1-NOPS
OI Steps	AOM-0202, AOM-0202-A
CAPEX	BLUE-MED, DANUBE, FABEC, UK-IR

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

The objective takes over some implementation actions from its predecessor in the previous MPL3 edition (AOM19), however both content and deadline for these objectives are different so comparison with previous years might not be relevant. The objective is an important enabler for the PCP sub-functionality 3.1 and is progressing within the agreed timelines. Eight (8) States have already completed it (BE, CH, CY, DK, EE, HU, MAS and RO) and all others within the applicability area have reported plans to implement by Dec/2018 except two (2) (SE, TR), which are still considering the need for its implementation. Although some States are implementing local solutions, a majority of them rely on LARA (Local and sub-Regional ASM Support System) and for these, the information provided by States is in line with the information available in EUROCONTROL, also with regards to the interoperability of the ASM tools with NM systems .



AOM19.2 ASM management of real-time airspace data

First year of monitoring. The reliable estimated achievement date can not be defined at this time.

Stakeholders
- ANSPs
- Airspace Users
- Network Manager

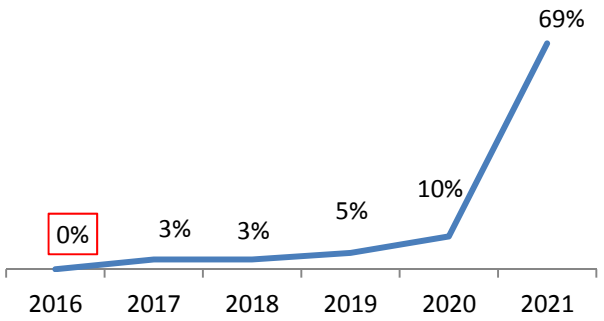
FOC 12/2021

Estimated achievement not available

Applicability Area
All ECAC States

SESAR Key Features	Optimised ATM Network Services
PCP Sub-Functionality	S-AF3.1 ASM and Advanced FUA
ICAO ASBU	B1-FRTO, B1-NOPS
OI Steps	AOM-0202-A
CAPEX	BLUE-MED, DANUBE, FABEC, UK-IR

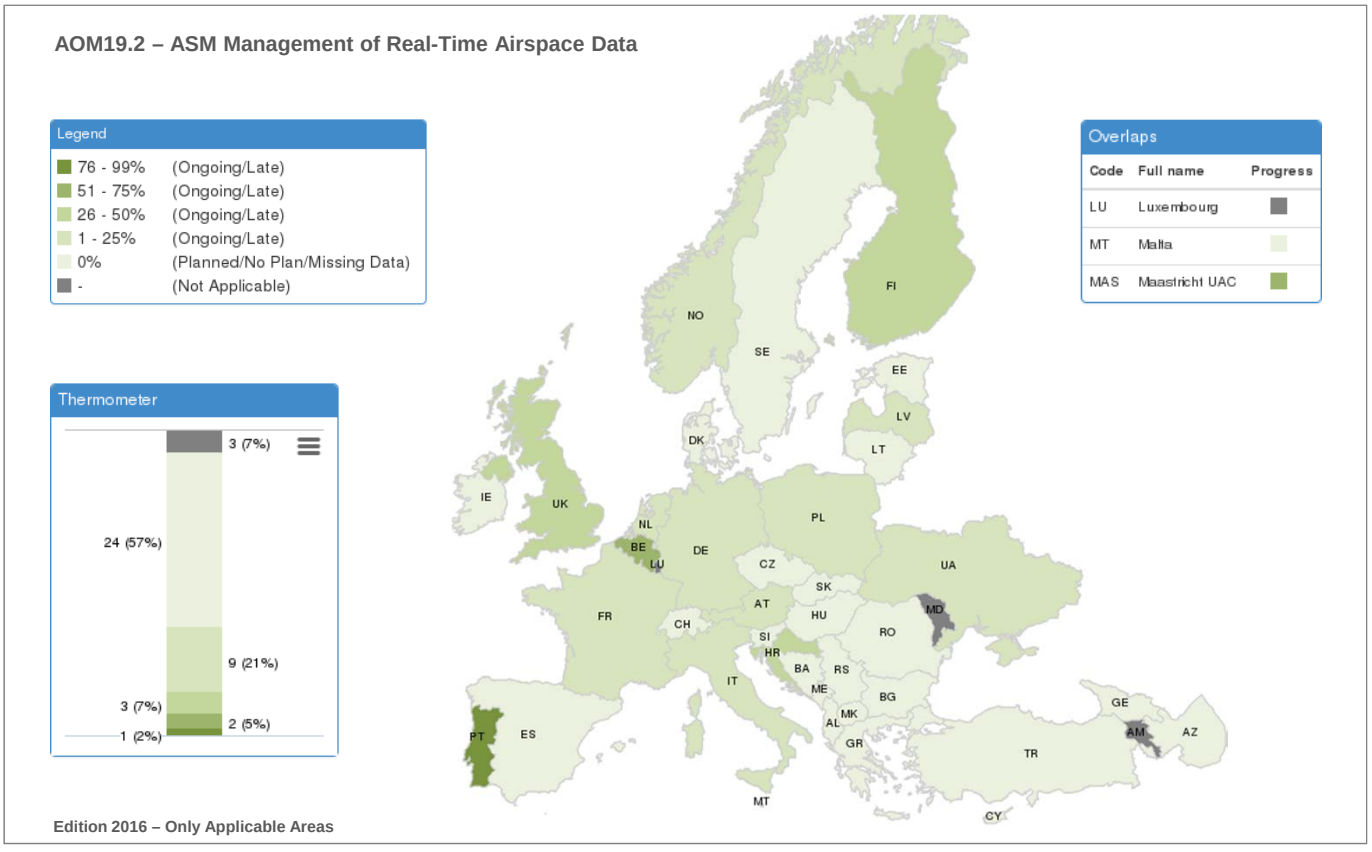
Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

2016 was the first year of this objective being monitored so no comprehensive assessment of progress can be done. Some elements of the concept operations for this objective are still unclear and the Data Pack for the SESAR Solution linked to the objective was only published in January 2017.

Stakeholders are therefore, at best, in the early planning stages and up to 11 States reported not having plans yet. For this reason, no estimated achievement date can be calculated. It is to be noted that one (1) State (FR) already reported the objective 'Late' due to the fact that the necessary system upgrade will only take place in Dec/2022. Although the implementation deadline is 12/2021 and it might be too early to assess the objective as 'risk of delay', there are certainly some elements for concern and stakeholders should take measures to activate their implementation plans.



AOM19.3 Full rolling ASM/ATFCM process and ASM information sharing

First year of monitoring. The reliable estimated achievement date can not be defined at this time.

Stakeholders
- ANSPs
- Airspace Users
- Network Manager

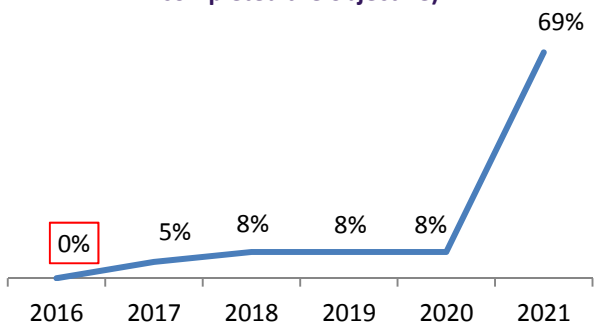
FOC 12/2021

Estimated achievement not available

Applicability Area
All ECAC States

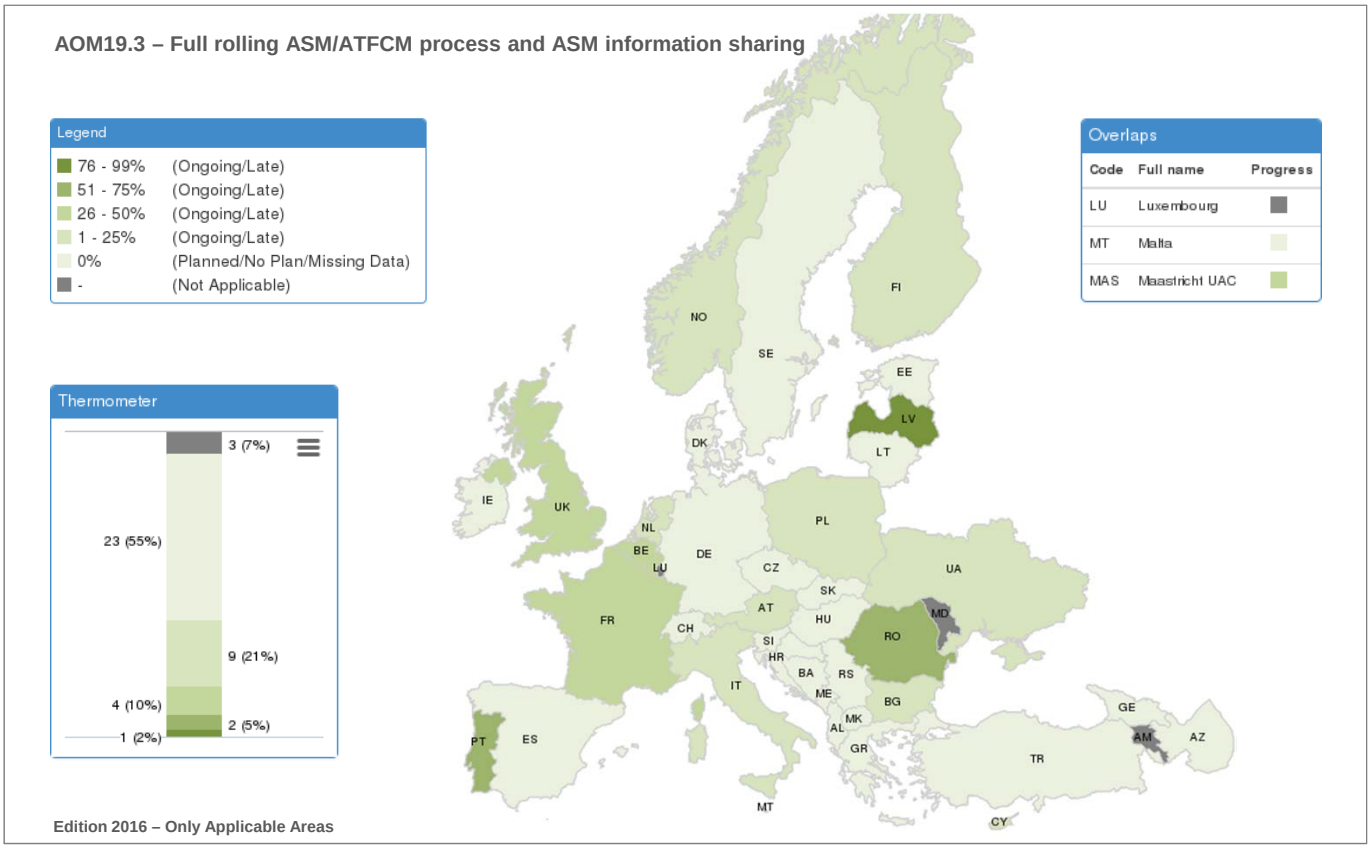
SESAR Key Features	Optimised ATM Network Services
PCP Sub-Functionality	S-AF3.1 ASM and Advanced FUA
ICAO ASBU	B1-FRTO, B1-NOPS
OI Steps	AOM-0202, AOM-0202-A
CAPEX	BLUE-MED, DANUBE, FABEC, UK-IR

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

Like for AOM19.2, 2016 was the first year of this objective being monitored and the assessment is almost identical. No comprehensive assessment of progress can be done. Some elements of the concept operations for this objective are still unclear and the Data Pack for the SESAR Solution linked to the objective was only published in January 2017.
Stakeholders are also in the early planning stages and up to 12 States reported not having plans yet.
Although the implementation deadline is 12/2021 and it might be too early to assess the objective as 'risk of delay', there are certainly some elements for concern and stakeholders should take measures to activate their implementation plans.



FCM03 Collaborative flight planning

Stakeholders
- ANSPs
- Network Manager

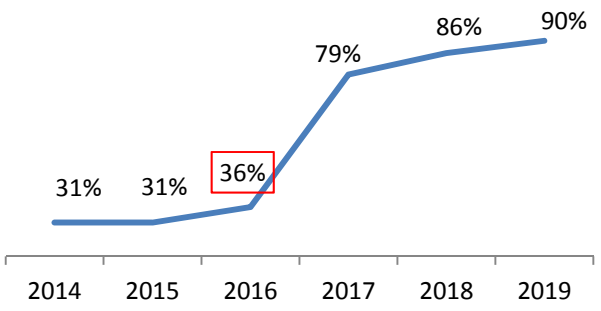
FOC	**12/2017**
Estimated achievement	**12/2018**

Planned delay

Applicability Area
All ECAC States

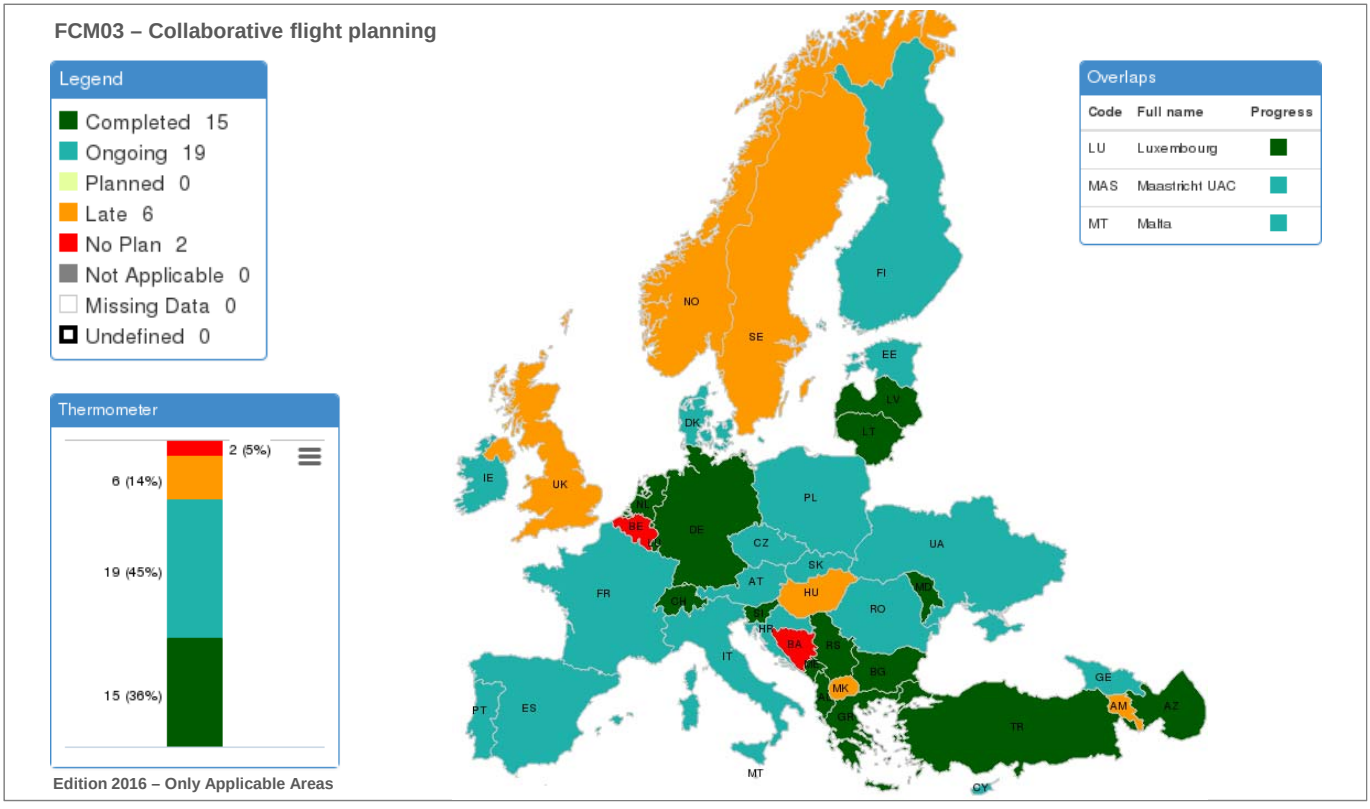
SESAR Key Features	Optimised ATM Network Services
PCP Sub-Functionality	Basic Network Operations Planning Pre-requisite for PCP/AF4 Network Collaborative Management
ICAO ASBU	B0-NOPS
OI Steps	IS-0102
CAPEX	BLUE-MED, DANUBE, DK-SE, FABCE, FABEC, SW FAB

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

Implementation is slow in particular taking into account that the objective is a pre-SESAR one and that it has suffered several postponements of its FOC date over the last years. It is expected that 2017 will see a surge in implementation, getting close to 80% completion rate. However, full implementation over the entire area of applicability is expected only in 2020. The main challenge in implementation is the fact that there is a need for a major system upgrade to implement the functionality. Another, but less important reason for the longer implementation time, is that the objective is considered implemented when the NM has integrated the received AFP messages in the operational NM system. And this requires not only the capability of the local ANSP systems to generate and transmit AFP messages but also a testing and validation period with the NM. It is noted that for several States (AZ, DE, ME, TR, RS, SL) having claimed completion, the integration within NM has not yet been tested or the tests have failed and AFP messages are not integrated in the operational NM system. At the time of writing, no tests have been scheduled with NM for 2017.



FCM04.1 STAM phase 1

Stakeholders
- ANSPs
- Airspace Users
- Network Manager

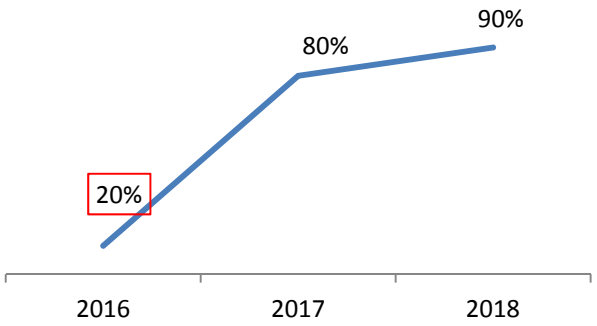
FOC	**10/2017**
Estimated achievement	**10/2017**

On time

Applicability Area
FR, DE, IT, PL, ES, CH, AT, BE, CZ, HR

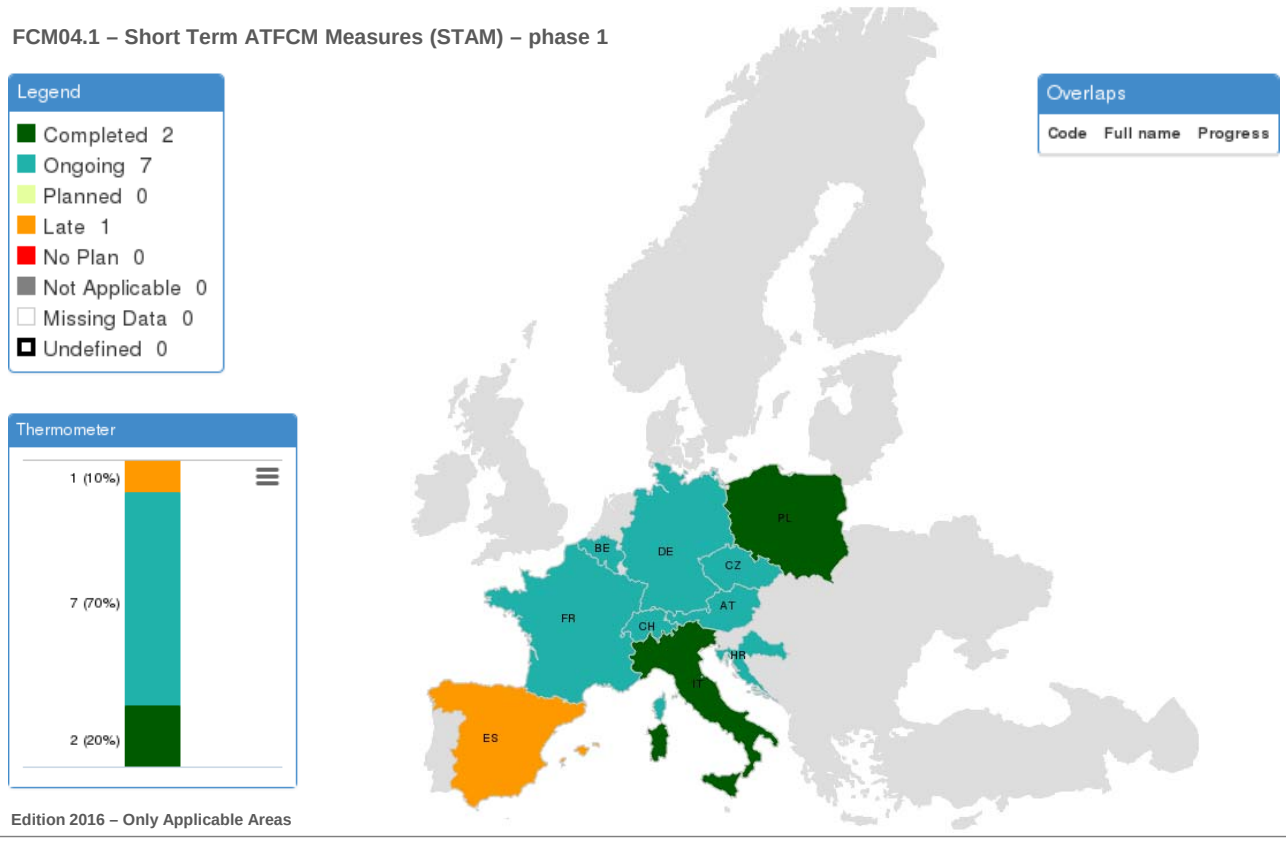
SESAR Key Features	Optimised ATM Network Services
PCP Sub-Functionality	Pre-requisite for PCP AF4 Network Collaborative Management
ICAO ASBU	B0-NOPS
OI Steps	DCB-0205
CAPEX	FABCE, FABEC

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

The implementation delays identified in the previous edition of the Report have been absorbed due to the shift of the FOC date of the objective to October 2017. This shift was triggered by the alignment of the FOC date with the implementation dates of the corresponding Family in the Deployment Programme as well as by the enlargement of the applicability area of the objective so as to include the voluntary implementations. It is expected that the objective will be implemented on time with only one (1) State (ES) estimating a slight delay of approximately 6 months.



FCM04.2 STAM phase 2

First year of monitoring. The reliable estimated achievement date can not be defined at this time.

Stakeholders
- ANSPs
- Airspace Users
- Network Manager

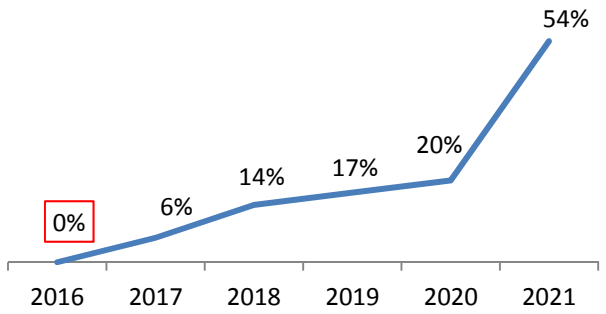
FOC 12/2021

Estimated achievement not available

Applicability Area
EU+ States

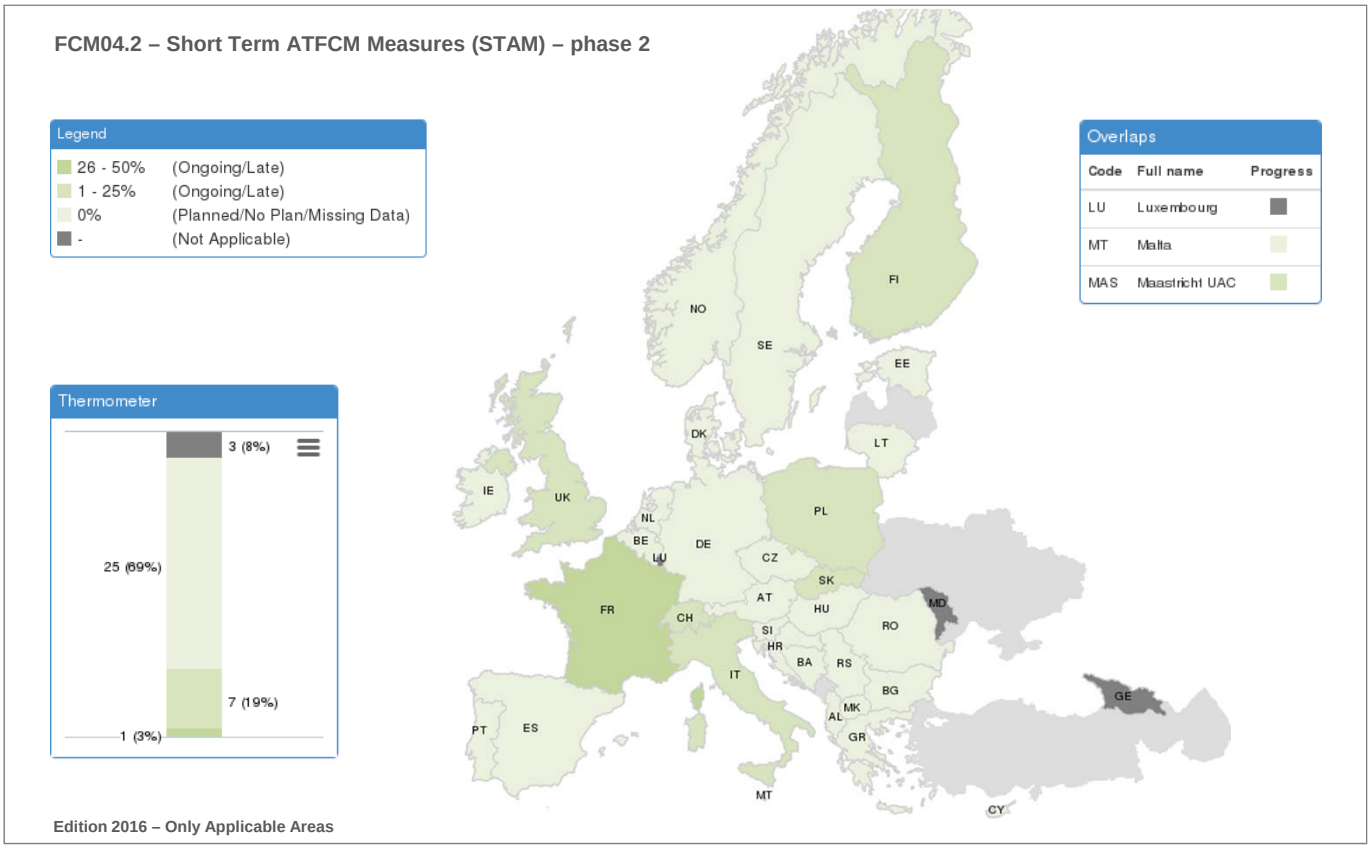
SESAR Key Features	Optimised ATM Network Services
PCP Sub-Functionality	S.AF 4.1 Enhanced STAM
ICAO ASBU	No corresponding ASBU
OI Steps	DCB-0205
CAPEX	FABCE, FABEC

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

This objective is a new one, reflecting the PCP requirements as well as SDM's Deployment Programme. As it is the first reporting cycle, it is premature to establish conclusive implementation trends, in particular as almost half of the States in the applicability area have not reported implementation plans yet. Based on the information received from the 19 States which already have implementation plans or for which the deployment is ongoing, it is expected that implementation will progress slowly over the next years (e.g. two (2) States are expected to be ready in 2017 and three (3) other in 2018) with the main bulk of implementation being expected in 2021, as required by the PCP Regulation.
The reports indicate a tendency for the stakeholders to make use of the STAM tools to be made available shortly by the NM while fewer ANSPs have reported plans for the development of local tools.



FCM05 Interactive rolling NOP

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

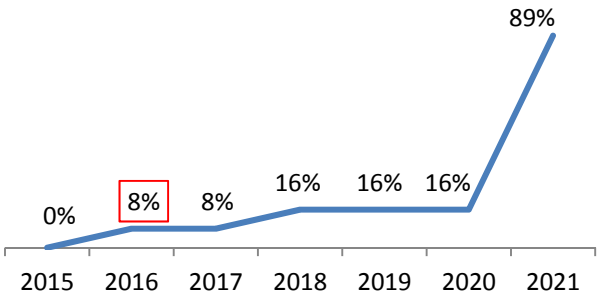
FOC	**12/2021**
Estimated achievement	**12/2021**

On time

Applicability Area
All ECAC States except Armenia and FYROM

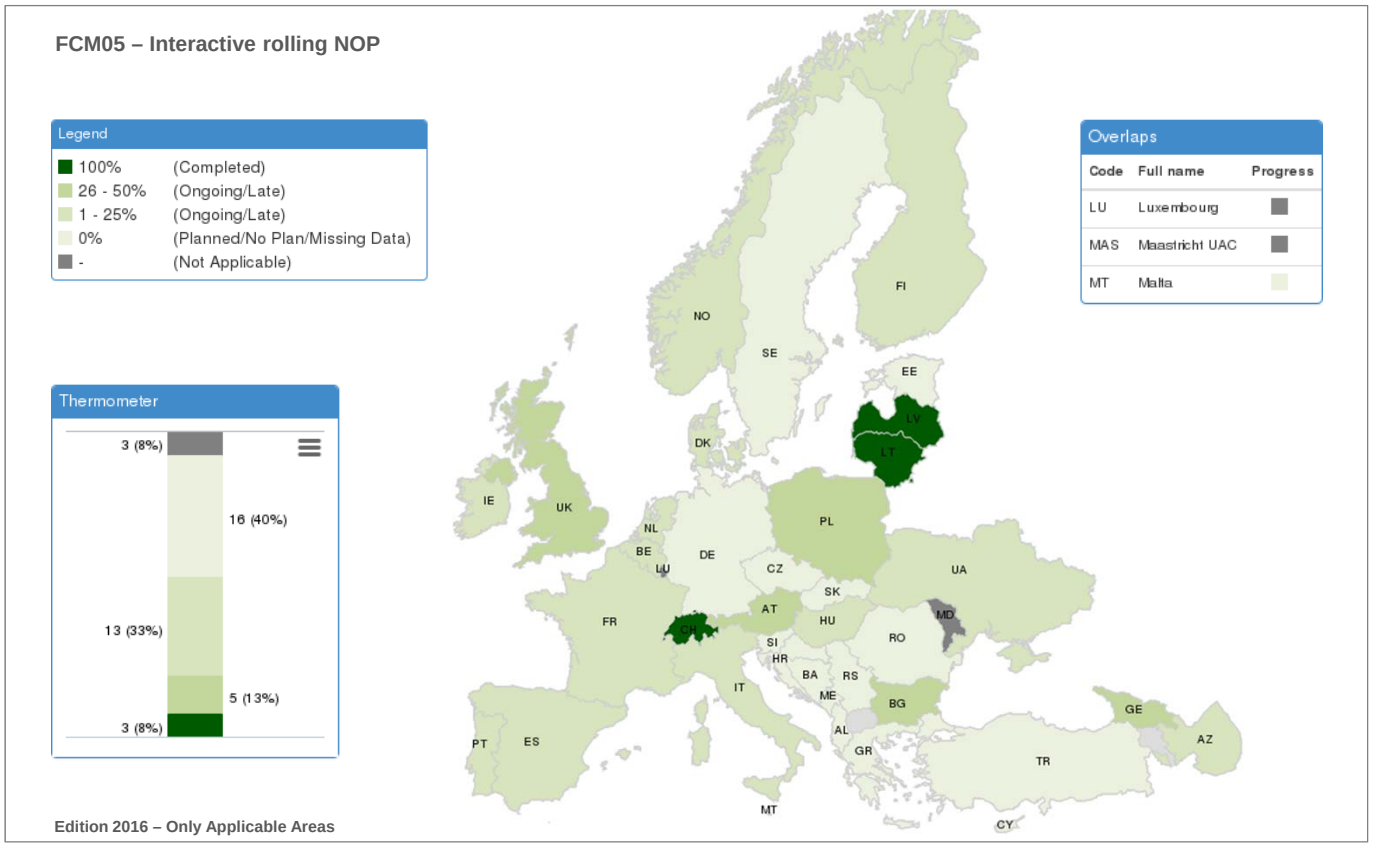
SESAR Key Features	Optimised ATM Network Services
PCP Sub-Functionality	S-AF4.2 Collaborative NOP
ICAO ASBU	B0-NOPS, B1-NOPS
OI Steps	DCB-0102, DCB-0103-A
CAPEX	BLUE-MED, FABCE, FABEC

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

The vast majority of States have started implementation or have set-up concrete implementation plans, with the objective to complete implementation before the FOC date of 2021. There is still a small number of States (AL, GR, SE, TR) for which an implementation decision has not been taken yet. Most of the SLoAs (12) are applicable to the NM. Out of these 12, eight (8) have already been implemented while the remaining four (4) are progressing according to the plans and will be sequentially deployed between 2018 and 2021.



FCM06 Traffic Complexity Assessment

The reliable estimated achievement date can not be defined at this time.

Stakeholders
- ANSPs
- Network Manager

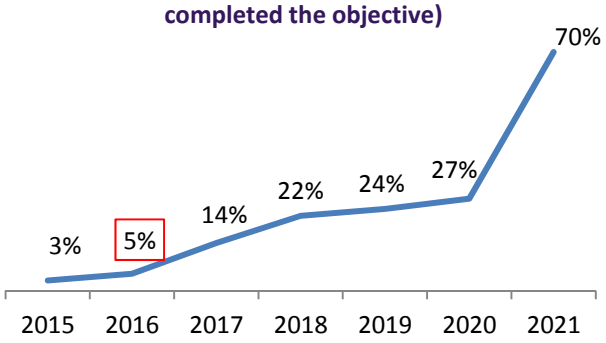
FOC 12/2021

Estimated achievement Not available

Applicability Area
All EU+ States

SESAR Key Features	Optimised ATM Network Services
PCP Sub-Functionality	S. AF 4.4 Automated Support for Traffic Complexity Assessment
ICAO ASBU	B0-NOPS, B1-NOPS
OI Steps	CM-0101, CM-0103-A
CAPEX	BALTIC, FABCE

Completion Rate Evolution (% of States completed the objective)

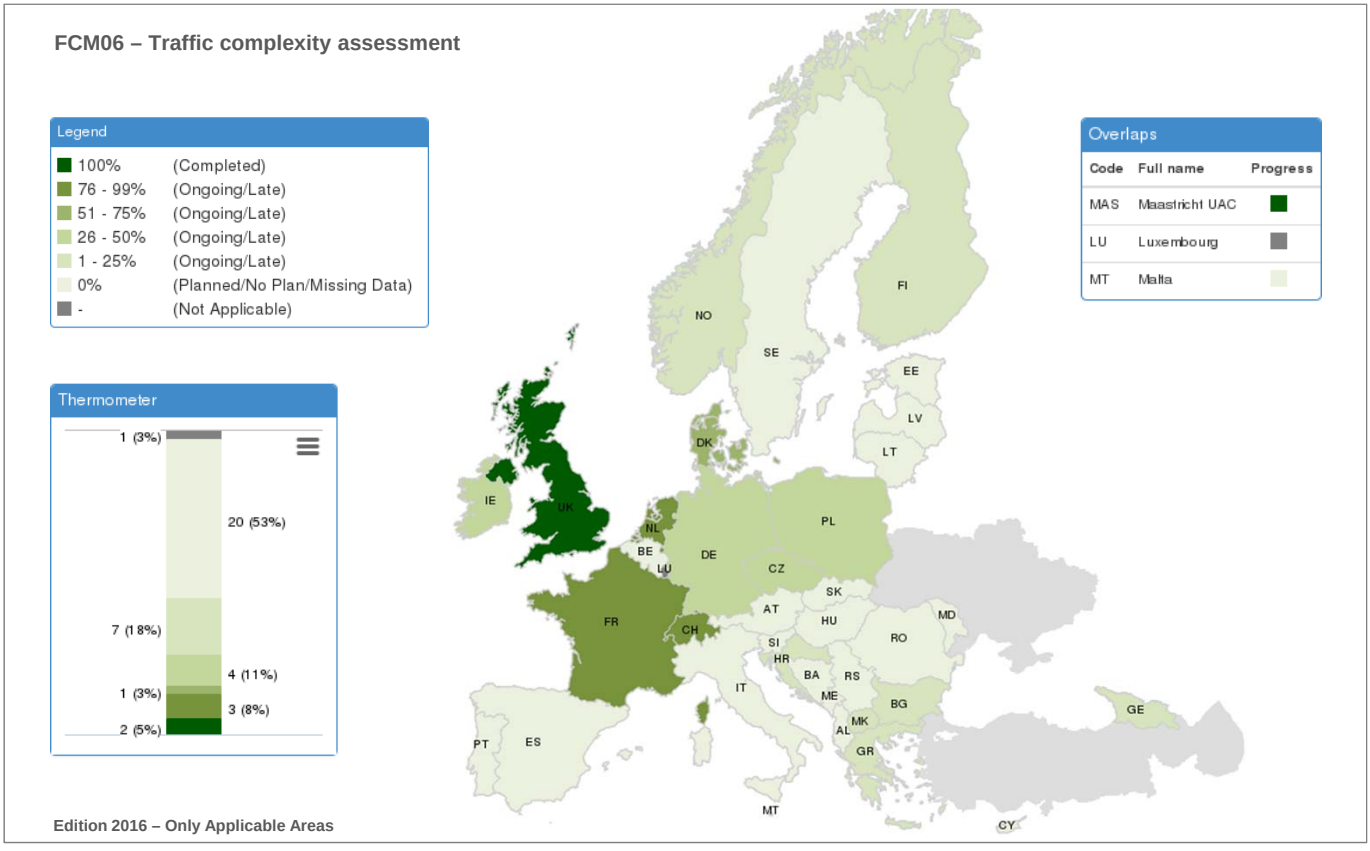


Main 2016 developments

A second ANSP (MUAC) has completed the implementation of this objective. In several ANSPs, the implementation has now started, bringing the total of ongoing implementation to fifteen (15) States.

Eleven (11) ANSPs have actual plans to begin with the implementation while nine (9) ANSPs have not yet drawn concrete plans. Some ANSPs are coordinating the implementation of traffic complexity management tools among FAB Partners.

At the current rate of planned implementation, the objective of completion by the timeframe (FOC:12/2021) will not be fully achieved (~70%). The lack of concrete implementation plans in some States may therefore jeopardize the on-time implementation, although the corrective actions can still be taken to respect the FOC date.



FCM09 Enhanced ATFM Slot swapping

Stakeholders
- Network Manager
- Airspace Users

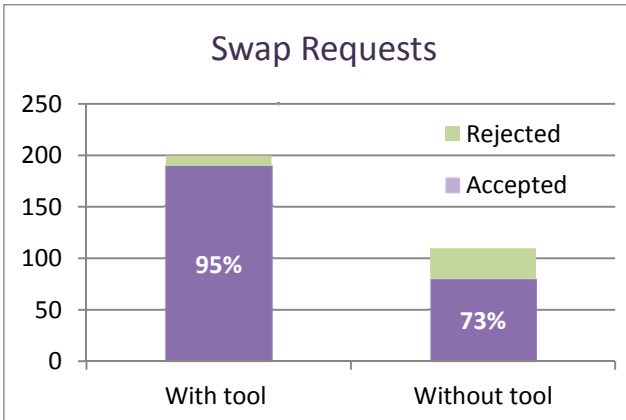
FOC 12/2021

Estimated achievement 12/2021

On time

Applicability Area
All ECAC States

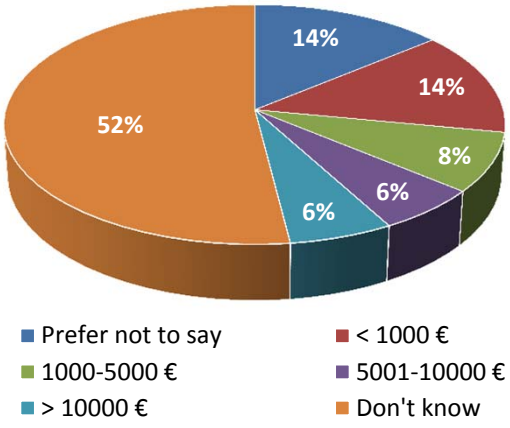
SESAR Key Features	Optimised ATM Network Services
PCP Sub-Functionality	Intermediate step towards UDPP – User Driven Prioritisation Process
ICAO ASBU	B1-ACDM, B1-NOPS
OI Steps	AUO-0101-A
CAPEX	-



Main 2016 developments

This objective mostly involves the NM and the Airspace Users during ATFM constrained situations. The current pre-tactical phase facility offered by the NM provides airlines and airline groups with better visibility to identify slot-swap candidates. In practice slot swapping facilitates the Airspace User to balance the priorities of flights subject to the same ATFM regulation. A higher priority flight may transfer a portion of its ATFM delay to a lower priority flight or a low priority flight may increase its proportion of delay to benefit a neutral priority flight (reducing their delay). In addition to this, slot swapping can be used to reduce the delay of a flight by re-using the slot of a to-be cancelled flight from the same airline or airline grouping. The next steps to be taken by the NM will be to analyse the benefits and risks of: allowing flights to share delay between maximum three (3) other flights using 'multiple-swaps'; and facilitating more long and short haul slot swapping by making it possible to swap pre-allocated with allocated ATFM slots.

The savings achieved by using the Enhanced Slot-Swapping (source: Network Manager)



- 4900 € - the average cost saved per single ATFM slot swap
- 7-8 M€ per year saving currently
- 500 M€ estimated over 20 years

AOM21.1 Direct Routing

Stakeholders
- ANSPs
- Network Manager

FOC 12/2017

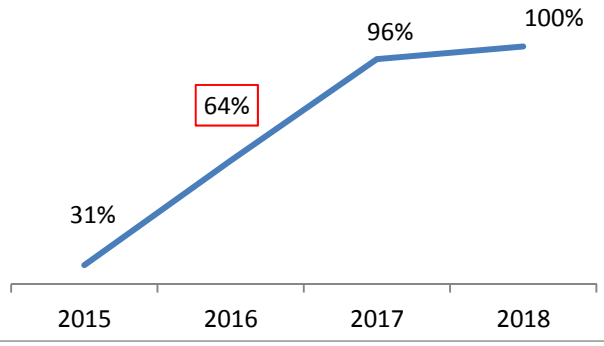
Estimated achievement 12/2017

On time

Applicability Area
25 ECAC States

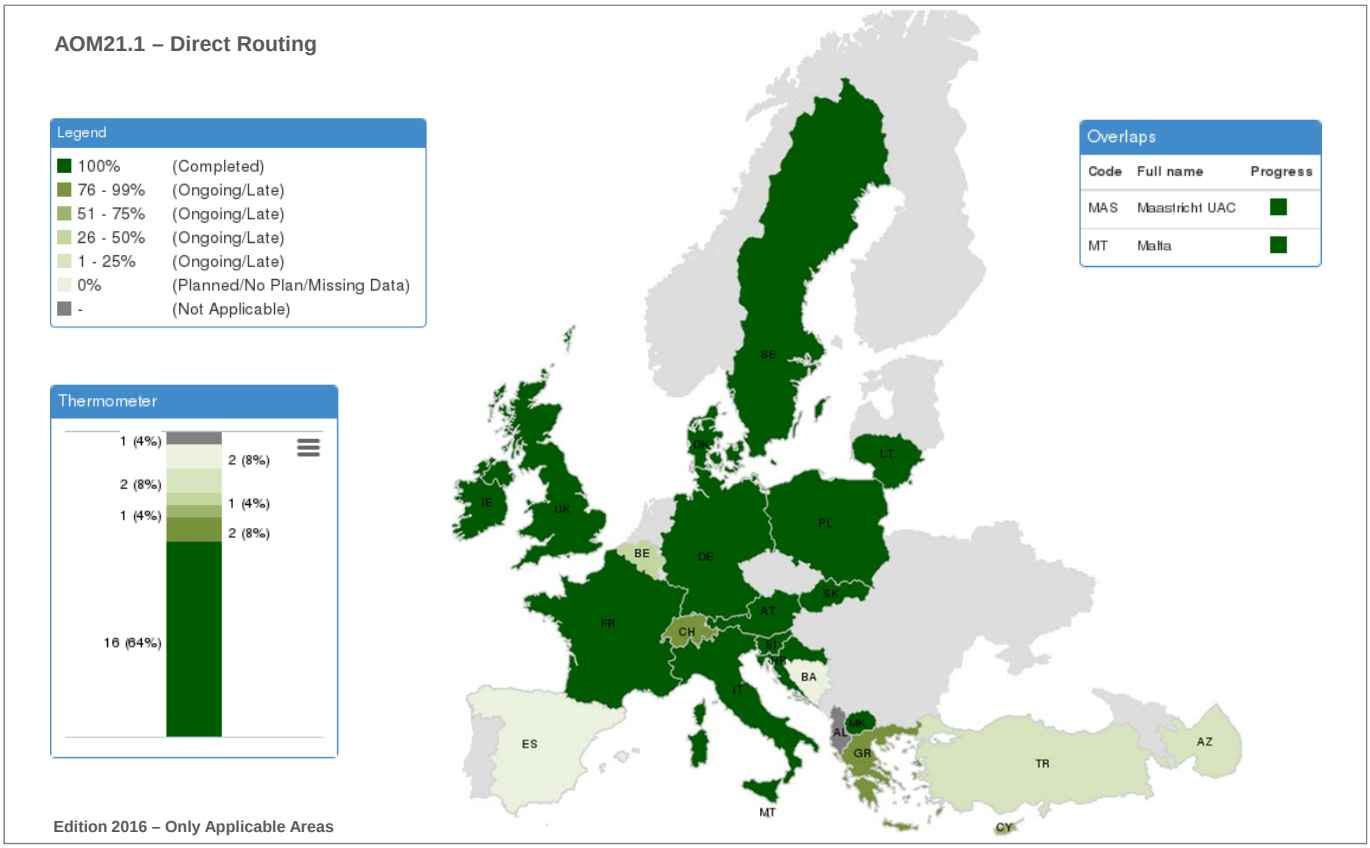
SESAR Key Features	Advanced Air Traffic Services Optimised ATM Network Services
PCP Sub-Functionality	S-AF3.2 Free Route
ICAO ASBU	B0-FRTO, B1-FRTO
OI Steps	AOM-0401, AOM-0402, AOM-0500
CAPEX	BLUE-MED, FABCE, FABEC

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

Four (4) States (CZ, FR, MT, SK) more than in the previous year reported this objective as 'completed' (seventeen (17) in total). None of the States reported delay in implementation of this objective and its estimated achievement falls within FOC. Out of the six (6) States within the applicability area that report this objective as 'on-going' three (3) declare the implementation progress above 50%. Seventeen (17) States still report it as 'not applicable' due to the fact that they have already implemented full FRA or plan to deploy full FRA before 1 January 2018 (fifteen (15) States) and due to no service provision above FL310 (two (2) States) (see details in ATM Master Plan Level 3 Report 2015).



AOM21.2 Free Route Airspace

Stakeholders:
- ANSPs
- Airspace Users
- Network Manager

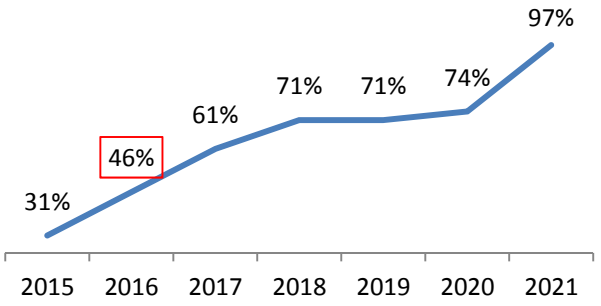
FOC	**12/2021**
Estimated achievement	**12/2021**

On time

Applicability Area
All ECAC States except Azerbaijan, Belgium and Luxembourg

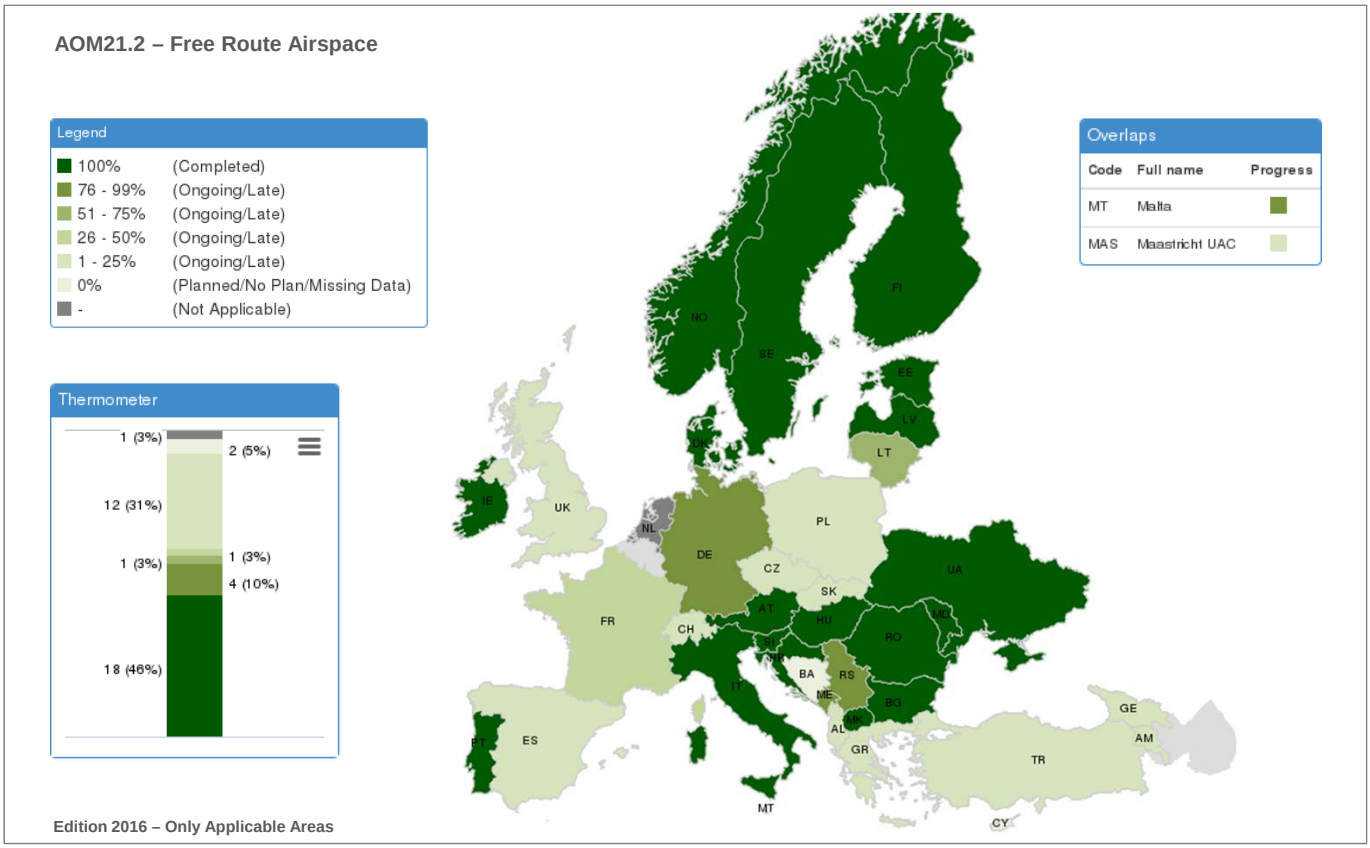
SESAR Key Features	Advanced Air Traffic Services Optimised ATM Network Services
PCP Sub-Functionality	S-AF3.2 Free Route
ICAO ASBU	B1-FRTO
OI Steps	AOM-0401, AOM-0402, AOM-0501, AOM-0505, CM-0102-A
CAPEX	BLUE-MED, FABCE, FABEC, NEFAB, UK-IR

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

This Objective is progressing well and no delay in the overall implementation is expected. The estimated achievement is planned in the year of FOC. Six (6) additional States (AT, FI, SI, HR, MK, IT) reported it as 'completed one (1) State (CZ) changed the status from 'completed' in 2015 to 'on-going' in 2016. Moreover one (1) additional State (NL) changed the status from 'planned' to 'not applicable' due to lack of FRA airspace identified in the Amsterdam FIR below FL245 (four (4) States in total with 'not applicable' status). Out of the nineteen (19) States that planned the implementation of this objective until FOC majority (fourteen (14)) report the implementation progress to be lower than 50%.



ATC02.8 Ground-based Safety Nets

Stakeholders
- ANSPs

FOC 12/2016

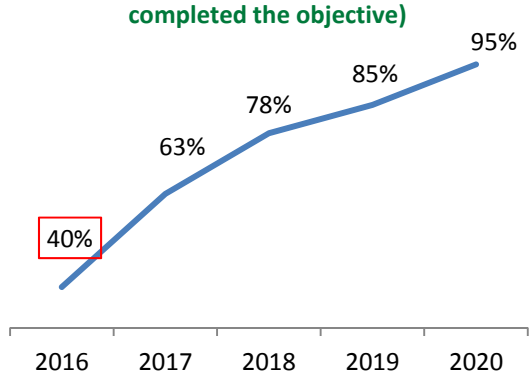
Estimated achievement 12/2019

Late

Applicability Area
All ECAC States

SESAR Key Features	Advanced Air Traffic Services
PCP Sub-Functionality	Only APW: Pre-requisite for S-AF3.2 Free Route (PCP)
ICAO ASBU	B0-SNET, B1-SNET
OI Steps	CM-0801
CAPEX	BALTIC, BLUE-MED, DANUBE, FABCE, NEFAB, SW FAB

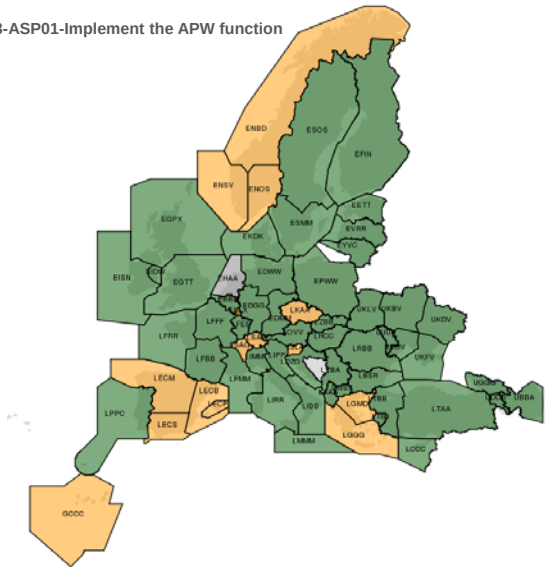
Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

This is the first year for which the monitoring of the implementation of three (3) ground-based safety nets (APW, MSAW, APM) has been combined into a single objective. End of the year 2016 was also the target date for completion.
The progress was insufficient to achieve the timely implementation of overall objective.
While the implementation rate has reached seventeen (17) States having completed the objective (~40%), half of the States (21) are now late. This delay is, in several cases, associated to one of the three (3) safety nets (with the others implemented, and in particular APW which is a pre-requisite for Free-Route in PCP), and reported as due to alignment with a major upgrade, or replacement, of the ATM system. In addition, two (2) States (FR, UK) reported that they have put in place alternative systems. The planned overall completion is expected by 2019.

ATC02.8-ASP01-Implement the APW function



Legend
- Completed 51
- Partly completed 0
- Planned 0
- Late 15
- No Plan 0
- Not Applicable 1
- Missing Data 0
- Undefined 0

Overlaps

Code	Full name	Progress
EDUU	EDUU	
ELLX	ELLX	

Edition 2016 – Only Applicable Areas - Main ANSPs Only

ATC02.8 - Ground-based Safety Nets

Legend
- Completed 17
- Ongoing 1
- Planned 0
- Late 21
- No Plan 2
- Not Applicable 1
- Missing Data 0
- Undefined 0

Overlaps

Code	Full name	Progress
MAS	Maastricht UAC	
MT	Malta	
LU	Luxembourg	

Edition 2016 – Only Applicable Areas

ATC07.1 AMAN tools and procedures

Stakeholders
- ANSPs

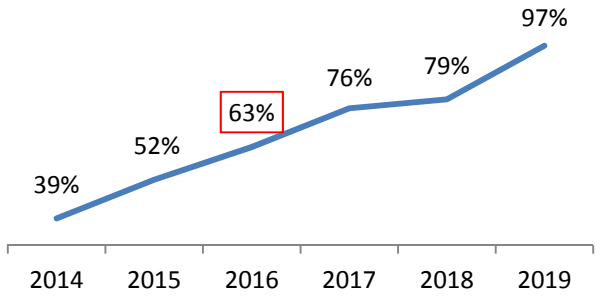
FOC	**12/2019**
Estimated achievement	**12/2019**

On time

Applicability Area
23 PCP airports + 8 non-PCP airports

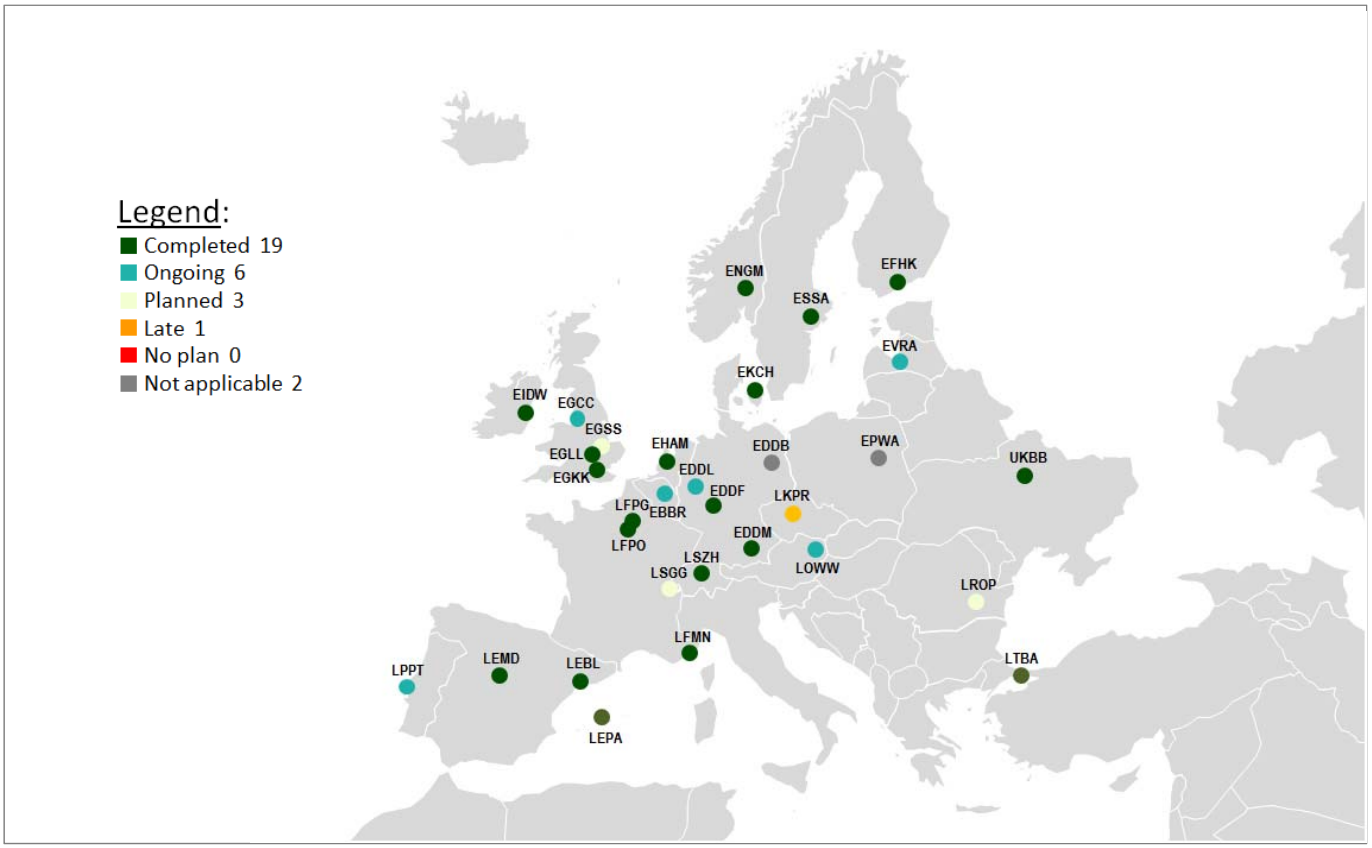
SESAR Key Features	Advanced Air Traffic Services
PCP Sub-Functionality	Basic AMAN Facilitator for: - S-AF1.1 AMAN Extended to En-Route Airspace (PCP) - AMAN/DMAN Integration Including Multiple Airports (OC)
ICAO ASBU	B0-RSEQ
OI Steps	TS-0102
CAPEX	BALTIC, DANUBE, FABCE, FABEC, SW FAB

Completion Rate Evolution (% of Airports completed the objective)



Main 2016 developments

The positive trend in the implementation of basic AMAN is confirmed in 2016, at similar pace than in 2015. The completion rate is set at 63% of the total, against 52% in 2015. Furthermore, the number of airports declaring to be late in implementation has dropped from three (3) in 2015, to only one (1) in 2016 (LKPR Prague).It is worth noting that the objective is now in the plans of 29 airports, against 19 in 2015. Three (3) airports (EGSS Stansted; LSGG Geneva and LROP Bucharest), while reporting the objective as 'Planned'' (i.e. the project was not yet started in 2016), announce a completion date in line with the FOC of the objective (12/2019).



ATC12.1 MONA, TCT and MTCD

Stakeholders
- ANSPs

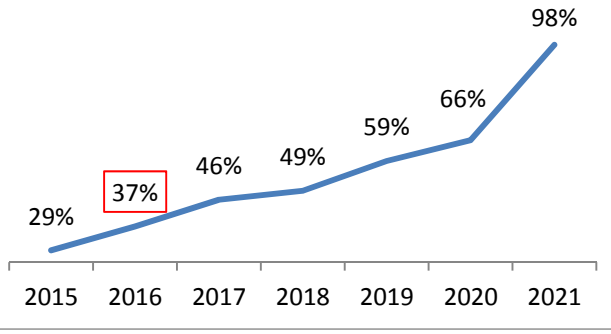
FOC	**12/2021**
Estimated achievement	**12/2021**

On time

Applicability Area
All ECAC States except Luxembourg

SESAR Key Features	Advanced Air Traffic Services
PCP Sub-Functionality	Pre-requisite for S-AF 3.2 Free Route (PCP)
ICAO ASBU	No corresponding ASBU
OI Steps	CM-0202, CM-0203, CM-0205, CM-0207-A
CAPEX	BALTIC, BLUE-MED, FABCE, FABEC, UK-IR

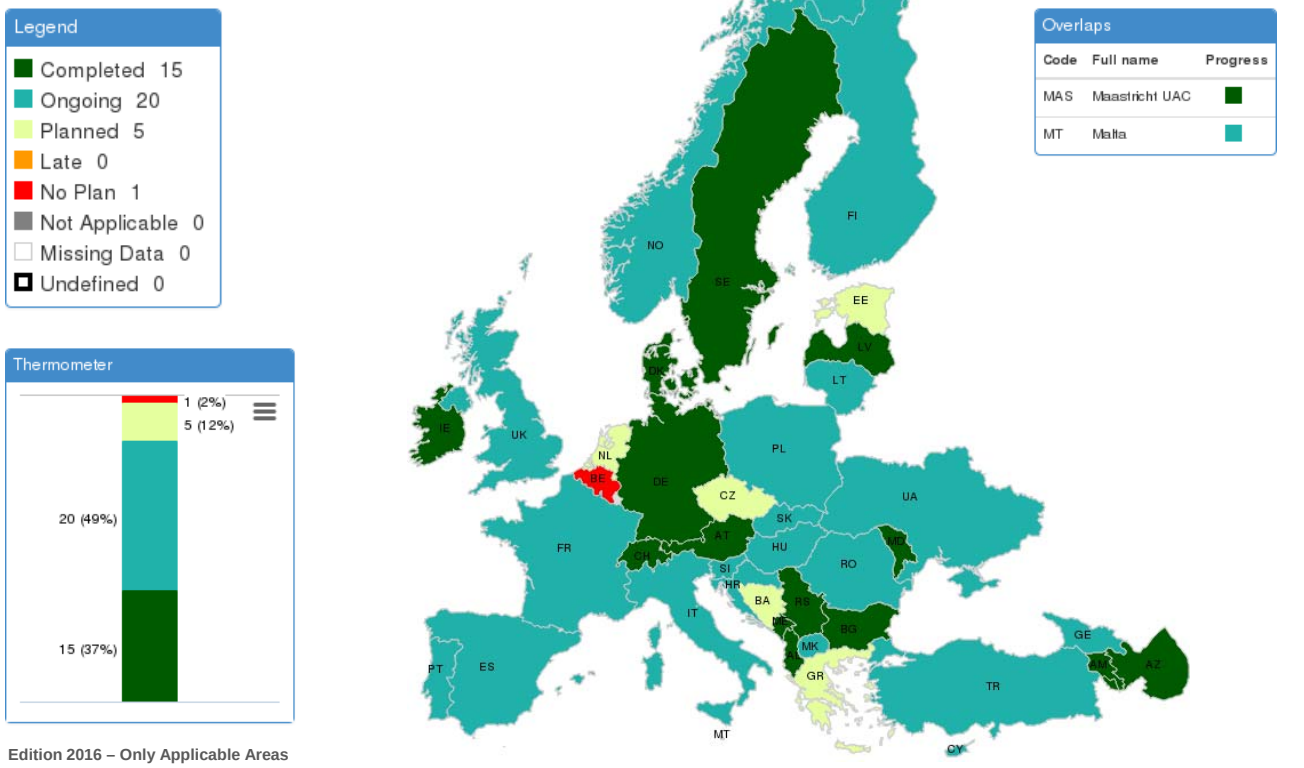
Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

This objective was introduced in 2015 and it is built on former ATC12 (Medium Term Conflict Detection MTCD) and MONA tools) to account for the implementation of Free Route, as for the PCP mandate. It requires the implementation of MTCD with resolution support functions (CORA) and monitoring aids (MONA). The implementation of a Tactical Controller Tool (TCT) function (ASP03) is not required in the PCP mandate for MTCD but is considered an optional feature. The objective shows a positive trend in its implementation rate, which moved from 12 ANSPs (29%).in 2015, to 15 (37%) in 2016. Within its applicability area, only one (1) ANSP is reporting a 'No Plan' (Belgocontrol of Belgium, where the function exists in their ATM system, but is currently inhibited). Its implementation is not showing any risk for delay.

ATC12.1 - Automated support for conflict detection, resolution support information and conformance monitoring



Edition 2016 – Only Applicable Areas

ATC15.1 Information exchange with en-route in support of AMAN

Stakeholders
- ANSPs

FOC 12/2017

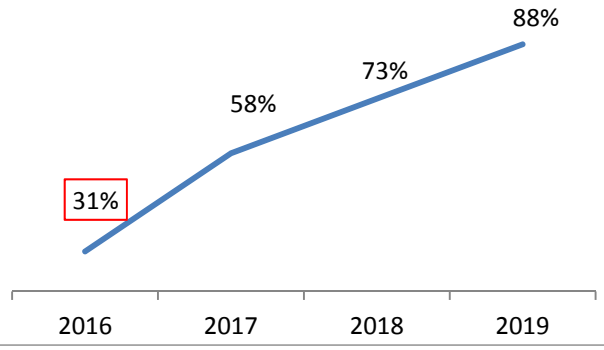
Estimated achievement 12/2019

Planned delay

Applicability Area
EU States except CY, GR, LT, LU, MT, SK and SI.
Plus: BA, MAS, NO, CH, TR

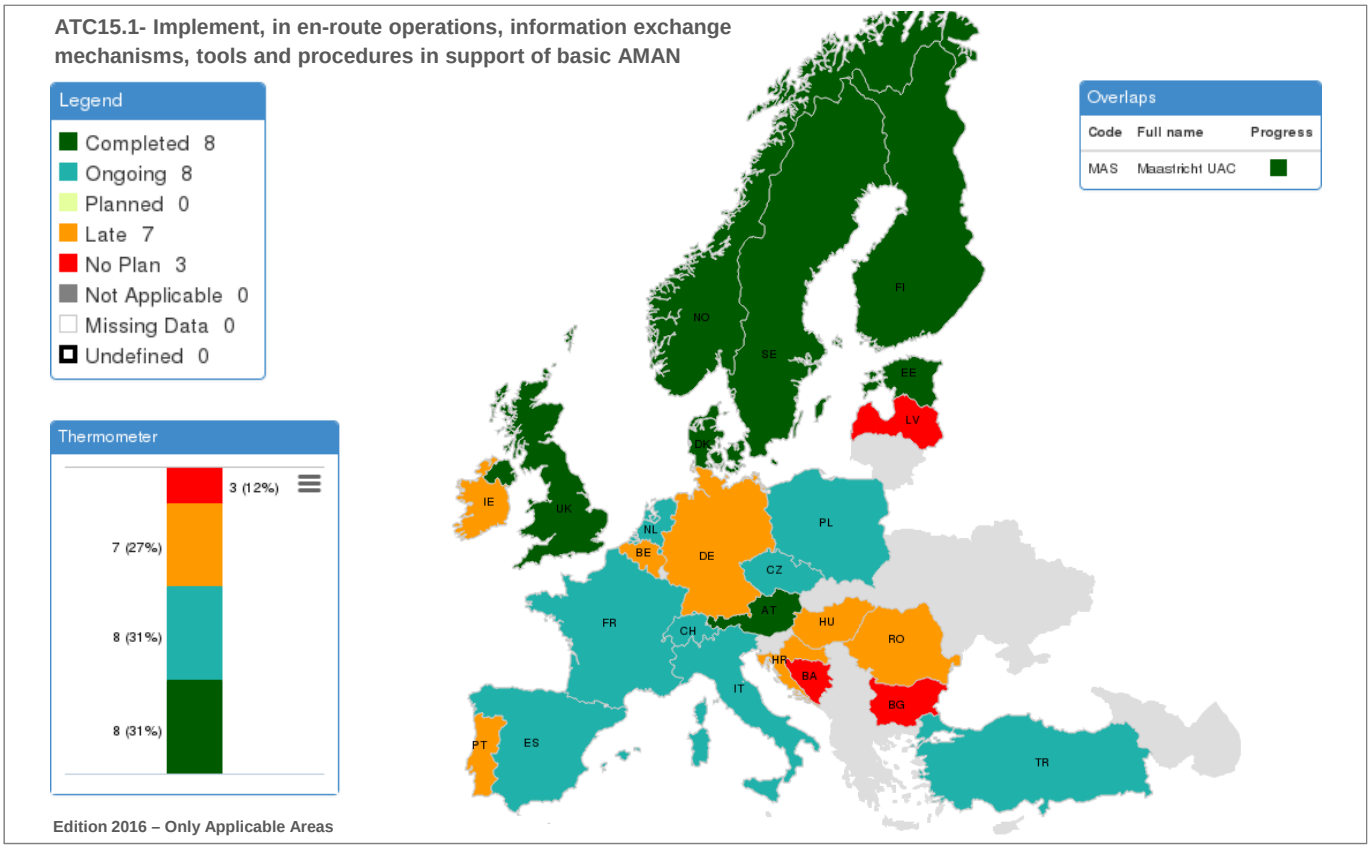
SESAR Key Features	Advanced Air Traffic Services
PCP Sub-Functionality	Predecessor of S-AF1.1 AMAN extended to En-Route Airspace (PCP)
ICAO ASBU	B0-RSEQ
OI Steps	TS-0305
CAPEX	BALTIC, BLUE-MED, DANUBE, FABCE, FABEC, UK-IR

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

The objective requires information exchange between AMAN systems supporting the respective TMAs and the first upstream ATS systems of the surrounding en-route control sectors. There is a very limited improvement in the implementation progress (eight (8) States, against seven (7) in 2015). The biggest implementation step is expected in 2017, where plans show a target completion for 15 States. Delays are so far reported by seven (7) States: Belgium, Croatia, Germany, Hungary for which plans are linked to coordination with Austrocontrol, Ireland (within Ireland; whereas it is implemented with UK since 2014), Portugal and Romania. No specific risks have been identified. Three (3) States report no plans for implementation: Bosnia Herzegovina will assess it in 2017; Bulgaria for which planning dates are further to be discussed and aligned with the deployment of the AMAN in Istanbul airport; and Latvia.



ATC15.2 Arrival Management extended to en-route airspace

First year of monitoring. The reliable estimated achievement date can not be defined at this time.

Stakeholders
- ANSPs
- Network Manager

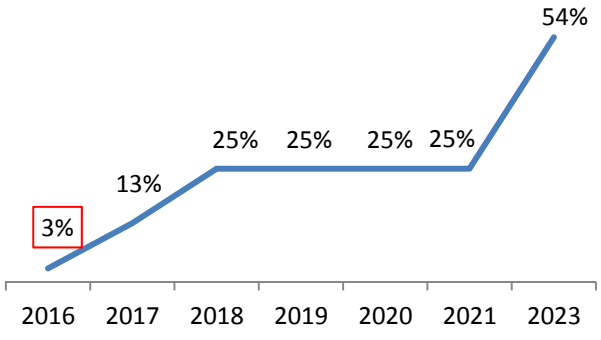
FOC 12/2023

Estimated achievement not available

Applicability Area
ACCs within the extended AMAN horizon, including those adjacent to TMAs serving/associated to PCP airports

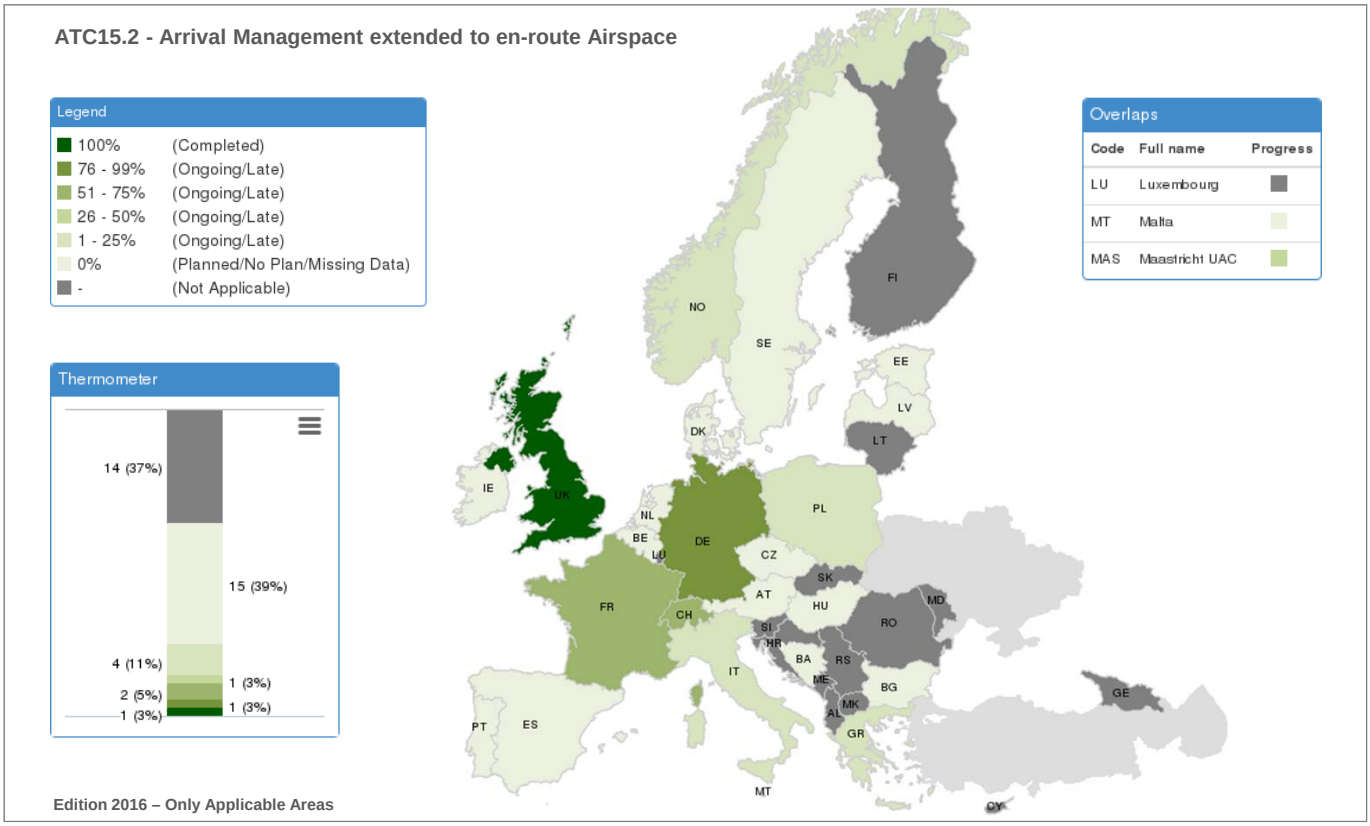
SESAR Key Features	Advanced Air Traffic Services
PCP Sub-Functionality	S-AF1.1 Arrival Management Extended to En-route Airspace
ICAO ASBU	B1-RSEQ
OI Steps	TS-0305-A
CAPEX	BALTIC, BLUE-MED, DANUBE, FABCE, FABEC, UK-IR

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

This is a new objective for 2016, building upon ATC15.1 with the extension of the AMAN to 180-200 nautical miles. For many ANSPs its implementation will require coordination with neighboring countries. Within the 24 States that are implementing this objective, 11 report it as 'No Plan' and four (4) as 'Planned'. UK has completed the project following the 12 month trial period. It is worth noting that the 'No Plans' are expected to evolve towards 'Ongoing' in the incoming reporting cycles. Among the 12 States having already firm plans to implement it, none has, at this early stage, identified concrete risks for a delay.



ATC17 Electronic Dialogue supporting COTR

Stakeholders
- ANSPs

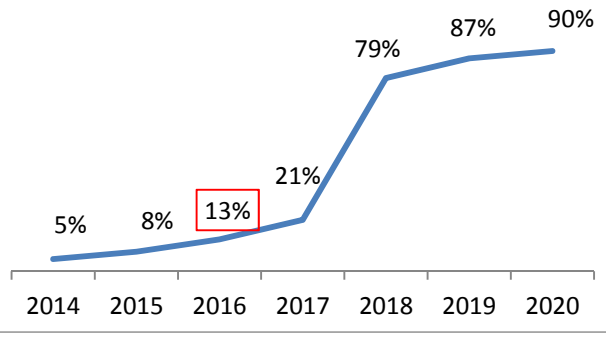
FOC	**12/2018**
Estimated achievement	**12/2019**

Planned delay

Applicability Area
All ECAC States, except SK and IE

SESAR Key Features	Advanced Air Traffic Services
PCP Sub-Functionality	Enabler for S-AF3.2 Free Route
ICAO ASBU	B0-FICE
OI Steps	CM-0201
CAPEX	BALTIC, BLUE-MED, DANUBE, DK-SE, FABCE, FABEC, NEFAB, UK-IR

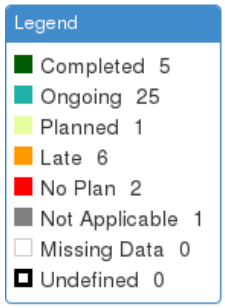
Completion Rate Evolution (% of States completed the objective)

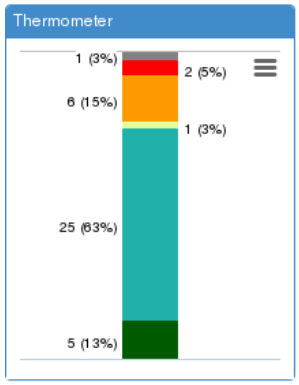


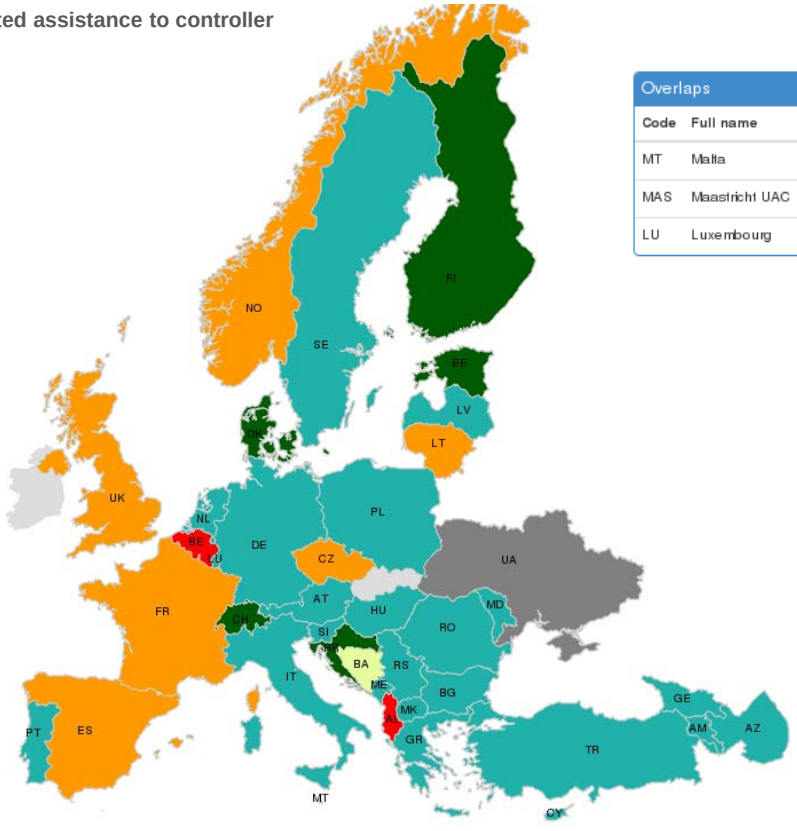
Main 2016 developments

This objective complements the services implemented with ITY-COTR, regulated provision based on the IR. Most of the States expect the implementation between 2017 and 2018. By the FOC date completion rate should reach 79%, therefore very close to the target of 80% at which the objective would be labelled as 'Achieved'. Still, risks remain that some countries might experience delays with respect to their current plans. Two (2) States (DK and EE) have completed the objective in 2016. Also, the number of 'No Plans' went down from three (3) last year, to two (2) in 2016 (AL and BE). Most OLDI messages are already available in many ATM systems across the applicability area but their operational introduction is pending on an the signing of an agreement between neighbouring ACCs. Six (6) ANSPs declare themselves as 'Late': three (3) plan to finalise implementation in 2019, (CZ, FR, LT) , one (1) in 2020 (NO) and two (2) in 2021 (ES and UK).

ATC17-Electronic Dialogue as automated assistance to controller during coordination and transfer







Edition 2016 – Only Applicable Areas

ENV01 CDO techniques

Stakeholders
- ANSPs
- Airspace Users
- Airport Operators

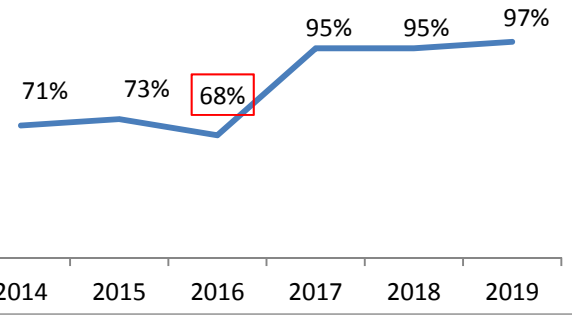
FOC	**12/2013**
Estimated achievement	**12/2017**

Late

Applicability Area
59 airports

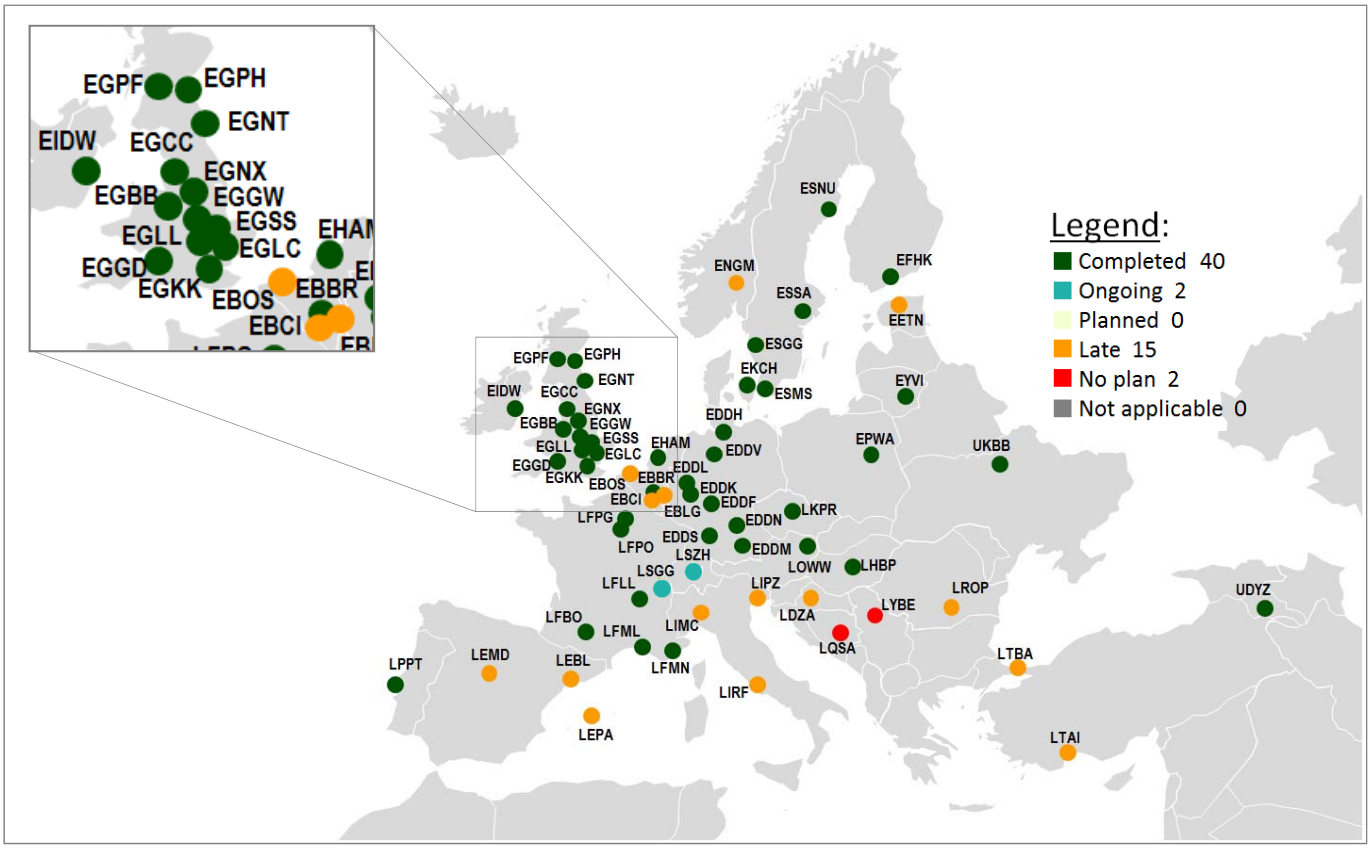
SESAR Key Features	Advance Air Traffic Services
EOC/OC	-
ICAO ASBU	B0-CDO
OI Steps	AOM-0701
CAPEX	FABEC, UK-IR

Completion Rate Evolution (% of Airports completed the objective)



Main 2016 developments

The objective completion was delayed for one more year comparing to last year estimate (12/2017). Also, the overall number of airports that have completed this functionality has reduced. This is because Spanish airports downgraded their implementation status as a result of new activities in this area initiated by the CEM working arrangement recommendation. Around 25% of airports in applicability area report delays in implementation. It seems that action that relates to monitoring of performance is the most challenging for implementation. It was also reported that some airports are performing CDO at the pilot requests, some only at night time. It should also be mentioned that some airports reported an ongoing status instead of late. This is the case for Swiss airports Geneva and Zurich. Some airports (namely Sarajevo and Belgrade) have downgraded their status from "late" in 2015 to "no plan" in 2016.



NAV03 RNAV 1

Stakeholders
- ANSPs
- Airspace Users

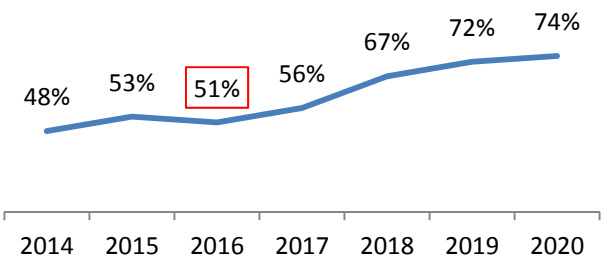
FOC	**12/2023**
Estimated achievement	**12/2023**

On time

Applicability Area
All ECAC States, except LU, MAS and SK

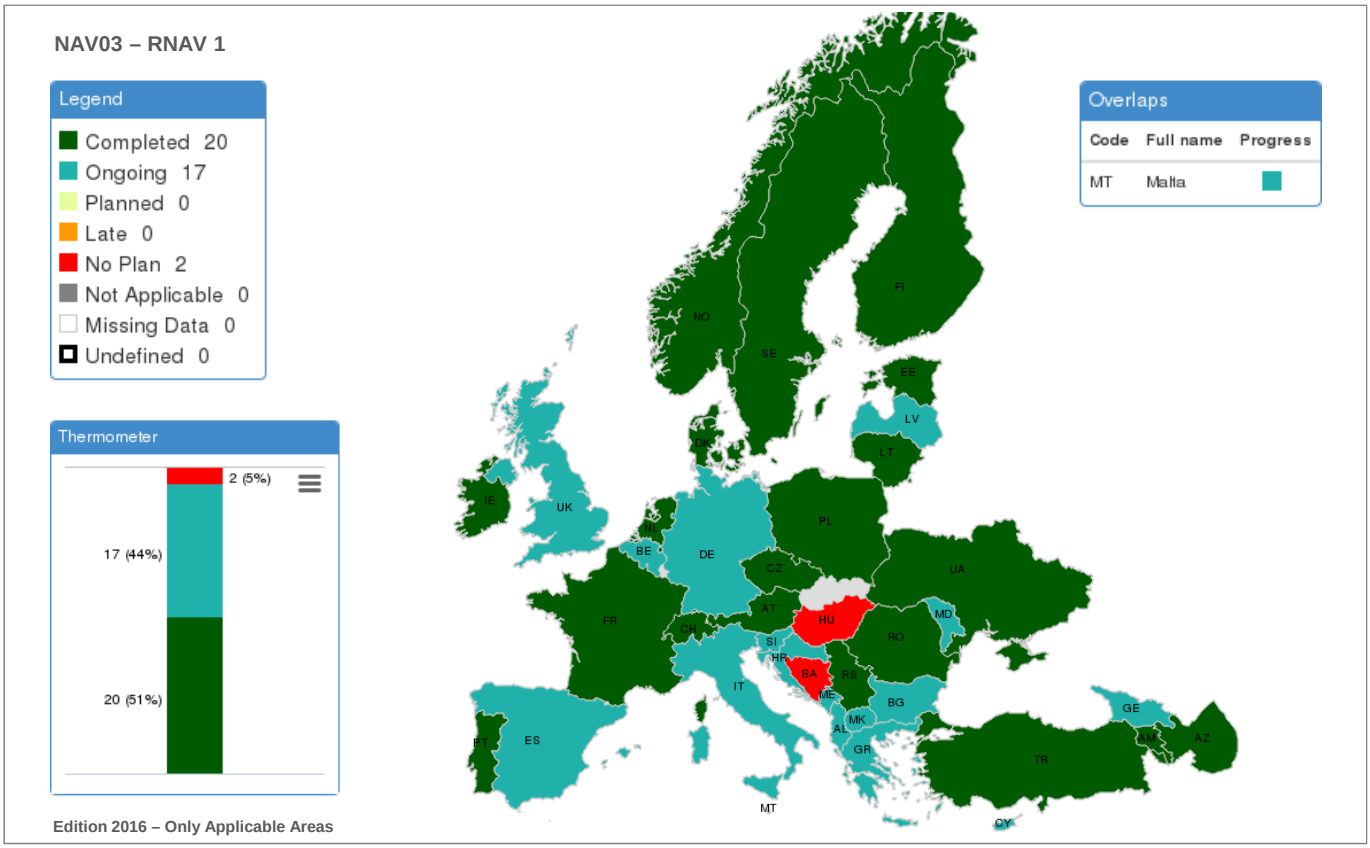
SESAR Key Features	Advanced Air Traffic Services
PCP Sub-Functionality	Introduction of P-RNAV S-AF1.2 Enhanced TMA Using RNP-Based Operations
ICAO ASBU	B0-FRTO, B0-CDO, B1-APTA, B1-FRTO
OI Steps	AOM-0601, AOM-0602, AOM-0603, AOM-0605
CAPEX	BALTIC, BLUE-MED, DANUBE, FABEC, NEFAB, SW FAB, UK-IR

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

None of the States has reported the completion of this implementation objective in 2016. Germany has downgraded its status from 'completed' to 'ongoing', which leads to slightly worse completion rate comparing to 2015 (51%). This is, most probably, the result of uncertainty related to PBN IR finalisation. On the brighter side, quite few States are very close to completion (UK at 86%, DE at 78%, IT at 70%, BE at 88%, BG at 82%). Taking into account quite long FOC date, no delays are expected at this time. Hungary and Bosnia and Herzegovina are the only two States that reported 'no plan' status. In case of Hungary, the reason is MIL implementation status, while civil side is very advanced (almost at 80%). Bosnia and Herzegovina reported that no stable plans are defined yet. Slovak Republic is outside of applicability area of this objective but reports quite well advanced implementation of RNAV1 (almost at 50%).



NAV10 APV procedures

Stakeholders
- ANSPs
- Airspace Users
- Regulators

FOC 12/2016

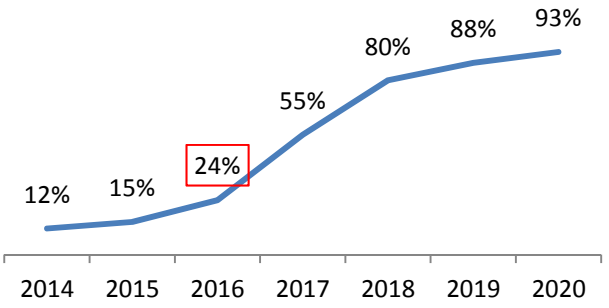
Estimated achievement: 12/2018

Late

Applicability Area
All ECAC States except MAS

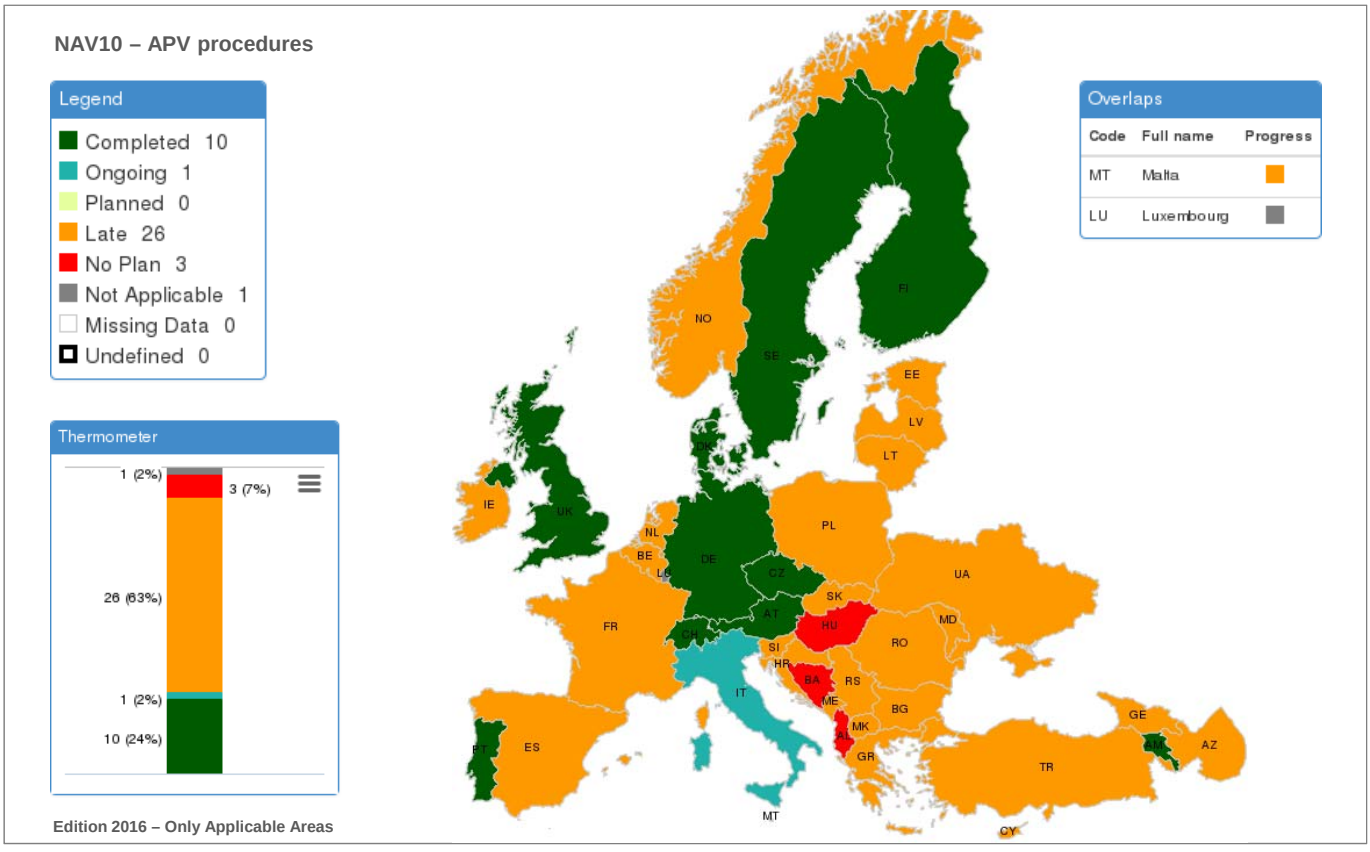
SESAR Key Features	Advanced Air Traffic Services
PCP Sub-Functionality	Pre-requisite for S-AF1.2 Enhanced TMA Using RNP-Based Operations
ICAO ASBU	B0-APTA
OI Steps	AOM-0602, AOM-0604
CAPEX	BLUE-MED, NEFAB, FABEC, SW FAB, UK-IR

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

Additional four (4) States have completed this implementation objective in 2016 (CH, DK, FI and UK). Quite few States are very close to completion (FR at 99%, SK at 90%, IT at 84%, BE at 93%). Despite this steady implementation progress recorded in 2016, objective is assessed as 'late' at ECAC level, as the official FOC date was reached at the end of 2016. It should be mentioned that some reluctance in implementation probably exist because PBN IR is still not published. Most of Stakeholders that reported delays are setting up national deployment plans in accordance with ICAO 3711 resolution. Three (3) States have reported 'no plan' status, BA because no reliable plan has been set up, AL is reviewing the functionality, and HU has completed ASP actions and has no plan for the REG ones. According to the EUROCONTROL PRISME CNS business intelligence, over 50% of the flights had APV capabilities (53% RNP BARO and 2,2% LPV SBAS).



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

Stakeholders
- ANSPs
- Airport Operator
- Airspace Users
- Regulators

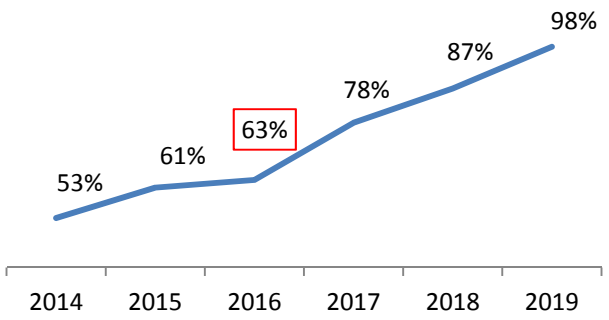
FOC	**12/2011**
Estimated achievement	**12/2018**

Late

Applicability Area
25 PCP + 22 non-PCP airports

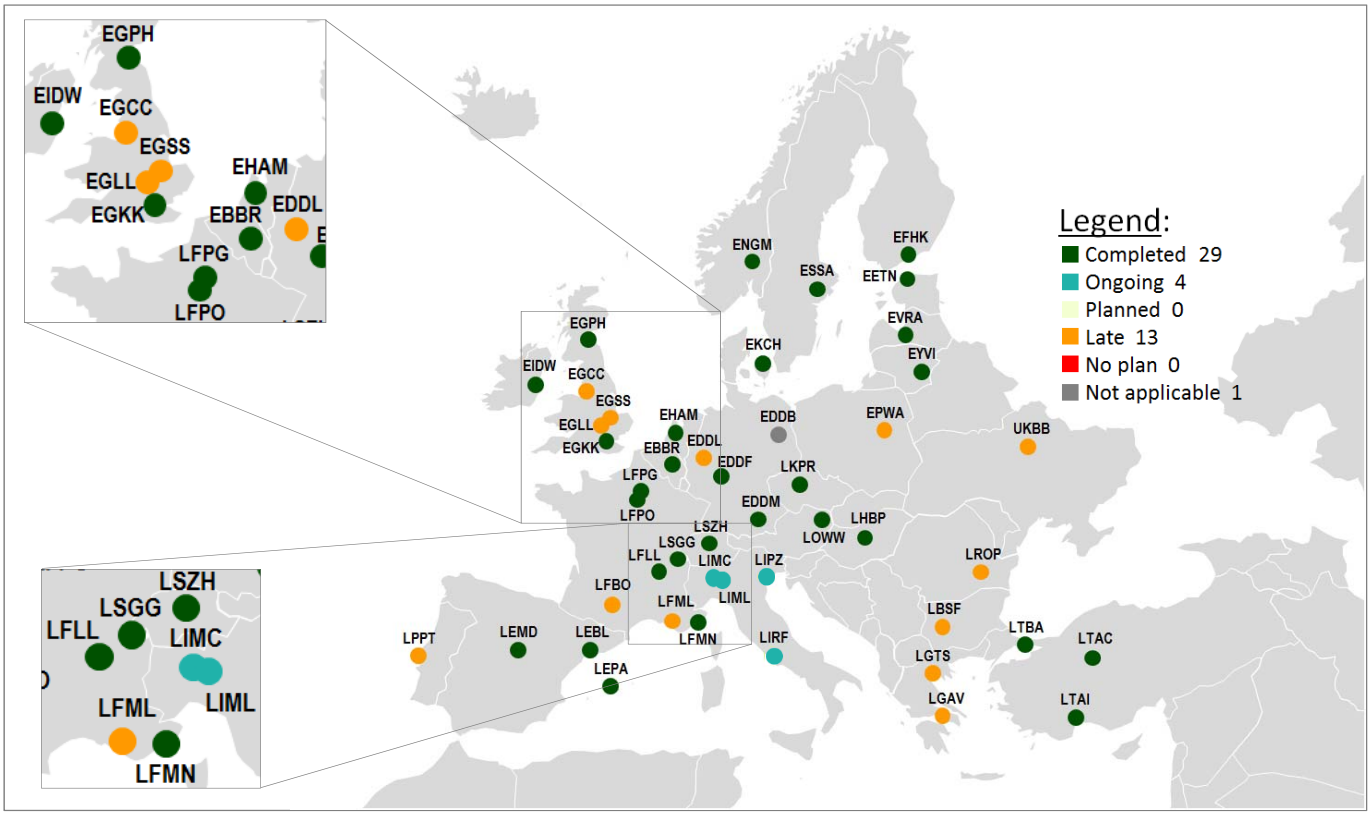
SESAR Key Features	High Performing Airports
PCP Sub-Functionality	Pre-requisite for: - S-AF2.2 DMAN Int. Surface Management Constraints (PCP) - S-AF2.4 Automated Assistance to Controller for Surf. Movement Planning and Routing (PCP) - S-AF2.5 Airport Safety Nets (PCP) Integrated Surface Management (EOC)
ICAO ASBU	B0-SURF
OI Steps	AO-0201
CAPEX	BALTIC, BLUE-MED, DANUBE, FABCE, FABEC, NEFAB

Completion Rate Evolution (% of Airports completed the objective)



Main 2016 developments

A-SMGCS Level 1 is a pre-requisite for PCP AF2 and a first step in order to complete subsequent functions prescribed in implementation objectives AOP04.2, AOP12 and AOP13. According to data reported in 2016, objective is implemented at 29 airports in the ECAC area. Out of 25 PCP airports, six (6) of them have not yet implemented Level 1 A-SMGCS although it is a pre-SESAR functionality. Airports Rome Fiumicino and Manchester are the latest one of the group that plan to complete Level 1 functionality at the end of 2019. Airports Barcelona and Palma de Majorca have completed the implementation in 2016. London Stansted has downgraded its implementation status from “completed” to “late”, due to planned purchase of new vehicle transmitters. Italian airports Rome and Milan Malpensa report ‘ongoing’ status although beyond FOC date. The most challenging aspect of implementation remains the equipage of ground vehicles.



AOP04.2 A-SMGCS RMCA (former Level 2)

Stakeholders
- ANSPs
- Airport Operator

FOC 12/2017

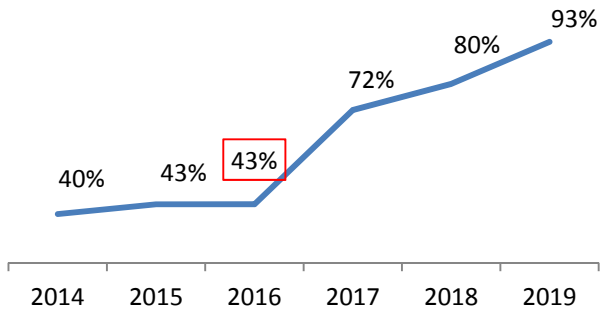
Estimated achievement 12/2019

Planned delay

Applicability Area
25 PCP + 22 non-PCP airports

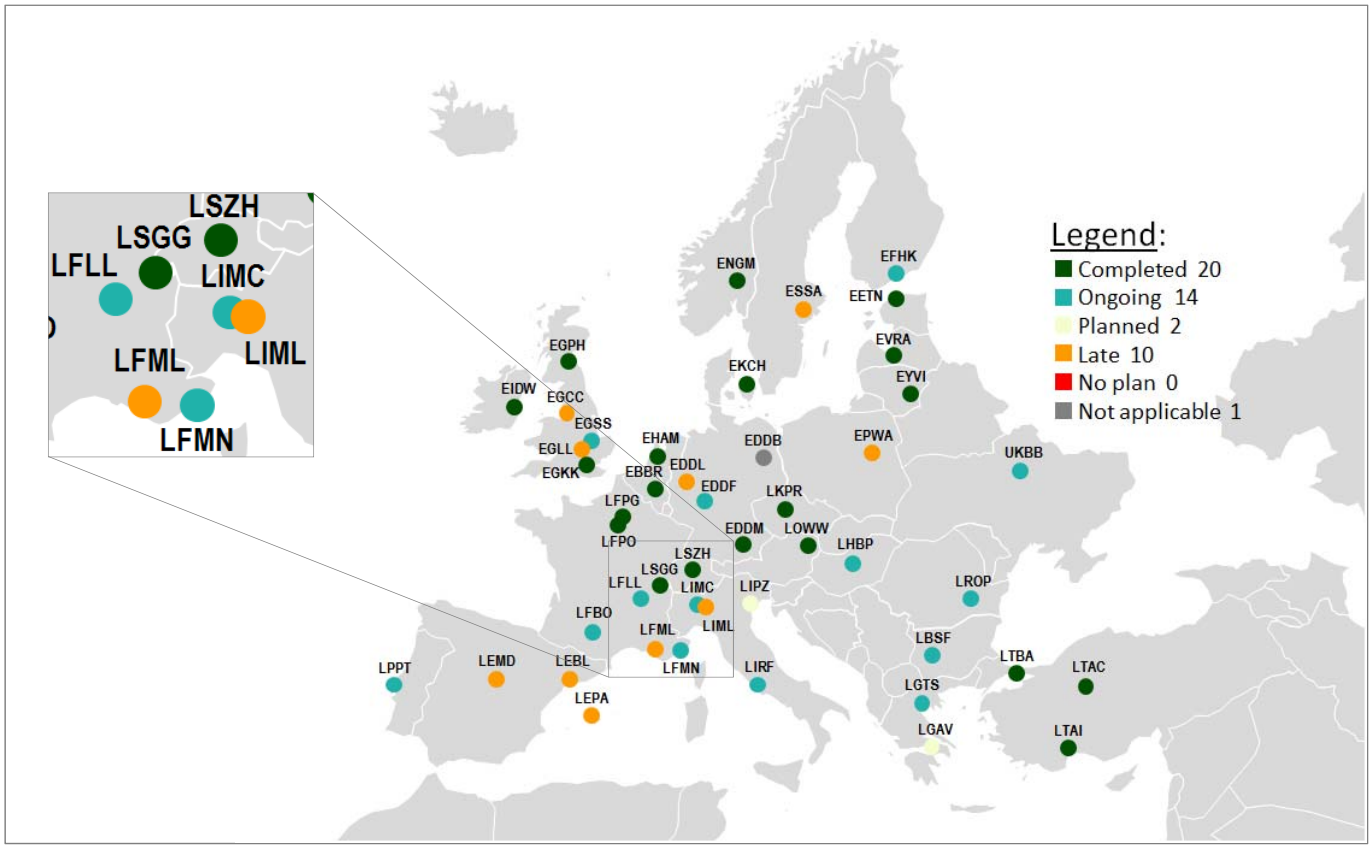
SESAR Key Features	High Performing Airports
PCP Sub-Functionality	Pre-requisite for: - S-AF2.2 DMAN Int. Surface Mgt Constraints (PCP) - S-AF2.4 Automated Assistance to Controller for Surf. Movement (PCP) Planning and Routing (PCP) - S-AF2.5 Airport Safety Nets Integrated Surface Management (EOC)
ICAO ASBU	B0-SURF
OI Steps	AO-0102, AO-0201
CAPEX	BALTIC, BLUE-MED ,DANUBE FABCE, FABEC, NEFAB

Completion Rate Evolution (% of Airports completed the objective)



Main 2016 developments

A-SMGCS RMCA implementation builds on the implementation of AOP04.1 and it is an important pre-requisite towards the implementation of PCP AF2. Due to delays reported in AOP04.1 implementation, delayed implementation of RMCA functionality is inevitable. This is reflected in number of airports that reported delays in implementation in 2016. 21% of airports in the applicability area report late implementation. In addition, not single airport has completed this functionality in 2017. Out of 25 PCP airports, 12 of them have reported the A-SMGCS RMCA as operational. Remaining 13 PCP airports mostly report completion beyond FOC deadline, with Italian airports that report latest implementation dates (Rome Fiumicino 12/2020). Heathrow Airport reports that the A-SMGCS RMCA is operational although the overall objective is reported 'late'. This is because not all ground vehicles are fitted with transmitters yet (AOP04.1).



AOP05 Airport CDM

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

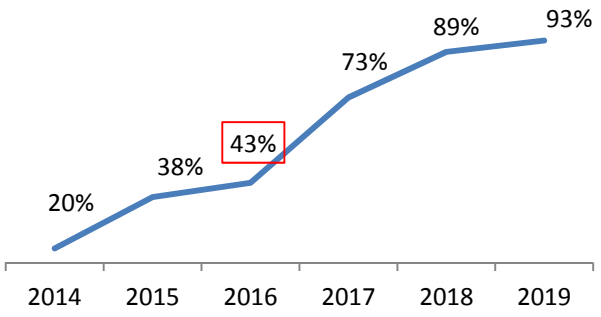
FOC	**12/2016**
Estimated achievement	**12/2018**

Late

Applicability Area
25 PCP + 21 non-PCP

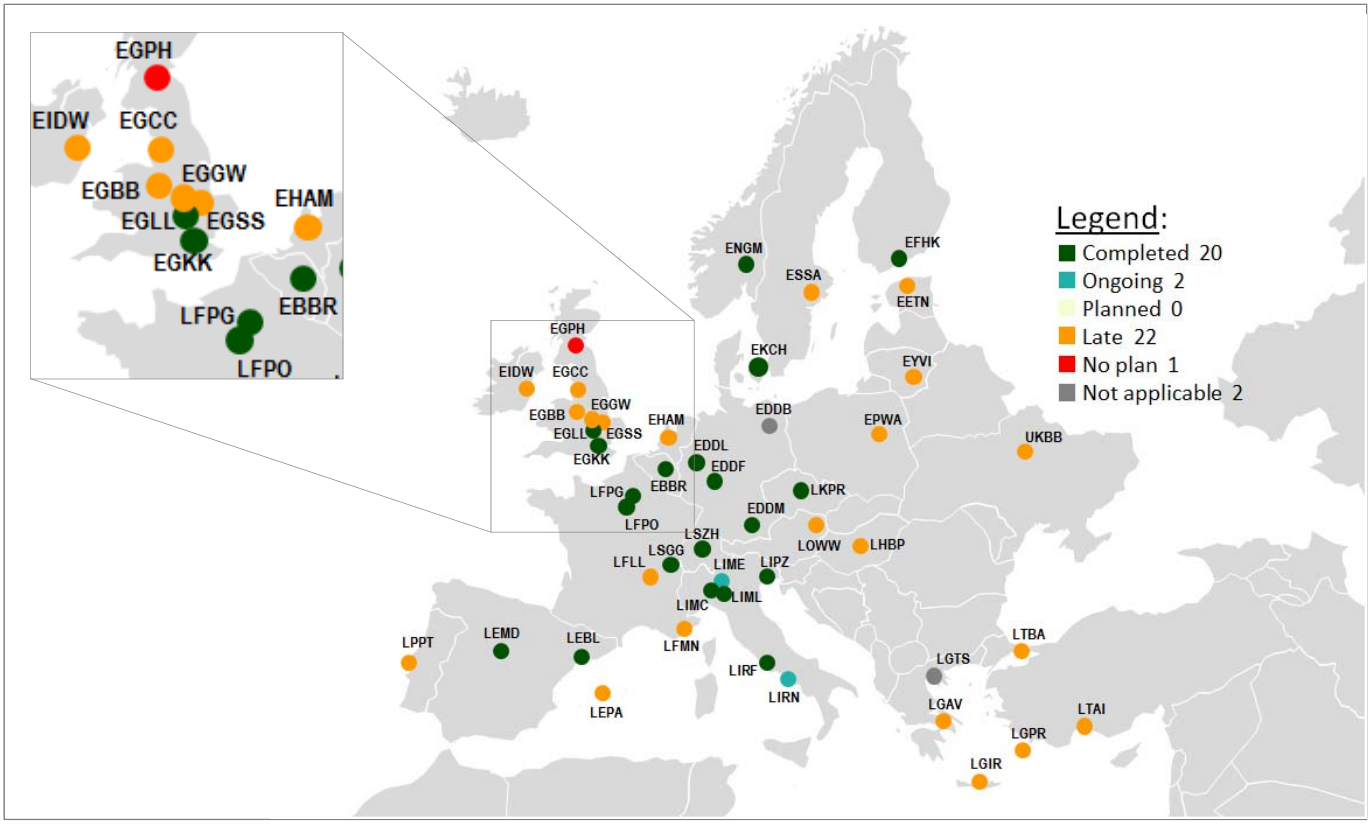
SESAR Key Features	High Performing Airports
PCP Sub-Functionality	Pre-requisite for: - S-AF2.1. DMAN synchronised with pre-departure sequencing (PCP) - Collaborative Airport (EOC)
ICAO ASBU	B0-ACDM
OI Steps	AO-0501, AO-0601, AO-0602, AO-0603, TS-0201
CAPEX	BLUE-MED, FABCE, FABEC, NEFAB, SW FAB, UK-IR

Completion Rate Evolution (% of Airports completed the objective)



Main 2016 developments

Three (3) additional Airports (Geneva/LSGG, Paris-Orly/LFPO, Copenhagen/EKCH) have completed the implementation in 2016, leading to a total of 20 A-CDM airports in Europe. Regarding the PCP airports, out of 25 airports mentioned in PCP IR, 14 have now implemented A-CDM and are connected to the Network Manager Operational Centre (NMOC).
The implementation is declared as ongoing at four (4) airports: two (2) in Italy (LIME and LIRN – these should actually be considered as late considering the applicable progress criteria) and two (2) outside the applicability area (Riga/EVRA and Zagreb/LDZA), and 22 other airports are now late. Among these, 13 airports are in the process of becoming operationally connected to NMOC (DPI exchanges) during 2017. Nine (9) airports (Nice/LFMN, Vienna/LOWW, Athens/LGAV, Tallin/EETN, Vilnius/EYVI, Birmingham/EGBB, Manchester/EGCC, London Luton/EGGW, and London Stansted/EGSS) are planning for full completion between 12/2018 and 12/2020.



AOP10 Time Based Separation

The reliable estimated achievement date can not be defined at this time.

Stakeholders
- ANSPs
- Airspace Users
- Regulators

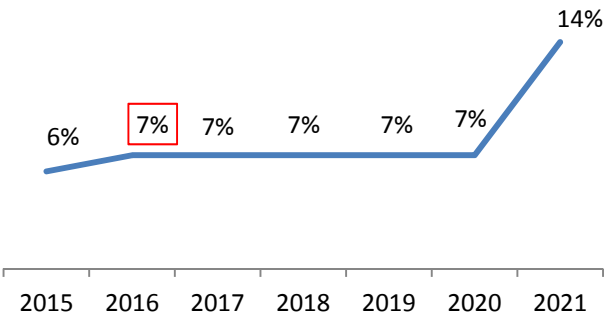
FOC 12/2023

Estimated achievement: Not available

Applicability Area
16 PCP airports

SESAR Key Features	High Performing Airports
PCP Sub-Functionality	S-AF2.3 Time-Based Separation for Final Approach
ICAO ASBU	B1-RSEQ, B1-WAKE
OI Steps	AO-0303
CAPEX	UK-IR

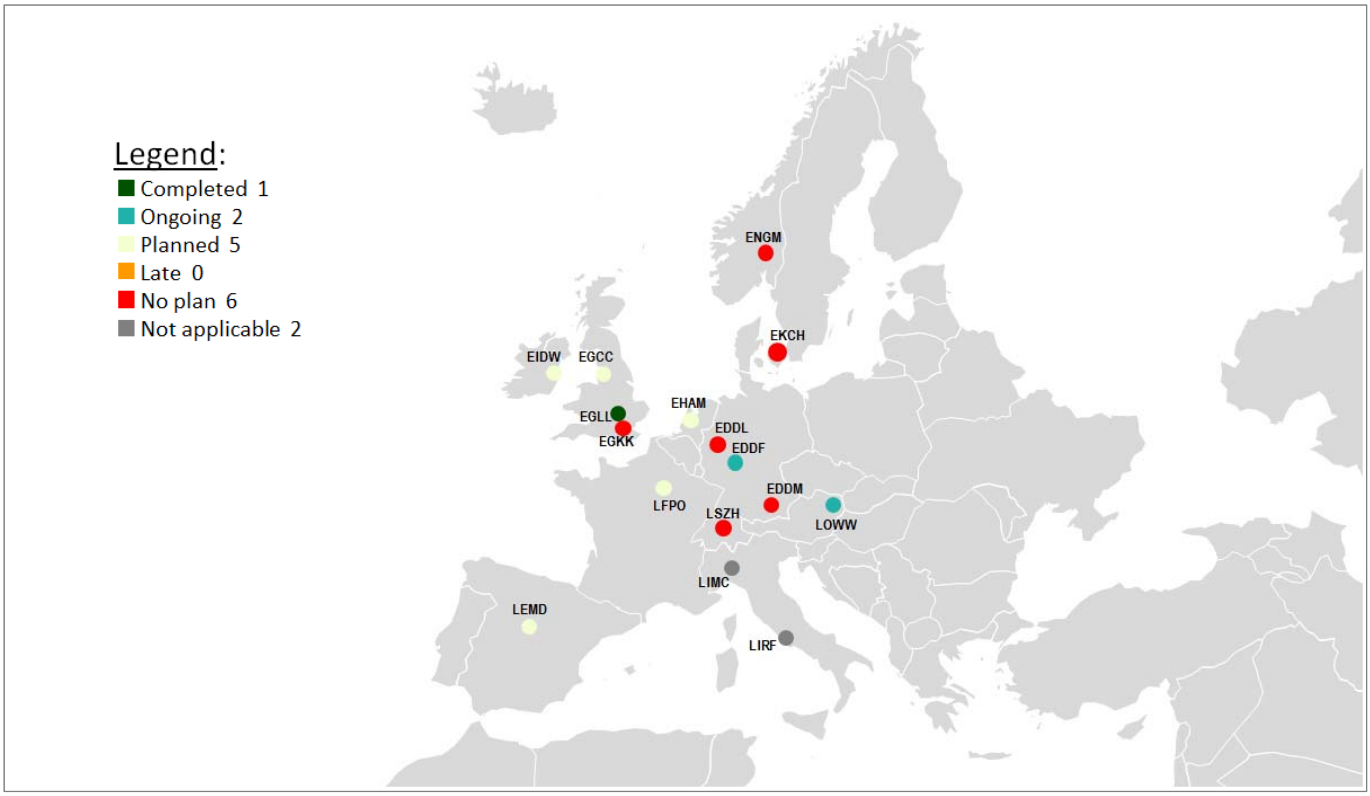
Completion Rate Evolution (% of Airports completed the objective)



Main 2016 developments

The objective is already implemented at London Heathrow Airport (EGLL). Vienna Schwechat (LOWW - initial implementation study has actually started in Vienna), Paris-Orly (LFPO), Dublin (EIDW), Madrid Barajas (LEMD) and Manchester Airport (EGCC) have planned the implementation of this objective. By the FOC date (12/2023), only eight (8) out of 16 airports identified in the PCP IR will have completed the objective. Six (6) airports do not have established concrete implementation plans yet and two (2) (LIRF, LIMC) declared as not applicable.

Some ANPSs are wondering about the benefits of implementing TBS due to lack of sufficient benefits linked to wind conditions. However, since TBS operations necessitate an integrated ATC support function, the TBS tool may also facilitate the optimisation of separation management on final approach segment and may therefore provide operational benefits independently of wind conditions. Overall, the objective is still at early implementation stages.



AOP11 Initial Airport Operations Plan

The reliable estimated achievement date can not be defined at this time.

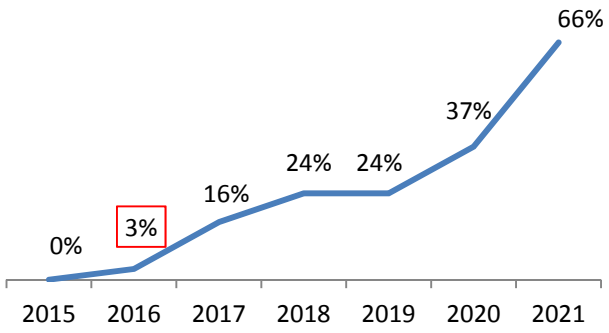
Stakeholders
- ANSPs
- Airspace Users
- Airport Operators

FOC	**12/2021**
Estimated achievement	**Not available**

Applicability Area
25 PCP Airports
15 non-PCP airports

SESAR Key Features	High Performing Airports Optimised ATM Network Services
PCP Sub-Functionality	S-AF2.1 DMAN synchronised with pre-departure sequencing S-AF4.2 Collaborative NOP
ICAO ASBU	B1-ACDM, B1-NOPS
OI Steps	AO-0801-A
CAPEX	-

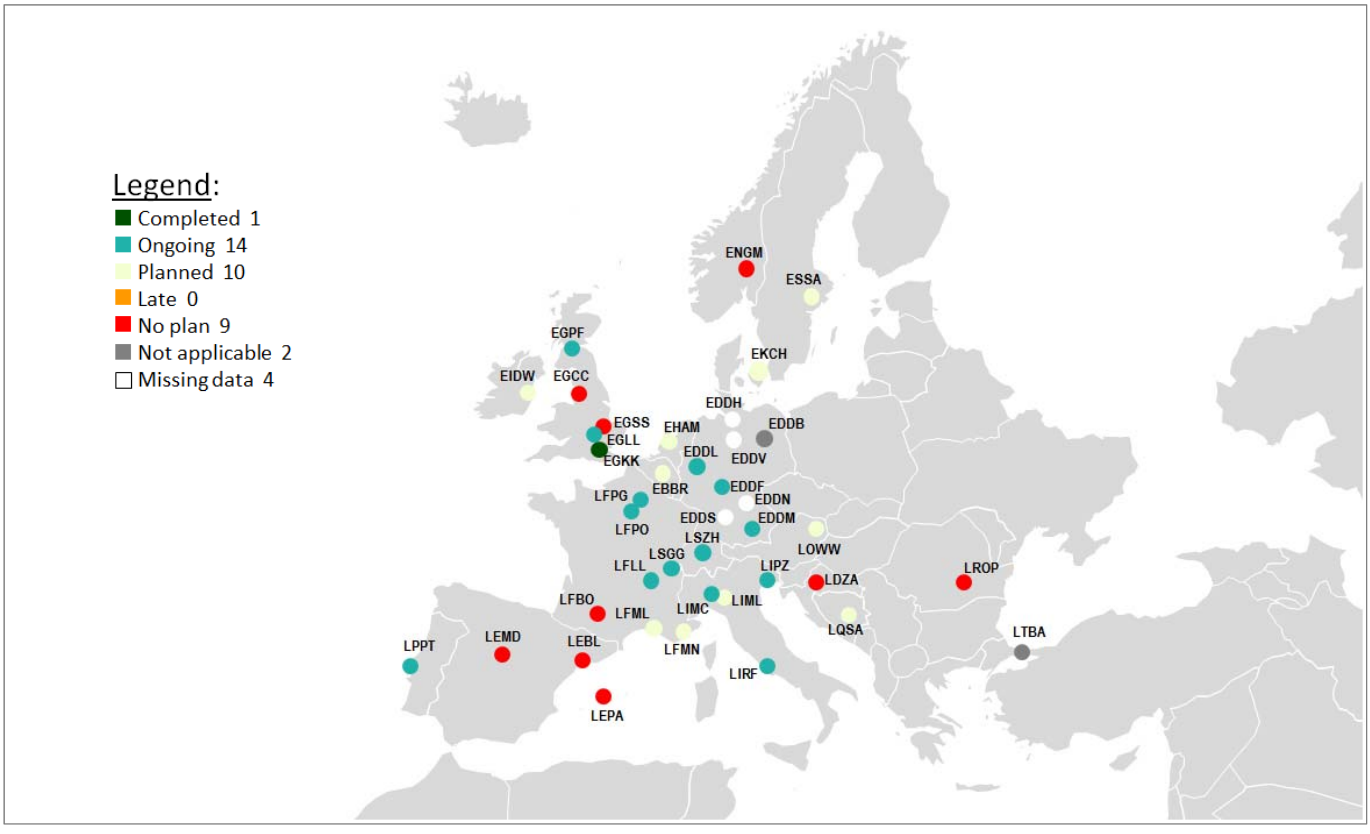
Completion Rate Evolution (% of Airports completed the objective)



Main 2016 developments

A first airport (EGKK) has declared to have completed the implementation of this objective. The implementation is ongoing at 14 airports. These are airports in Germany (EDDF, EDDL, EDDM), Italy (LIMC, LIPZ, LIRF), France (LFPG, LFPO, LFLL), Portugal (LPPT), Switzerland (LSGG, LSZH) and United Kingdom (EGLL, EGPF). Ten (10) airports have declared that the objective is in the planning phase of the implementation. Nine (9) airports have not yet defined the implementation plans, while four (4) show missing data. On this basis, only 25 out of 40 airports (25 PCP and 15 non-PCP) will have completed the objective by the FOC date (12/2021).

It should be clarified that an AOP is the basis of a collaborative management of Airport Operations Performance, and is different from an Airport Strategic Development Plan, so implementation actions must be consistently established.



AOP12 Improve RWY safety with CATC and CMAC

Stakeholders
- ANSPs
- Airspace Users
- Airport Operator

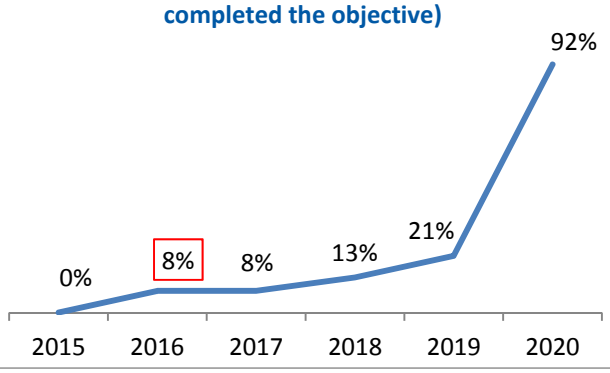
FOC	**12/2020**
Estimated achievement	**12/2020**

On time

Applicability Area
25 PCP airports

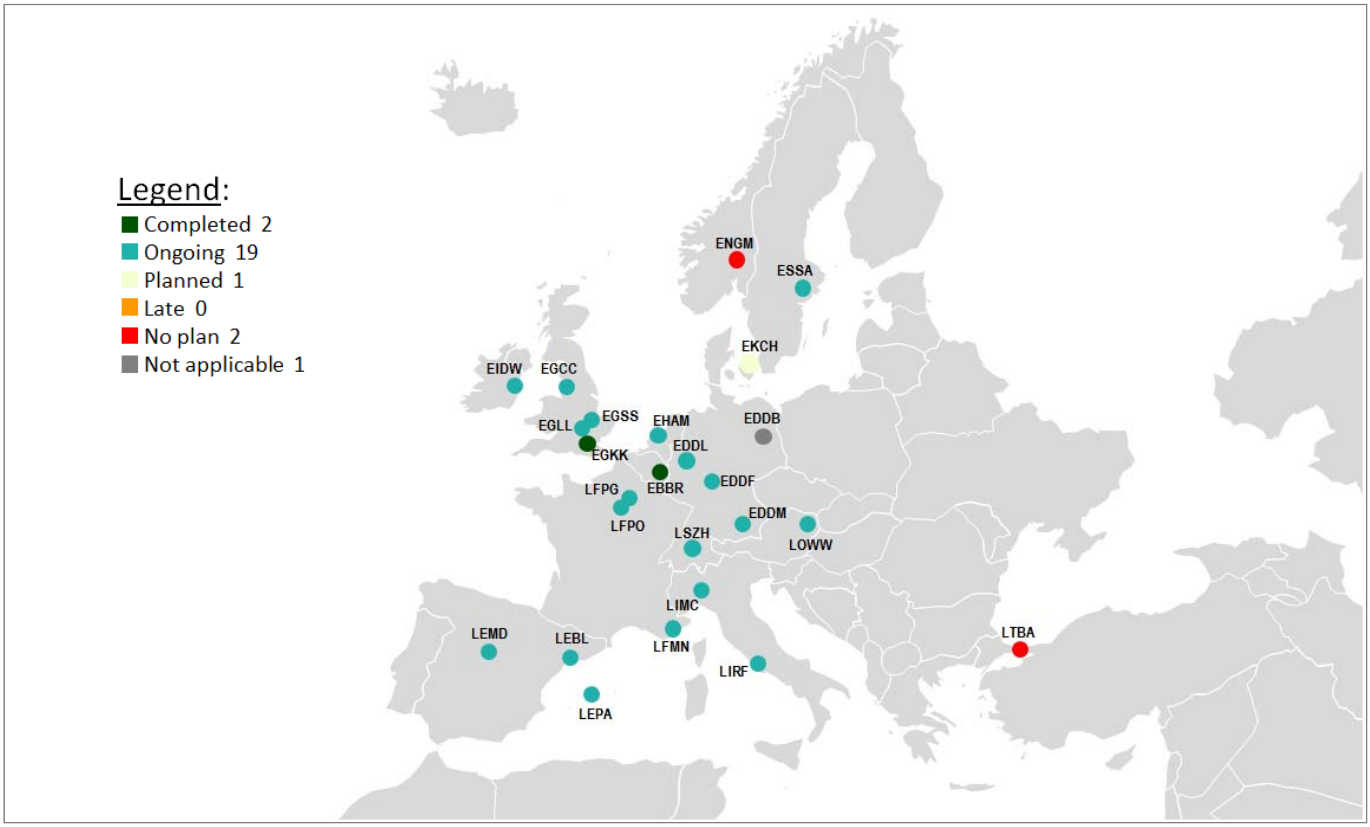
SESAR Key Features	High Performing Airports
PCP Sub-Functionality	S-AF2.1 DMAN synchronised with pre-departure sequencing S-AF2.5 Airport Safety Nets
ICAO ASBU	B1-SURF
OI Steps	AO-0104-A
CAPEX	FABEC, SW FAB

Completion Rate Evolution (% of Airports completed the objective)



Main 2016 developments

In 2016, two (2) airports have implemented this functionality, namely Brussels (EBBR) and Gatwick (EGKK) airport. Remaining airports have all started the implementation except Copenhagen (EKCH) Airport that is in the planning phase and Oslo (ENGM) and Istanbul Ataturk (LTBA) that still have no concrete plans for implementation. The most advanced aspect of implementation is putting in place electronic clearance input system (such as EFS), which has been implemented by ten (10) airports in the applicability area. These are: Vienna (LOWW), Berlin Brandenburg (EDDB), Brussels (EBBR), Frankfurt (EDDF), Dusseldorf (EDDL), Munich (EDDM), Stockholm Arlanda (ESSA), Zurich (LSZH), Manchester (EGCC), London Gatwick (EGKK) and Dublin (EIDW). The objective is still at early stages of implementation and stakeholders have not defined and potential risks of delay.



AOP13

Automated assistance to controller for surface movement planning and routing

First year of monitoring. The reliable estimated achievement date can not be defined at this time.

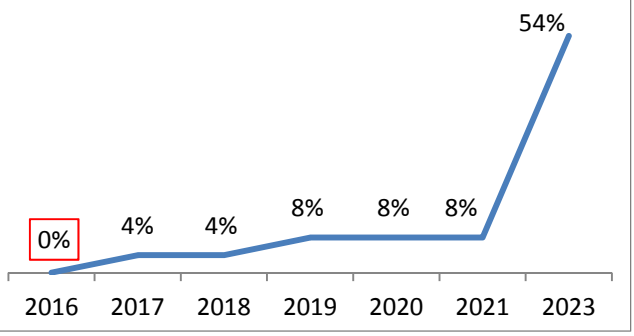
Stakeholders
- ANSPs
- Regulators

FOC	**12/2023**
Estimated achievement	**not available**

Applicability Area
25 PCP airports

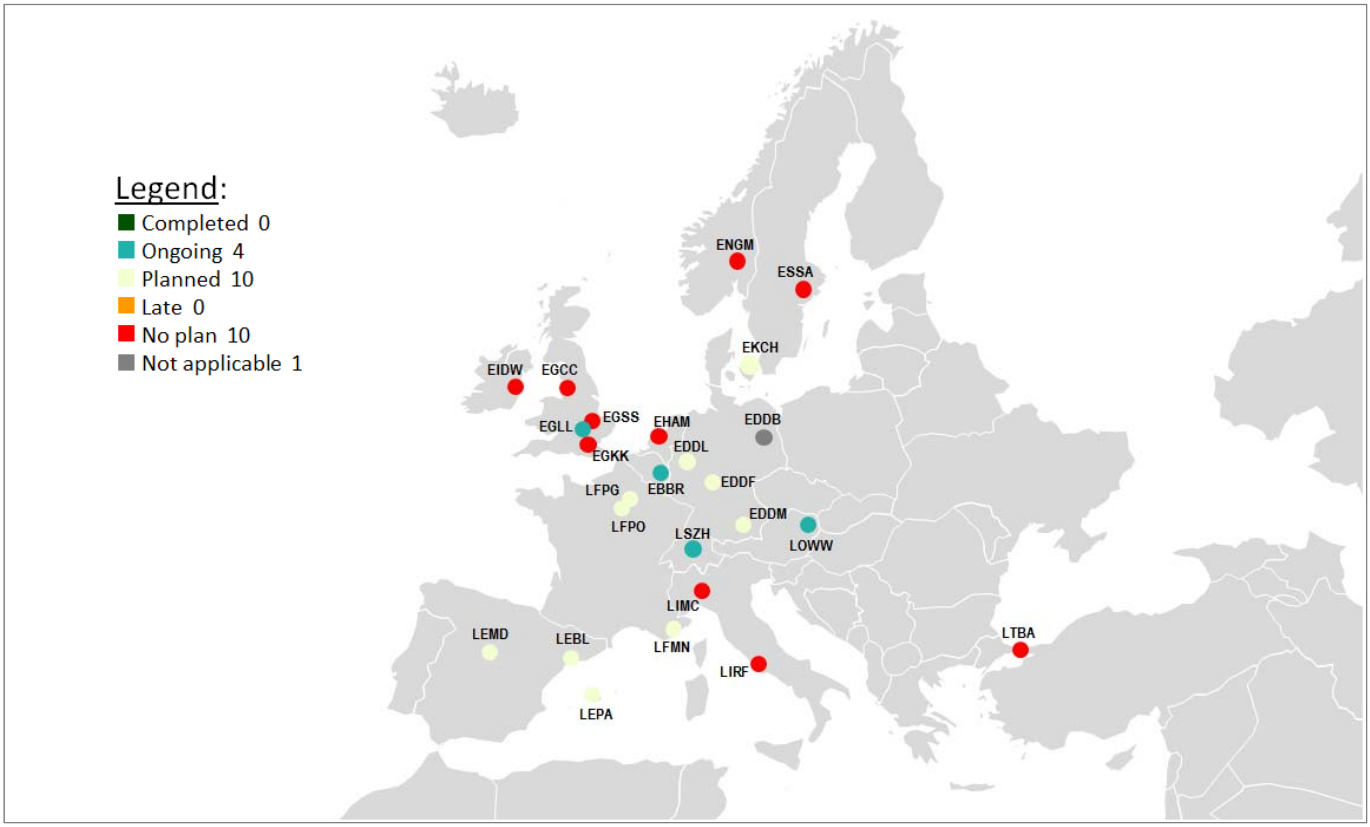
SESAR Key Features	High Performing Airports
PCP Sub-Functionality	S-AF2.4 Automated assistance to controller for surface movement planning and routing
ICAO ASBU	B1-RSEQ, B2-SURF, B1-ACDM
OI Steps	AO-0205
CAPEX	FABEC, SW FAB

Completion Rate Evolution (% of Airports completed the objective)



Main 2016 developments

This implementation objective is introduced in Level 3 in 2016. Therefore, it is in its first year of reporting. According to data reported from 25 airports in the applicability area, four (4) of them have already started the implementation (EGLL – London Heathrow, EBBR – Brussels, LOWW – Vienna and LSZH – Zurich). However, all of them are still at early stages of implementation. Ten (10) airports are in the planning phase and remaining airports have still not defined any plans for implementation. Due to this very early stages of implementation, the reliable estimate of achievement is difficult to establish. The more reliable assessment will be performed for next edition of the Level 3 report.



ENV02 CEM at Airports

Stakeholders
- ANSPs
- Airspace Users
- Airport Operators
- EUROCONTROL

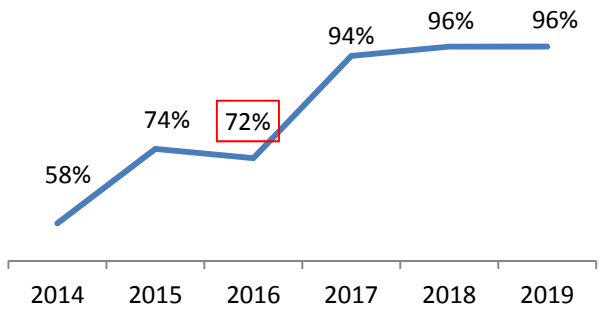
FOC	**12/2016**
Estimated achievement	**12/2017**

Late

Applicability Area
47 airports

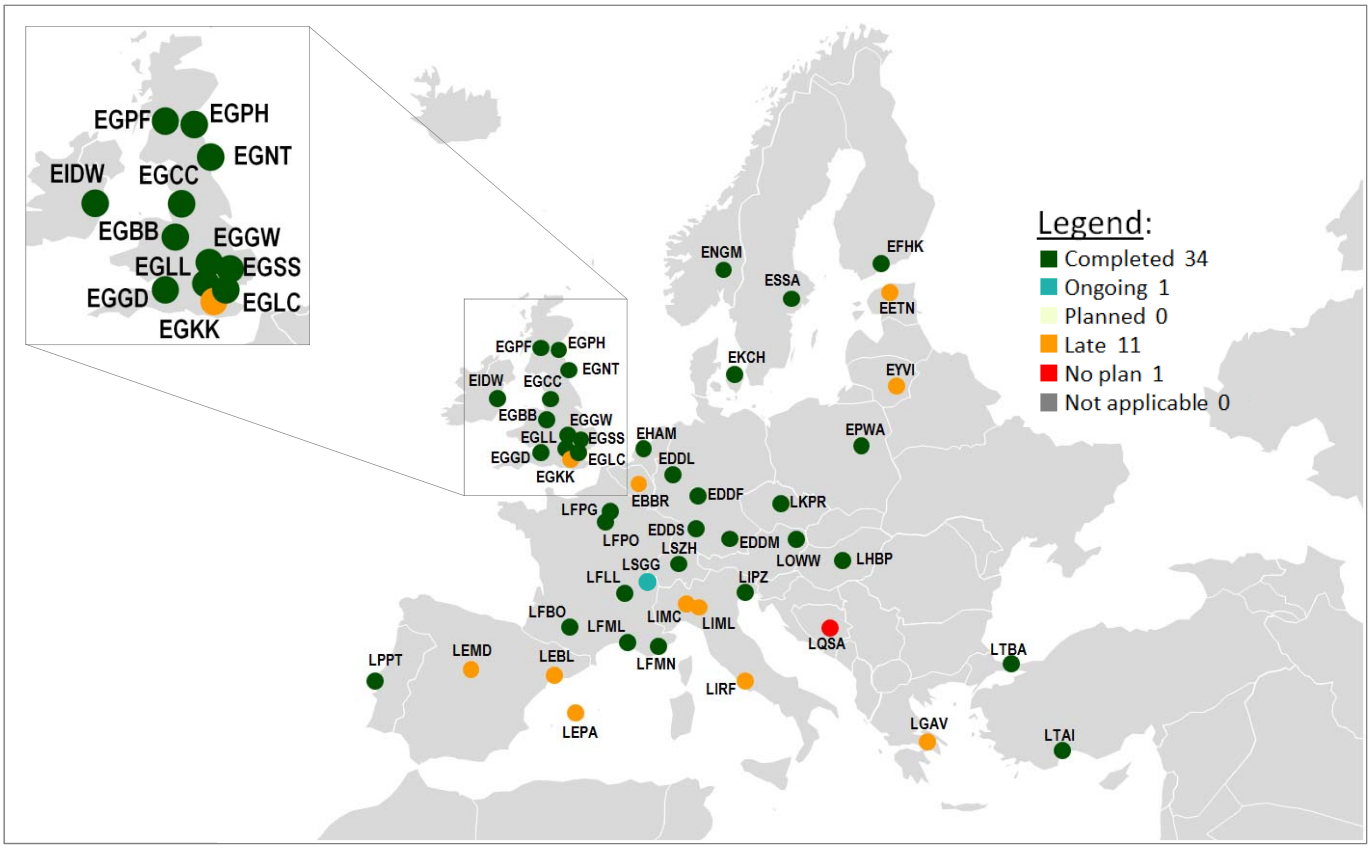
SESAR Key Features	High Performing Airports
EOC/OC	-
ICAO ASBU	No corresponding ASBU
OI Steps	AO-0703, AO-0705, AO-0706
CAPEX	FABEC

Completion Rate Evolution (% of Airports completed the objective)



Main 2016 developments

Implementation progress is roughly at the same level as in 2015. Similarly as for ENV01, Spanish airports downgraded their implementation status from "completed" to "late" due to new activities created as a result of new CEM specification published in September 2014. Two (2) additional airports (Prague and Copenhagen) completed the implementation in 2016. The issues that caused delays in implementation seem to be related to costs. Brussels airport reported that costs of implementation are non-proportionate to benefits achieved. Another reported reason of delay is due to difficulties to establish partnership agreements among Stakeholders (Italian airports). According to some airports, this improvement is currently not in the business focus/priorities for implementation (EGGW - Gatwick). One (1) airport has incorrectly reported an "ongoing" status instead of "late" (LSGG - Geneva).



SAF11 Prevent Runway Excursions

Stakeholders
- ANSPs
- Airspace Users
- Airport Operator
- Network Manager
- Regulators

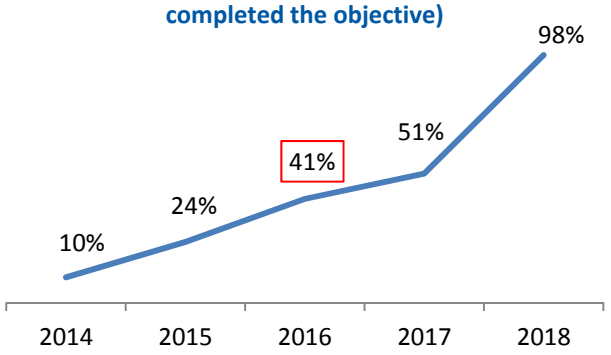
FOC	**01/2018**
Estimated achievement	**12/2018**

Planned delay

Applicability Area
All ECAC States, except MT

SESAR Key Features	High Performing Airports
EOC/OC	-
ICAO ASBU	No corresponding ASBU
OI Steps	PRO-006a (enabler)
CAPEX	FABEC

Completion Rate Evolution (% of States completed the objective)

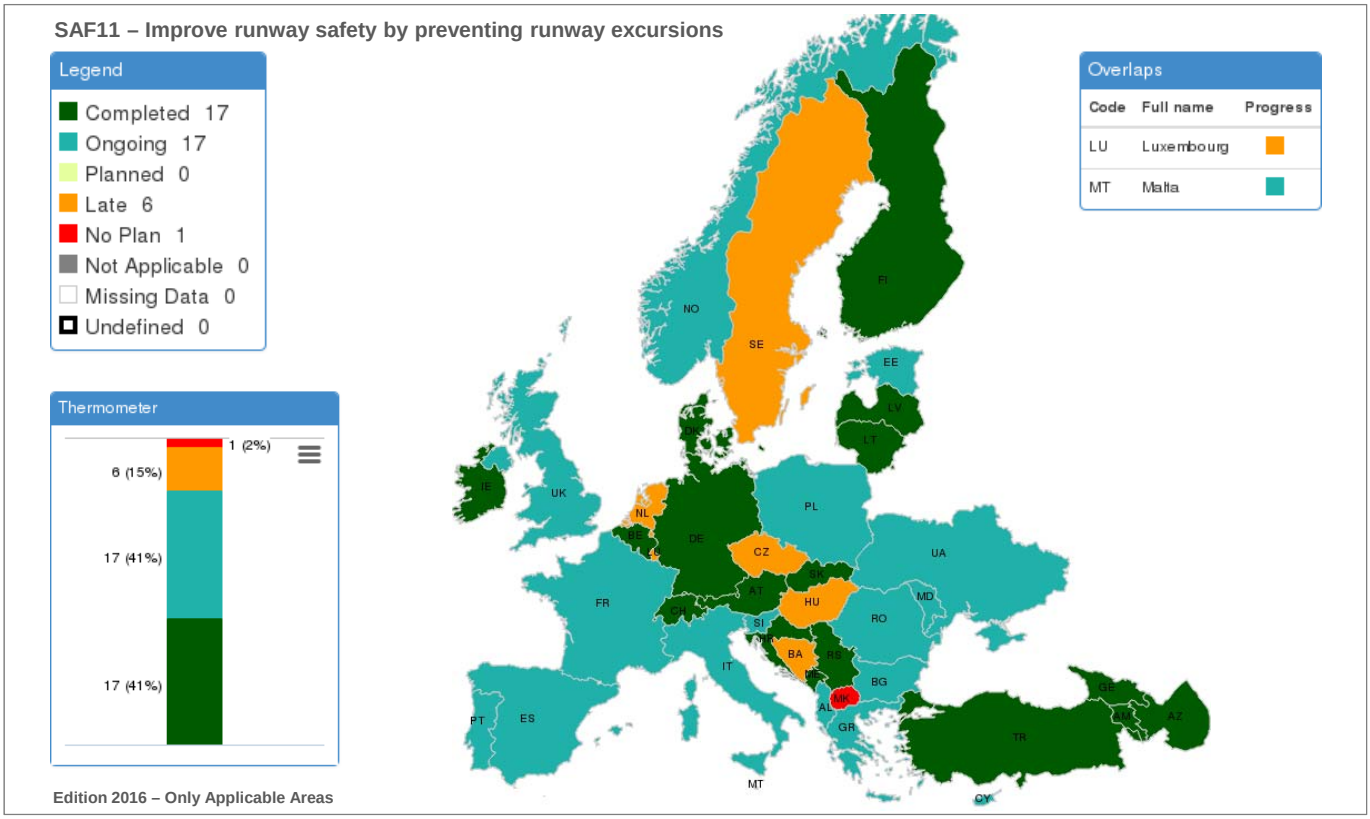


Main 2016 developments

Significant progress has been made in deploying this objective. Seven (7) additional States have completed this objective (AM, BE, CR, DK, ME, SK, TU), bringing to the total achieved to 17 States.

The implementation is also ongoing in 17other States. Only one (1) State (MK) has no plan yet established. The remaining six (6) States are late in implementation. However, the FOC date is set to 02/2018, and the Objective implementation is expected to be achieved by 12/2018, hence the delay will be limited.

A confusion may come due to the unusual FOC date, set at the start of the year (31/01/2018), and not at the end of the targeted year of implementation.



COM10 Migrate from AFTN to AMHS

Stakeholders
- ANSPs
- Industry
- EUROCONTROL

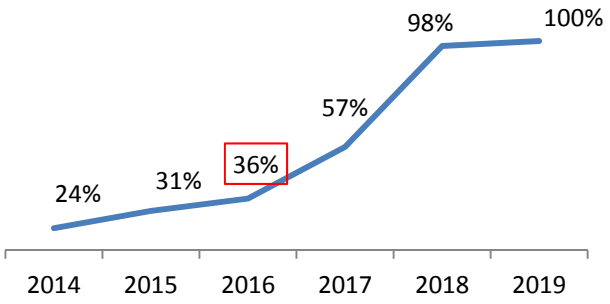
FOC	**12/2018**
Estimated achievement	**12/2018**

On time

Applicability Area
All ECAC States

SESAR Key Features	Enabling Aviation Infrastructure
EOC/OC	Predecessor of 'CNS Rationalisation' (EOC)
ICAO ASBU	No corresponding ASBU
OI Steps	CTE-C06c (enabler)
CAPEX	BALTIC, BLUE-MED, FABCE, FABEC, NEFAB, SW FAB UK-IR

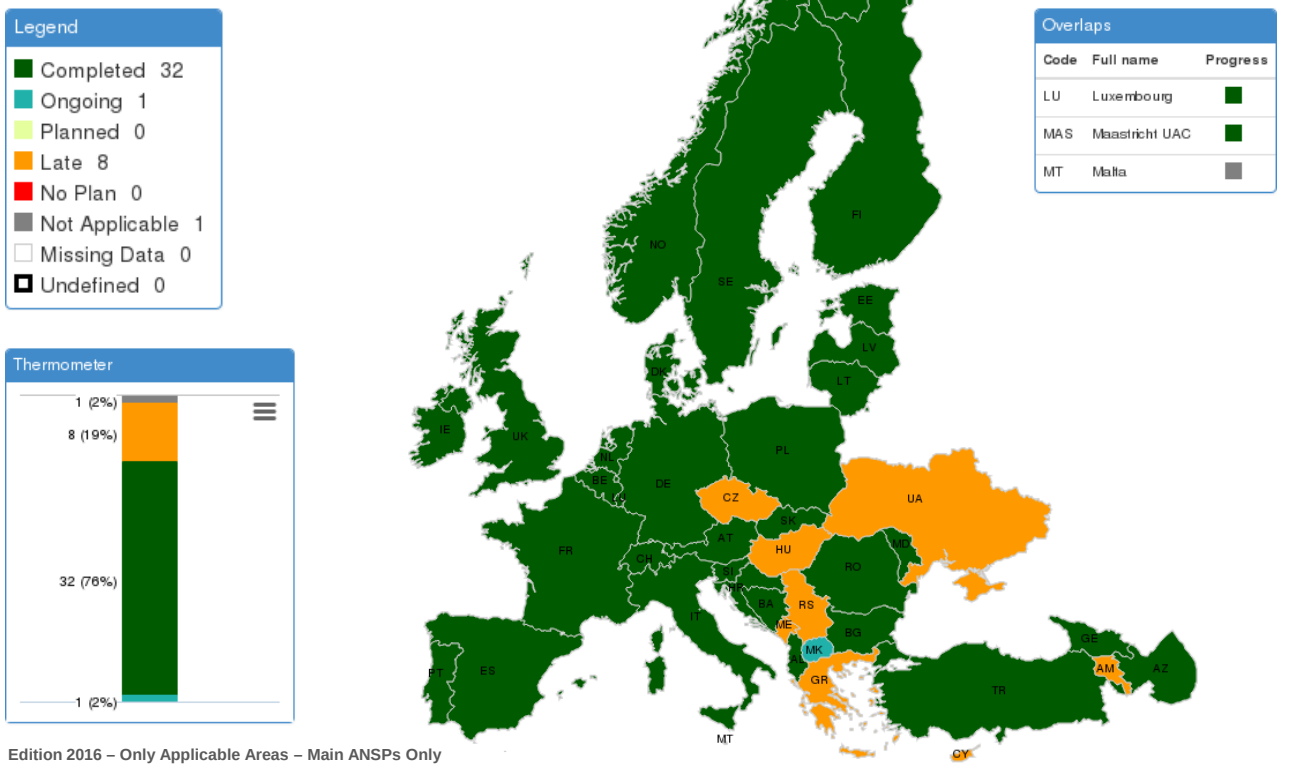
Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

All States have approved plans for implementation of this objective, which is progressing at modest rate: two (2) more states (DE and SI) have completed the objective in 2016. At functionality level, there is a good progress on implementation of the AMHS Level 1 (ASP01), which is the core of the objective, where 76% of the States have completed the respective actions. To be noted that information from NM refers that IE, NO and AL have not yet implemented AMHS. The implementation of the AMHS Level 2 is proving to be more difficult, observing only 36% of completion, hence driving the overall more conservative progress status at State level. Nevertheless, it is expected that the implementation of the objective will be achieved by the FOC date, that was extended in order to take into account the current developments on the security aspects for the Extended AMHS as well as on Directory Services.

COM10-ASP01-Implement AMHS capability (Basic ATSMHS) and gateway facilities to AFTN



Edition 2016 – Only Applicable Areas – Main ANSPs Only

COM11 VoIP in ATM

Stakeholders
- ANSPs

FOC 12/2020

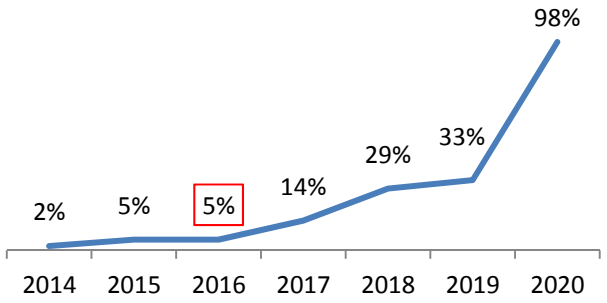
Estimated achievement 12/2020

On time

Applicability Area
All ECAC States

SESAR Key Features	Enabling Aviation Infrastructure
PCP Sub-Functionality	No link
ICAO ASBU	B0-FICE, B1-FICE, B0-TBO, B1-TBO
OI Steps	CTE-C05a (enabler), CTE-C05b (enabler)
CAPEX	BALTIC, BLUE-MED, DANUBE, DK-SE, FABEC, FABCE, NEFAB, SW FAB, UK-IR

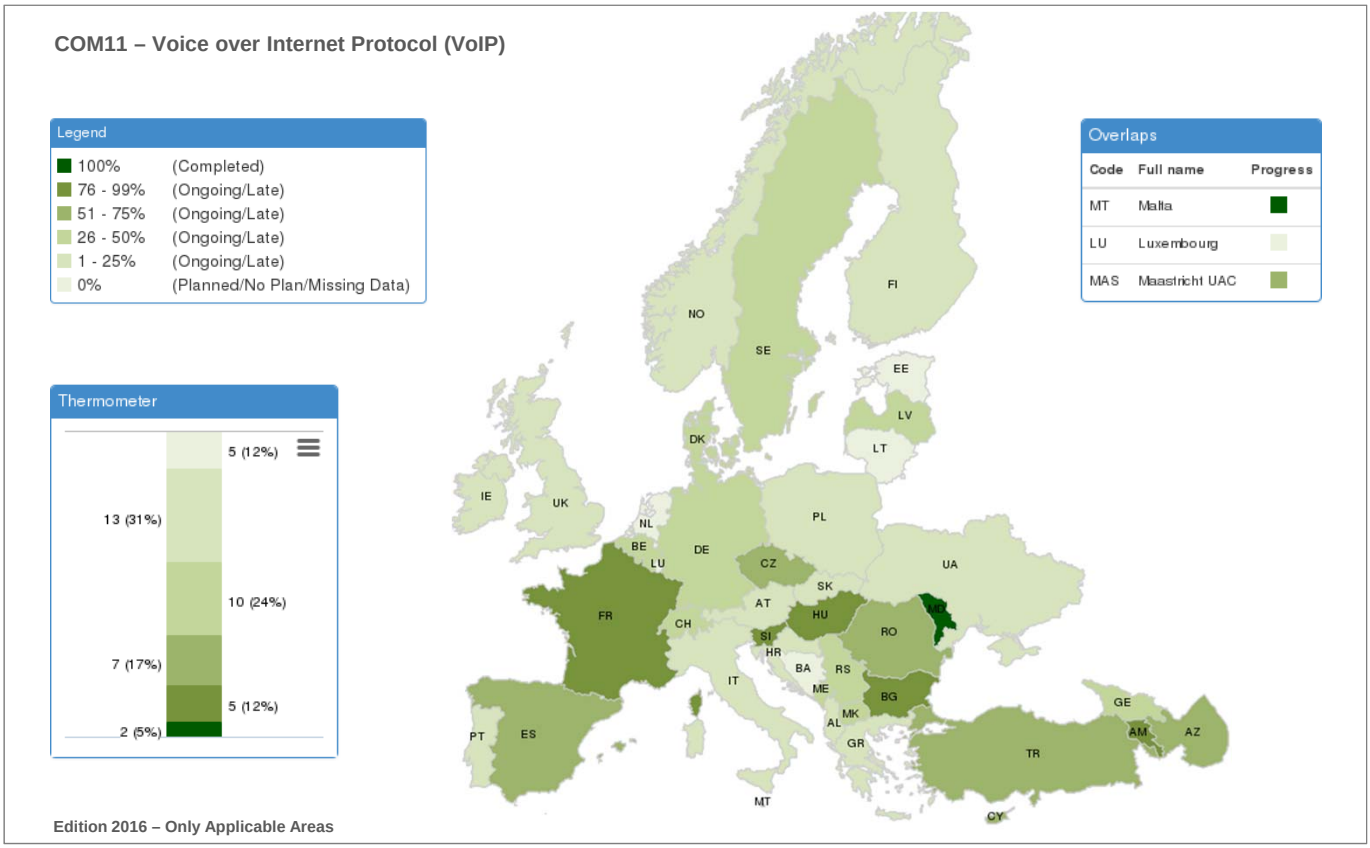
Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

Implementation progress is slow, with very small improvements every year. During the year of 2016, no State has implemented the objective. Moreover, whereas last year no State was declared as late, this year one (1) of the States has declared this status. Every State in ECAC region has declared implementation plans for this objective. On top of the four (4) ANSPs which had already upgraded the existing VCS or installed new VCS with VOIP capabilities in 2015, five (5) others (FR, SI, RO, MD, MT) have completed this task in 2016. Nevertheless for different States, the operation is still subject to the capabilities of the adjacent ACC centers.

Overall, the implementation of this objective is on time, remaining within the FOC date, although the progress made in the last couple of years has been slow.



FCM08 Extended Flight Plan

First year of monitoring. The reliable estimated achievement date can not be defined at this time.

Stakeholders
- ANSPs
- Network Manager
- Airspace Users

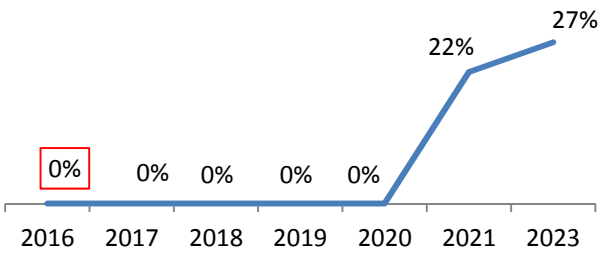
FOC 12/2021

Estimated achievement not available

Applicability Area
EU+ States

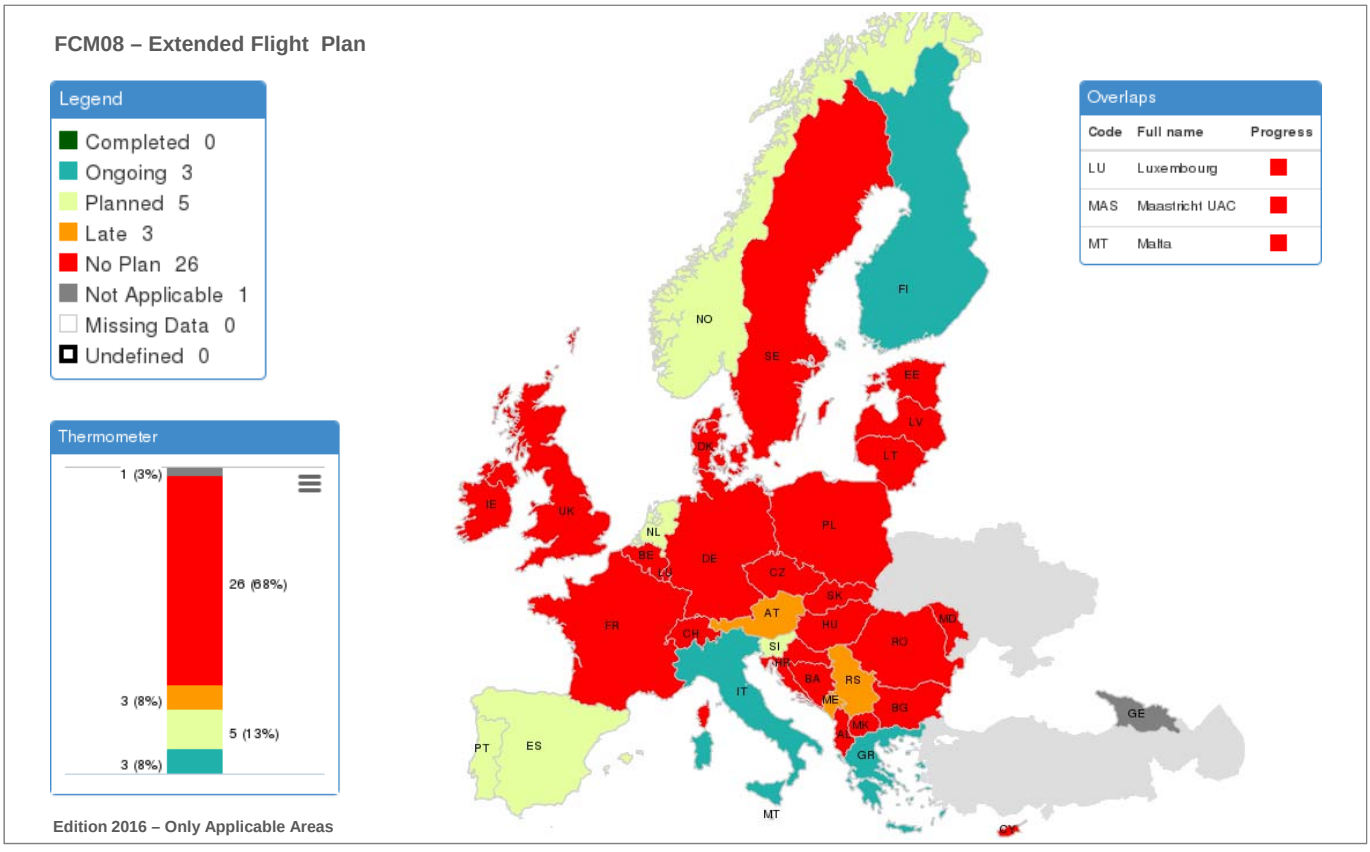
SESAR Key Features	Enabling Aviation Infrastructure
PCP Sub-Functionality	S-AF4.2 Collaborative NOP S-AF4.4 Automated Support for Traffic Complexity Assessment
ICAO ASBU	B1-FICE
OI Steps	AUO-0203
CAPEX	-

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

This is a new objective introduced in Level 3 in 2016. It is premature to establish conclusive implementation trends as this is the first year of reporting. Most of the States (26) have not yet established any concrete implementation plans, while those having reported Plans (seven (7) States) are in very initial stages. But virtually all States (only three (3) States consider it not-applicable) have reported interest in implementation. The development of more concrete implementation plans is depending on the availability of the ICAO FF-ICE (Flight and Flow Information for a Collaborative Environment (FF-ICE)) provisions, expected for publication early 2020 (drafts are already available).
At NM level the implementation of the eFPL is planned over a 3-4 year period as from 2017.



INF07 Electronic Terrain and Obstacle Data (e-TOD)

Stakeholders
- ANSPs
- Airport Operators
- Regulators

FOC 05/2018

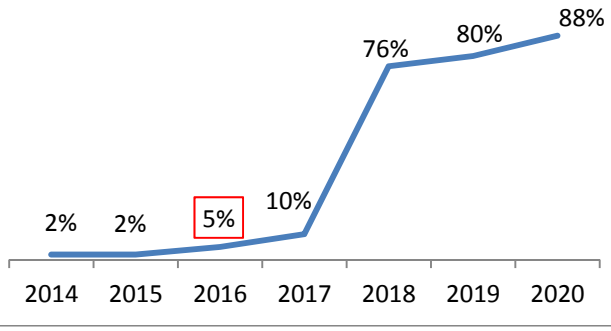
Estimated achievement 12/2019

Planned delay

Applicability Area
All ECAC States except MAS

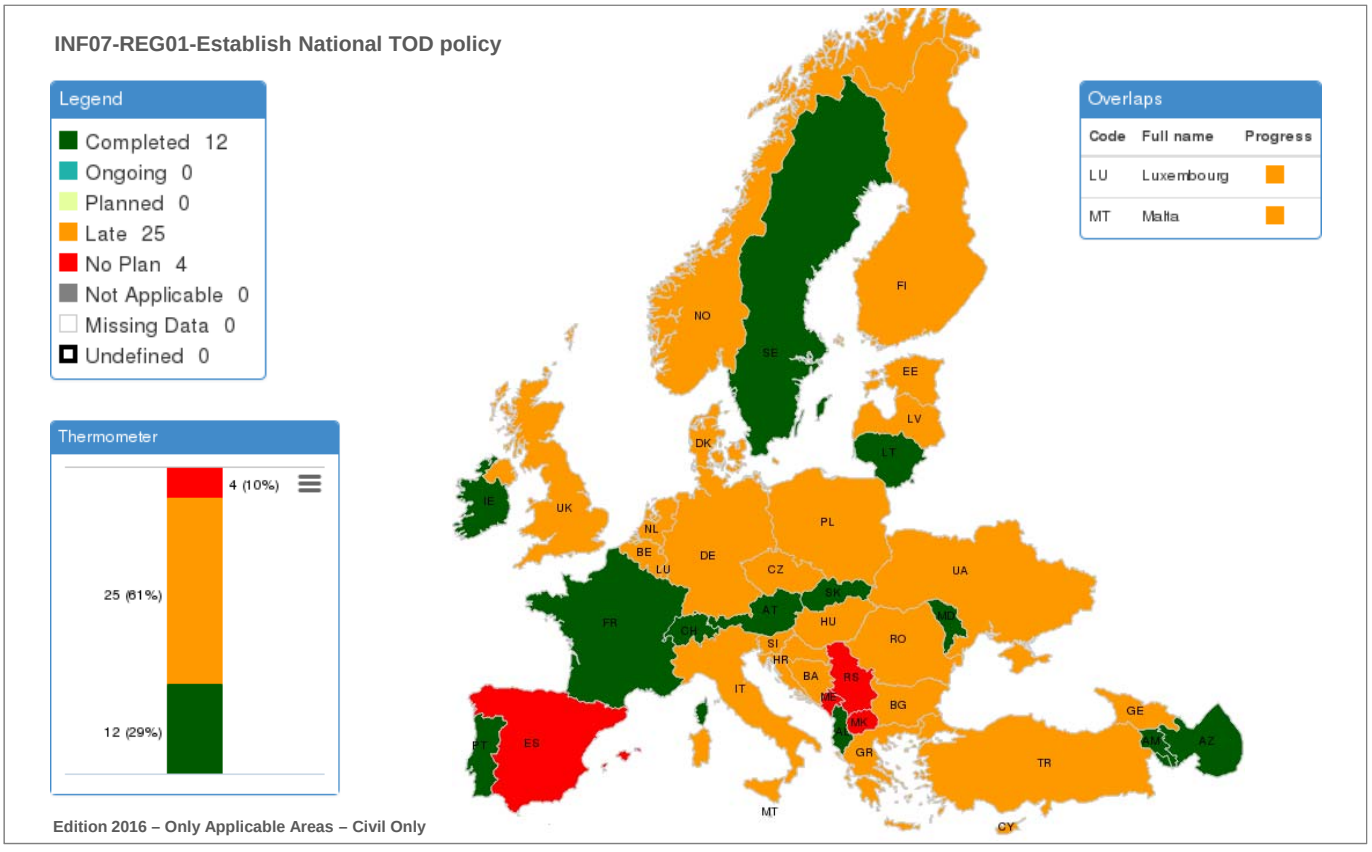
SESAR Key Features	Enabling Aviation Infrastructure
EOC/OC	Information reference and exchange models
ICAO ASBU	No corresponding ASBU
OI Steps	AIMS-16 (enabler)
CAPEX	FABCE, FABEC, UK-IR

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

Two (2) States completed the objective – Ireland and Armenia. Ten (10) States declared being "late", five (5) more than last year. REG 01 entails a very important activity -"Establish National TOD Policy"- because other REG, ASP and APO SLoAs depend on its availability to further progress and conclude their implementation activities. Nevertheless, (25) States are late and four (4) don't have any plan yet for REG 01, even if the action was due for November 2015. The delay on establishing the TOD Policy is in some cases explained by the need for coordination with many stakeholders, that is seen as being a time consuming activity. For ASP01 and APO01 the situation is equally bad as they are dependent on the completion of REG 01. States may consider to address the "Support to States" of EUROCONTROL for possible support on the implementation of this objective.



ITY-ACID Aircraft identification

Stakeholders
- ANSPs
- Airspace Users

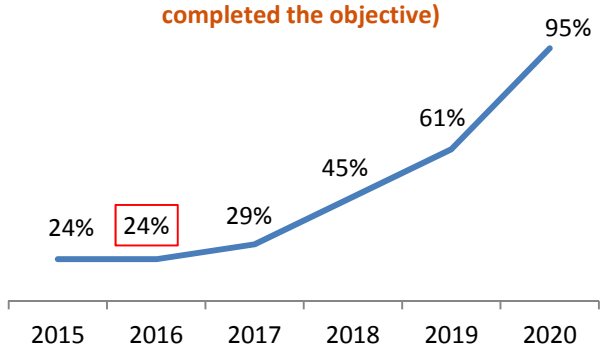
FOC	**01/2020**
Estimated achievement	**01/2020**

On time

Applicability Area
All EU+ States

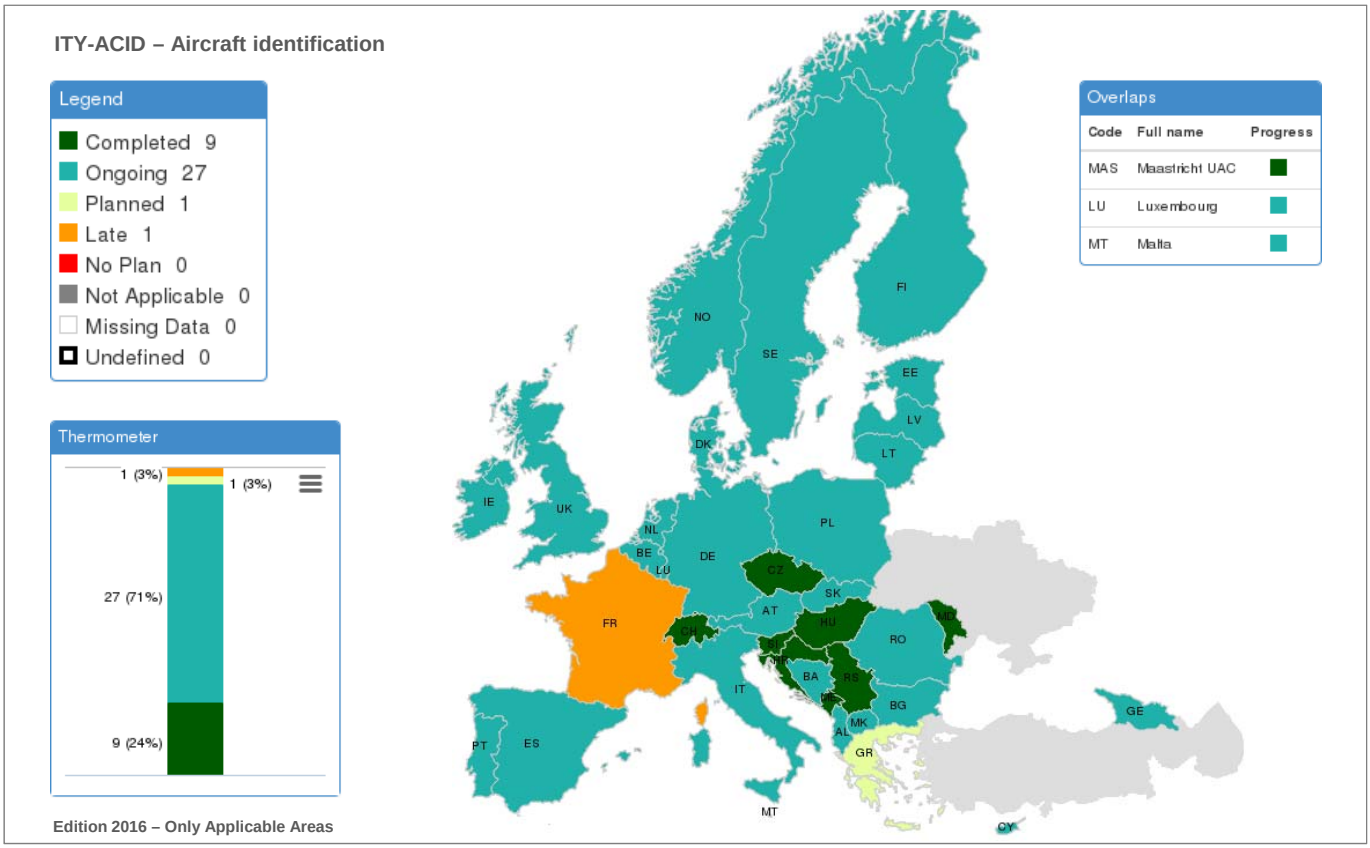
SESAR Key Features	Enabling Aviation Infrastructure
EOC/OC	Predecessor of 'CNS Rationalisation'
ICAO ASBU	No corresponding ASBU
OI Steps	GSURV-0101 (enabler)
CAPEX	BALTIC

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

The progress in the deployment of appropriate infrastructure is constant. The appropriate surveillance coverage is provided in the en-route airspace all over Europe. There are still gaps at low levels/altitudes but implementations plans are reported. However, the stakeholders shall be reminded that in order to claim completion with the objective, the airspace where downlinked aircraft identification is used shall be declared as such to the NM in order to maximise the network benefits. It is encouraging to note that many States which are outside the applicability area have reported implementation plans or even completion. Therefore even if the objective is an EU+, it has a significant pan-European coverage. Only two (2) military stakeholders (IT and FR) expect delays in implementation, but this delay is allowed by the Regulation, provided that the appropriate steps will be taken as required by Article 11 of Regulation 1206/2011.



ITY-ADQ

Ensure quality of aeronautical data and aeronautical information

Stakeholders
- ANSPs
- Airport Operators
- Regulators
- Industry

FOC 06/2017

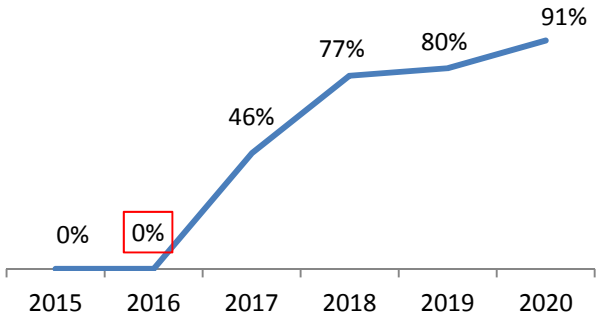
Estimated achievement 12/2020

Planned delay

Applicability Area
All EU+ States except GE, FYROM and MAS

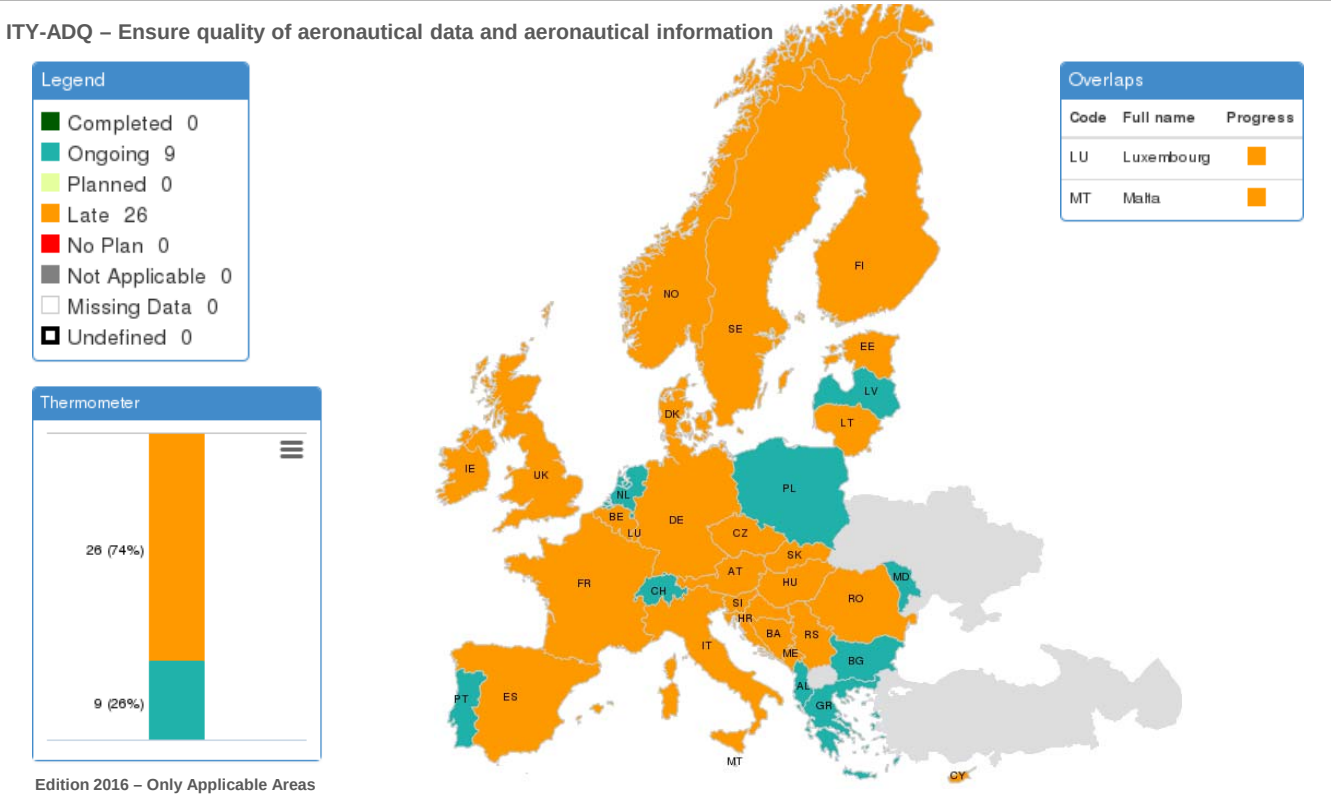
SESAR Key Features	Enabling Aviation Infrastructure
EOC/OC	Information reference and exchange models
ICAO ASBU	B0-DATM
OI Steps	IS-0202, IS-0204
CAPEX	BALTIC, BLUE-MED, DANUBE, DK-SE, FABCE, FABEC, UK-IR

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

More States have declared being “Late”, the number increased from 21 (last cycle) to 26 in the current reporting period. No State has completed the objective, even though the FOC is approaching (06/2017). Some SLoAs that are overdue and on the critical path for ADQ implementation, such as Formal Arrangements (ASP02), did not show relevant progress with 21 ANSP declaring being “Late”. It needs to be recognised that a lot of individual progress has been made by many stakeholders, mostly ANSP, nevertheless no State is yet in the position to declare full compliance. This is notably due to strong dependencies on a range of interfaces (data originators), the extremely challenging requirements, tight deadlines, tool adaptions or lack of mature software solutions and resources. In light of the approaching new EASA rule on AIS/AIM Providers, based on similar Essential Requirements as ADQ, it is very important that States make an effort to recover existing delays since ADQ compliance will provide an optimum basis for later certification by EASA.



ITY-AGDL A/G Data Link

Stakeholders
- ANSPs
- Airspace Users
- Regulators
- Military

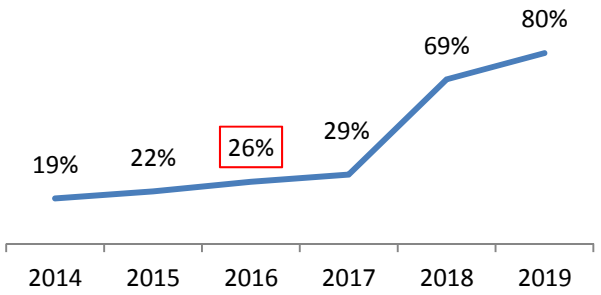
ATS unit ops. Capability	**02/2018**
Aircraft capability	**02/2020**
Estimated achievement	**12/2019**

Planned delay

Applicability Area
All EU+ States except GE, LU and NL

SESAR Key Features	Enabling Aviation Infrastructure
PCP Sub-Functionality	A/G datalink Pre-requisite for 6.1 Initial Trajectory Information Sharing (i4D) (PCP)
ICAO ASBU	B0-TBO
OI Steps	AUO-0301
CAPEX	BALTIC, BLUE-MED, DANUBE, DK-SE, FABCE, FABEC, NEFAB, SW FAB, UK-IR

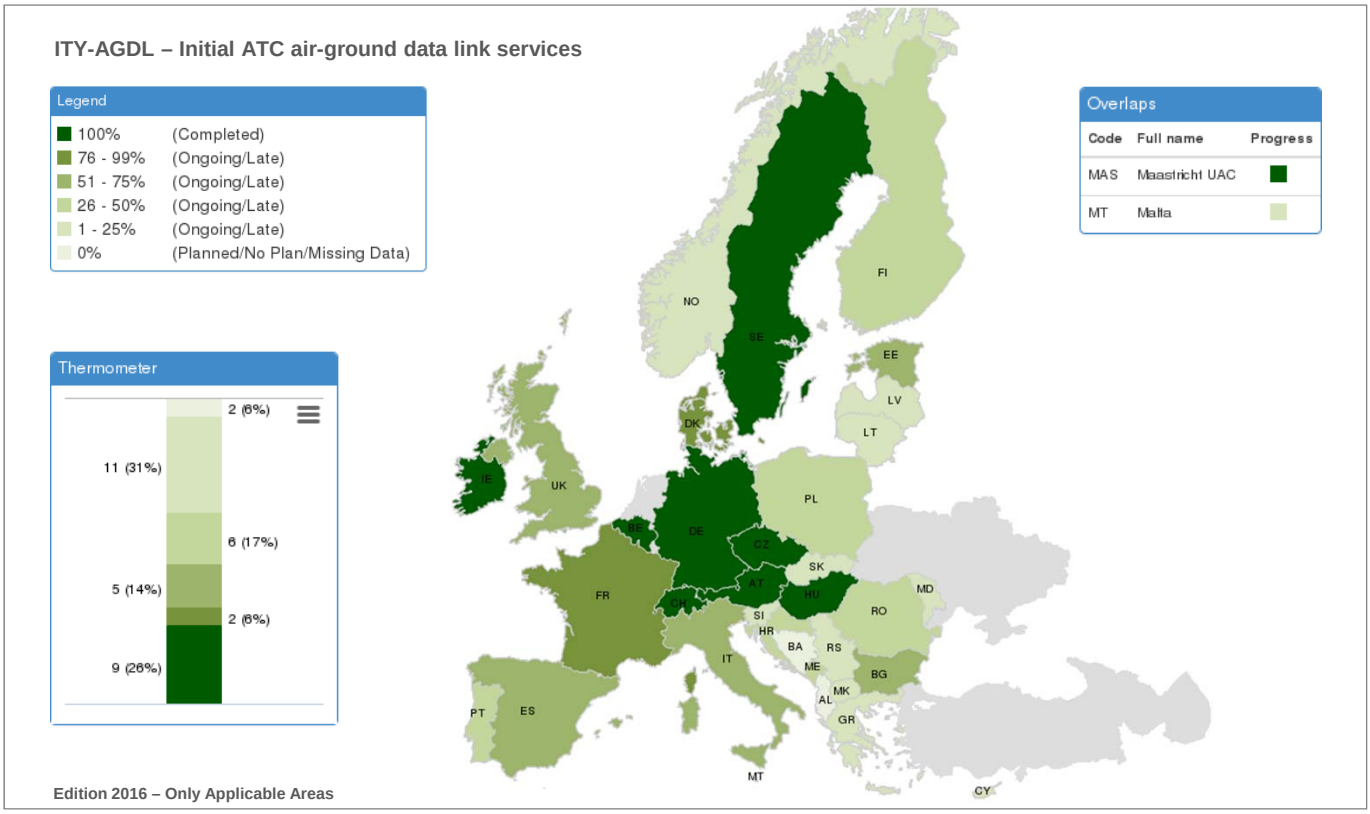
Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

2016 was a pivotal year for Data Link Services (DLS) implementation; the SJU finalised the what is known as the ELSA Consortium Study addressing the recommendations made by EASA in their report from 2014 on data-link's technical issues. Also in 2016, the SESAR Deployment Manager has been mandated by the EC to act as Data Link Services Implementation Project Manager and on this basis the SDM developed a DLS Recovery Plan aiming to set a realistic path from today's DLS implementation status in Europe.

It is not surprising that implementation has not progressed much during 2016 as stakeholders were expecting the results of the ELSA study. Only one (1) State (CZ) has completed the objective in 2016 and stakeholders have started to adjust their plans which implies a delay in the estimated achievement date from 02/2018 last year, to 12/2019 this year.



ITY-AGVCS2 AGVCS below FL195

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

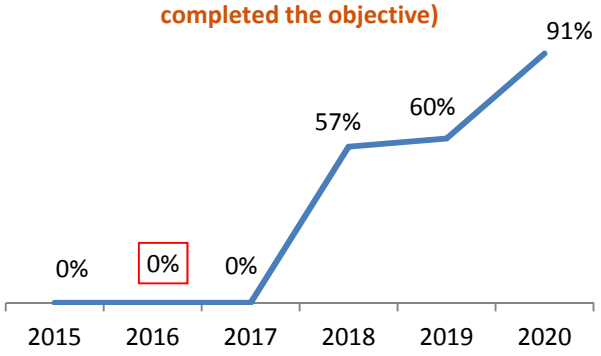
Freq. converted	**12/2018**
State Aircraft	**12/2020**
Estimated achievement	**12/2020**

Risk of delay

Applicability Area
All EU+ States

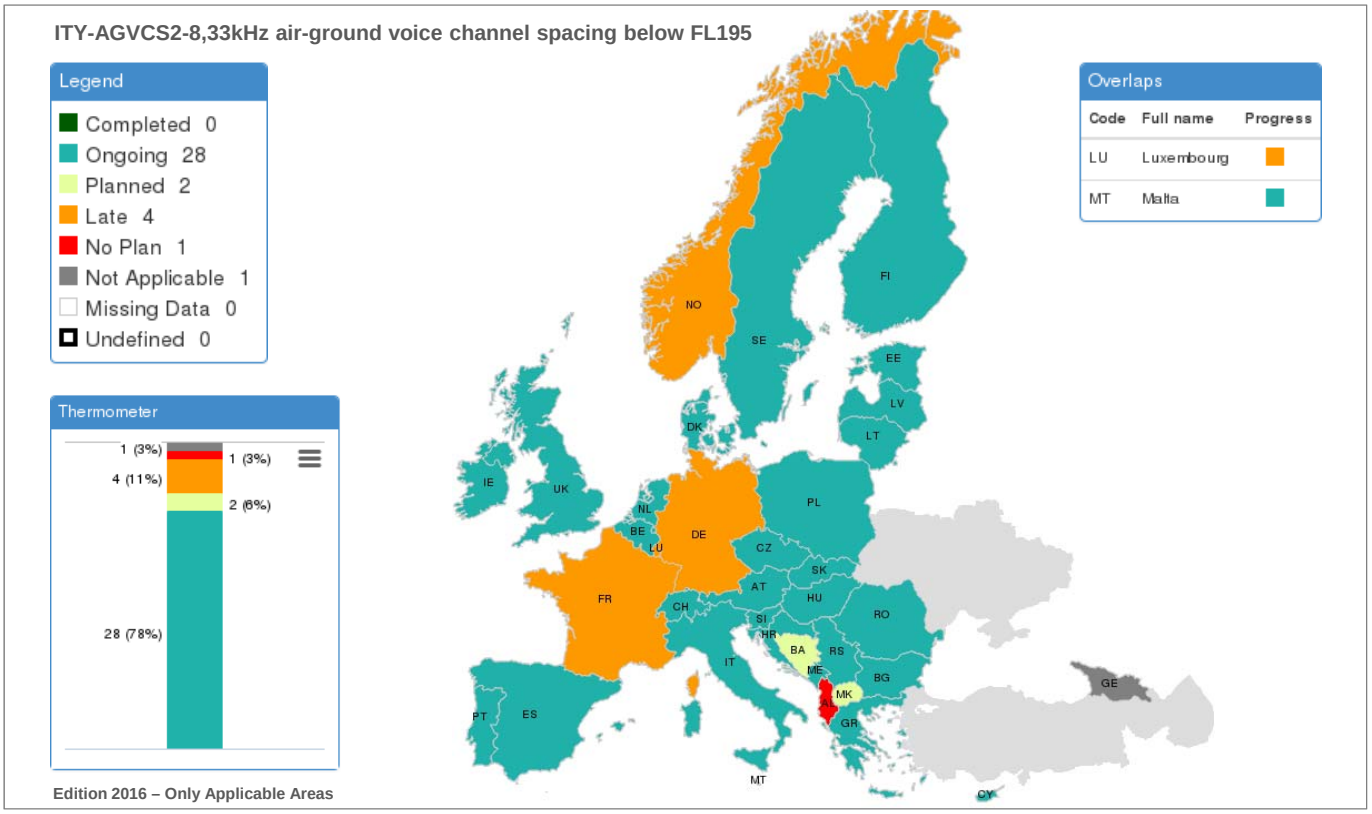
SESAR Key Features	Enabling Aviation Infrastructure
EOC/OC	-
ICAO ASBU	No corresponding ASBU
OI Steps	CTE-C01a (enabler)
CAPEX	BALTIC, BLUE-MED, DANUBE, FABCE, FABEC, SW FAB

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

The objective is now in its crucial phase with two (2) years to convert all frequency assignments required by Reg. (EU) 1079/2012. The EC has tasked NM, through the 8.33 VCS ISG, to take a central role in the coordination of the implementation of 8.33kHz below FL195. The number of States formally reporting the objective late has increased from one (1) to three (3) (DE, FR, NO) which is a cause for concern. 17 States have notified the EC of their intention to grant exemptions from the requirements of the Regulation. It is strongly recommended that all States including ECAA States, actively participate in the 8.33 ISG. The equipment of GA is still a concern due to the high cost of equipage and certification as well as the time available for installation. The EC INEA through CEF has identified the 8.33 radio capability retro-fit as one of the priorities in 2017; consequently several States have applied for funding.



ITY-FMTP Common Flight Message Transfer Protocol

Stakeholders
- ANSPs
- Military

FOC 12/2014

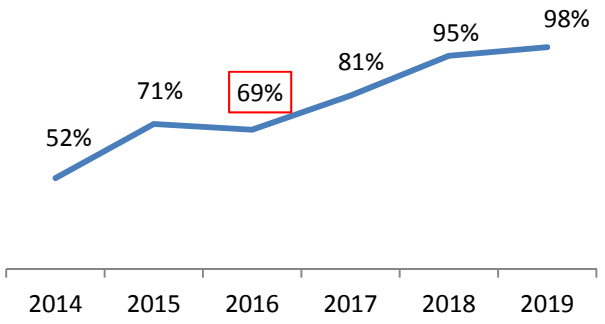
Estimated achievement 12/2017

Late

Applicability Area
All ECAC States

SESAR Key Features	Enabling Aviation Infrastructure
PCP Sub-Functionality	IP Network Pre-requisite for SWIM-related operational changes and PCP AF5 (Initial SWIM)
ICAO ASBU	B0-FICE
OI Steps	CTE-C06 (enabler)
CAPEX	BALTIC, BLUE-MED, DK-SE, FABCE, FABEC, SW FAB

Completion Rate Evolution (% of States completed the objective)

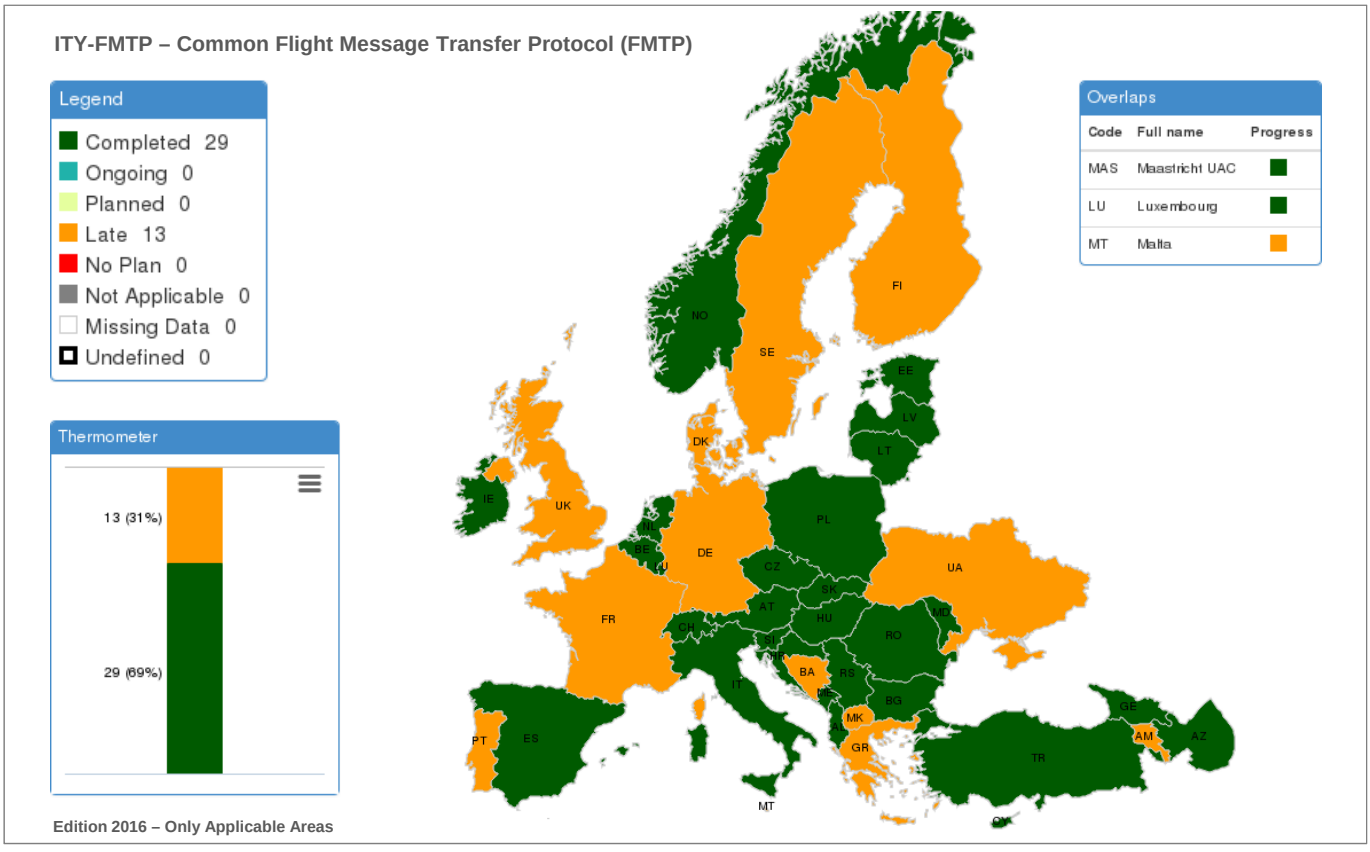


Main 2016 developments

Implementation is late, with three (3) years of delay. No State completed the objective during 2016 despite the fact that last year six (6) of them had reported plans to do so.

It is to be noted, however, that in three (3) States (DE, DK and UK) only implementation by the military is pending. SE reported the objective late but the objective is completed with all its neighbours except FI who has not yet fully implemented the objective, so it should have been reported completed by SE.

Stakeholders reporting the objective late cite a variety of reasons: cyber security concerns, budget restrictions especially for military ANSPs, having implemented FMTP on IPv4 in a first stage and postponement in implementation plans due to financial crisis.



ITY-SPI Surveillance Performance and Interoperability

Stakeholders
- ANSPs
- Airspace Users
- Military
- Regulators

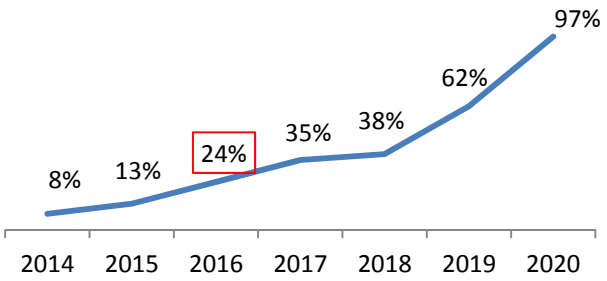
FOC	**06/2020**
Estimated achievement	**06/2020**

Risk of delay

Applicability Area
All EU+ States

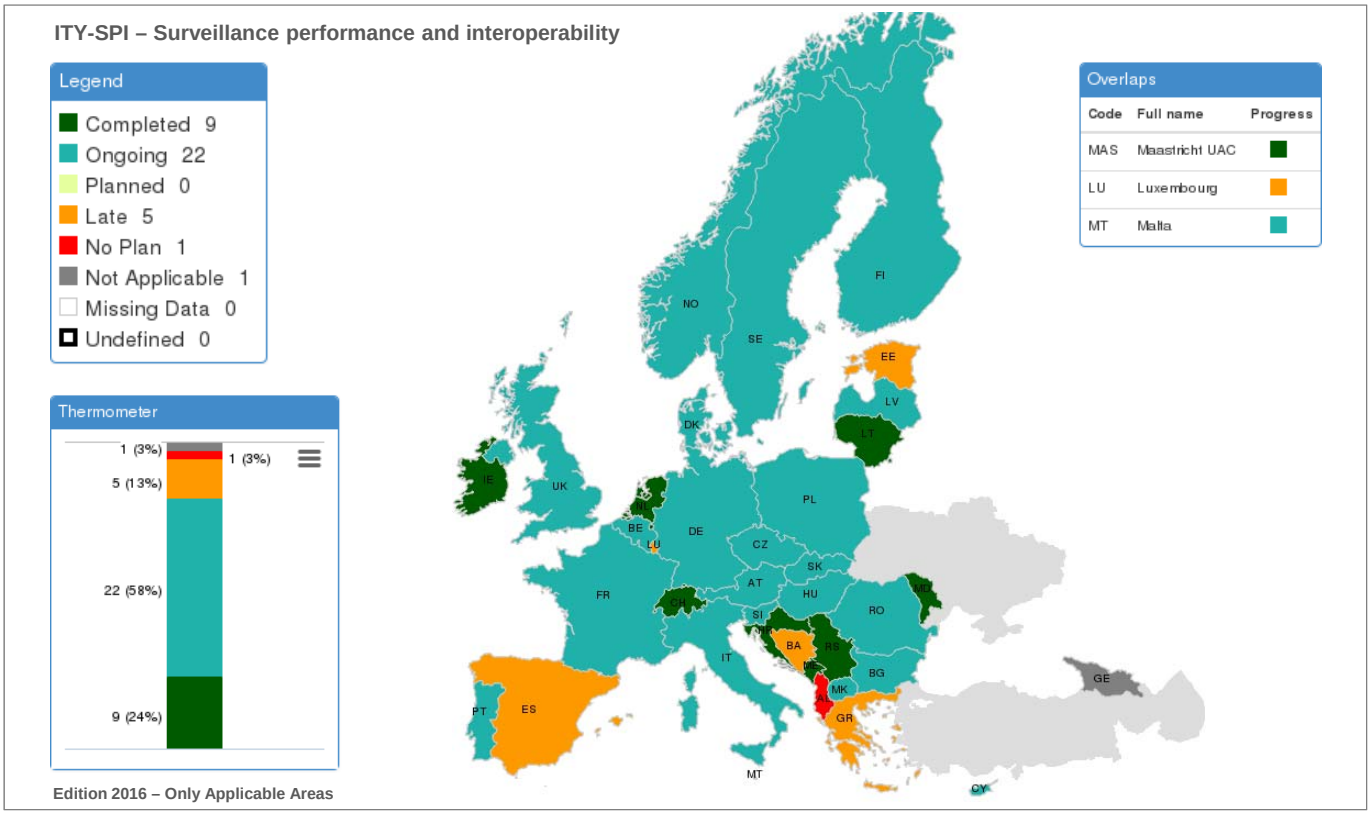
SESAR Key Features	Enabling Aviation Infrastructure
EOC/OC	Predecessor of 'CNS Rationalisation'
ICAO ASBU	B0-ASUR
OI Steps	GSURV-0101 (enabler)
CAPEX	BALTIC, BLUE-MED, DANUBE, DK-SE, FABCE, FABEC, NEFAB, SW FAB, UK-IR

Completion Rate Evolution (% of States completed the objective)



Main 2016 developments

Within the applicability area, the overall implementation progress is good. However, it is observed that several EU States (EE, ES, GR, LU) have missed the 2015 implementation milestones and are currently late. Because of this, the overall status is "Late". Based on the reported plans, it is expected that they will catch up with this delay in 2017. There is also good visibility from the Military stakeholders with regard the equipage plans of their fleets. It should be noted that the level of implementation of the objective does not provide a full picture with regard the level of implementation of the Regulation (EU) No 1207/2011, as amended, and multiple sources of information, in particular at State level, should be corroborated in order to obtain a complete picture of the implementation. It is also encouraging to observe that voluntary implementation is taking place outside the Applicability Area (EU+) making it a truly pan-European implementation.



4 ANNEXES

Relevant mappings of the Level 3

Table 6: Mapping of the L3 to Major ATM Changes, SESAR Key Features, solutions and DP2016 families

Key Features	Level 3 Implementation Objectives	Major ATM changes	SESAR Solutions	DP family
	AOM13.1 - Harmonise OAT and GAT handling	Free Route & Advanced FUA		none
	AOM19.1 - ASM tools to support A-FUA	Free Route & Advanced FUA	#31	• 3.1.1
	AOM19.2 - AMS management of real-time airspace data	Free Route &Advanced FUA	#31	• 3.1.2
	AOM19.3 - Full rolling ASM/ATFCM process and ASM information sharing	Free Route & Advanced FUA	#31	• 3.1.3
	FCM03 - Collaborative flight planning	ATFCM		• 4.2.3
	FCM05 - Interactive rolling NOP	ATFCM		• 4.2.2 • 4.2.4
	FCM04.1 - STAM phase 1	ATFCM		• 4.1.1
	FCM04.2 - STAM phase 2	ATFCM	#17	• 4.1.2
	FCM06 - Traffic Complexity Assessment	ATFCM	#19	• 4.4.2
	FCM09 - Enhanced ATFM Slot swapping	ATFCM	#56	• 4.1.1
	AOM21.1 - Direct Routing	Free Route	#32, #65	• 3.2.1 • 3.2.3
	AOM21.2 - Free Route Airspace	Free route	#33, #66	• 3.2.1 • 3.2.4
	ATC02.8 - Ground based safety nets	Free Route		• 3.2.1
	ATC07.1 - Arrival management tools	Enhanced Arrival Sequencing		• 1.1.1
	ATC12.1 - MONA, TCT and MTCD	Free Route	#27	• 3.2.1
	ATC15.1 – Initial extension of AMAN to En-route	Enhanced Arrival Sequencing		• 1.1.2
	ATC15.2 - Extension of AMAN to En-route	Enhanced Arrival Sequencing	#05	• 1.1.2
	ATC17 - Electronic Dialog supporting COTR	Free Route		• 3.2.1
	NAV03 – RNAV1	Performance Based Navigation		• 1.2.3 • 1.2.4 • 1.2.5
	NAV10 - Implement APV procedures	Performance Based Navigation	#103	• 1.2.1 • 1.2.2
	ENV01 - Implement CDO techniques	Performance Based Navigation		none
	AOP04.1 - A-SMGCS Level 1	Surface management		• 2.2.1 • 2.5.2
	AOP04.2 - A-SMGCS Level 2	Surface management		• 2.2.1

	AOP05 - Airport CDM	Collaborative Airport		• 2.1.1 • 2.1.3
	AOP10 - Time Based Separation	Enhanced operations in the vicinity of the runway	#64	• 2.3.1
	AOP11 - Initial Airport Operations Plan	Collaborative Airport	#21	• 2.1.4
	AOP12 - Improve RWY safety with ATC clearances monitoring	Surface management	#02	• 2.1.2 • 2.5.1
	AOP13 – Automated assistance for planning and routing functions	Surface management	#22	• 2.4.1
	ENV02 - Collaborative Enviromental Management (CEM) at Airports	Collaborative Airport		none
	SAF11 - Improve runway safety by preventing runway excursions	Surface management		none
	INF07 - Electronic Terrain and Obstacle Data (TOD)	Pre-SWIM & SWIM		none
	ITY-ADQ - Ensure quality of aeronautical data and aeronautical information	Pre-SWIM & SWIM		none
	ITY-AGDL - Initial ATC air-ground data link services above FL-285	Data link		• 6.1.1 • 6.1.3 • 6.1.4
	ITY-FMTP - Apply a common flight message transfer protocol (FMTP)	Pre-SWIM & SWIM		• 5.2.1
	ITY-ACID - Aircraft identification	CNS rationalisation		none
	ITY-AGVCS2 - AGVCS below FL195	CNS rationalisation		none
	ITY-SPI - Surveillance performance and interoperability	CNS rationalisation		none
	COM10 - Migration from AFTN to AMHS	CNS rationalisation		none
	COM11 - VoIP in ATM	CNS rationalisation		none
	COM12 - NewPENS	CNS rationalisation		• 5.1.2
	FCM08 – Extended Flight Plan	Pre-SWIM & SWIM	#37	• 4.2.3

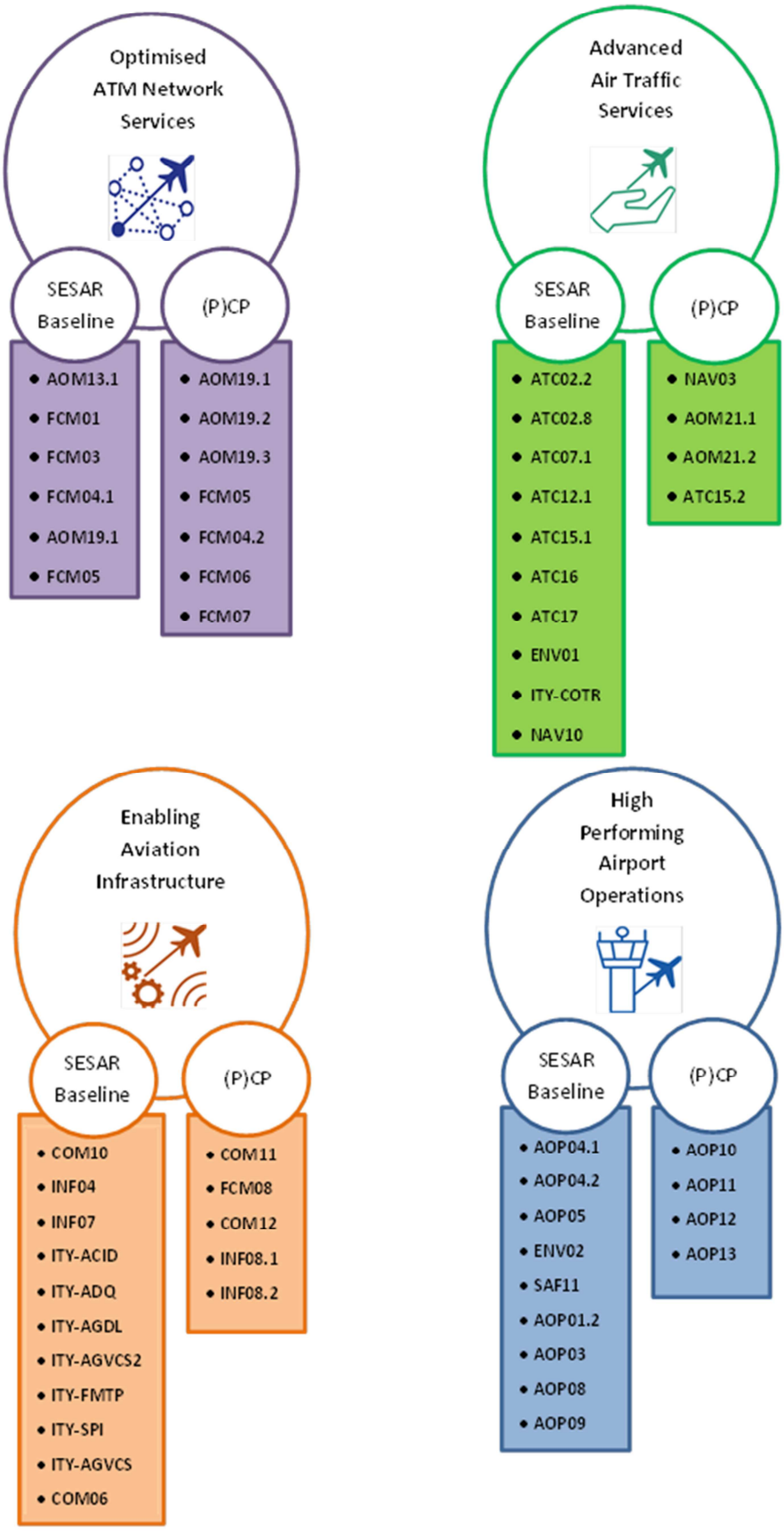


Figure 14: Mapping of Level 3 to SESAR baseline and (P)CP/SESAR1

Acronyms

A	
A/G	Air/Ground
ACC	Area Control Centre
A-CDM	Airport Collaborative Decision making
ACL	ATC Clearances and Information service
ACM	ATC Communication Management service
ADQ	Aeronautical Data Quality
ADS-B	Automatic Dependent Surveillance - Broadcast
AF	ATM Functionality
AF2	ATM Functionality 2
AF6	ATM Functionality 6
AFP	ATC Flight plan Proposal message
AFTN	Aeronautical Fixed Telecommunications Network
AFUA	Advanced Flexible Use of Airspace
AGDL	Air-Ground Data Link
AIP	Aeronautical Information Publication
AIRM	ATM Information Reference Model
AIXM	Aeronautical Information eXchange Model
AMA	Arrival Management Message
AMAN	Arrival Manager
AMC	ATC Microphone Check service
AMHS	ATS Message Handling Service
ANSP	Air Navigation Service Provider
AOM	Airspace organisation and management
AOP	Airport Operations Programme
APOC	Airport Operations Centre
APT	Airport
APV	Approach with Vertical Guidance
APW	Airborne Proximity Warning
ASBU	Aviation System Block Upgrade
ASM	Airspace Management
A-SMCGS	Advanced Surface Movement Control and Guidance System
ASP	Air Navigation Service Providers
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
ATFCM	Air Traffic Flow and Capacity Management
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATN	Aeronautical Telecommunications network
ATS	Air Traffic Services
ATSU	Air Traffic Service Unit
AU	Airspace Users
AUP	Airspace Use Plan
B	
B2B	Business-to-Business
C	
CAA	Civil Aviation Authority
CAPEX	Capital Expenditure
CATC	Conflicting ATC Clearances
CBA	Cost Benefit Analysis
CCO	Continuous Climb Operations
CDM	Collaborative Decision Making
CDO	Continuous Descent Approach
CEM	Collaborative Environmental Management
CFSP	Computer Flight Plan Software Provider
CMAC	Conformance Monitoring for Controllers
CNS	Communications, Navigation and Surveillance
COM	Communications
COTR	Coordination and Transfer
CPDLC	Controller Pilot Data Link Communications
CTOT	Calculated Take Off Time
D	
DCT	Direct Routing
DLS	Data Link Services
DLIC	Data Link Initiation Capability
DMAN	Departure Manager
DP	Deployment Program
DPI	Departure Planning Information (NM message)
E	
EAUP	European Airspace Use Plan
EC	European Commission
ECAC	European Civil Aviation Conference
EEC	EUROCONTROL Experimental Centre
EGNOS	European Geostationary Navigation Overlay Service
ENV	Environment
EOC	Essential Operational Change
ERNIP	European Route Network Improvement Plan
ESSIP	European Single Sky ImPlementation
eTOD	Electronic Terrain and Obstacle Data
EU	European Union
F	
FAB	Functional Airspace Block
FCM	Flow and Capacity Management

FIR	Flight Information Region
FIS	Flight Information Services
FL	Flight Level
FMTP	Flight Message Transfer Protocol
FOC	Final Operational Capability
FPL	Flight Plan
FRA	Free Route Airspace
FRQ	Frequencies
FSA	First System Activation
FUA	Flexible Use of Airspace
G	
GAT	General Air Traffic
GBAS	Ground Based Augmentation System
GNSS	Global Navigation Satellite System
I	
ICAO	International Civil Aviation Organisation
IFPS	Initial Flight Plan Processing System
IFR	Instrument Flight Rules
IND	Industry
INF	Information Management
INP	Initial Network Plan
IP	Internet Protocol
IR	Implementing Rule
ISRM	Information Service Reference Model
ITY	Interoperability
J	
JV	Joint Venture
K	
KEA	Key Environmental Area
KPI	Key Performance Indicators
L	
LARA	Local And sub-Regional Airspace Management
LSSIP	Local Single Sky Implementation
LU	Luxembourg
LVC	Low Visibility Conditions
M	
MAS	Maastricht UAC
MHz	Megahertz
MIL	Military Authorities
Mode S	SSR Selective Interrogation Mode
MONA	MONitoring Aids
MSSR	Monopulse Secondary Surveillance Radar
MT	Malta
MTCD	Medium Term Conflict Detection
MUAC	Maastricht Upper Area Control (Centre)

N	
N/A	Not applicable
NAV	Navigation
NDB	Non-Directional Beacon
NM	Network Manager
NMOC	Network Manager Operational Centre
NOP	Network Operations Plan
O	
OAT	Operational Air Traffic
OC	Operational Change
OI	Operational improvements
OLDI	On Line Data Interchange
OPEX	Operational Expenditure
P	
PBN	Performance Based Navigation
PCP	Pilot Common Project
PENS	Pan-European Network Services
PRB	Performance Review Body
PRISME	Pan-European Repository of Information Supporting the Management of EATM
P-RNAV	Precision RNAV
R	
REG	Regulatory Authorities
RNAV	Area Navigation
RNP	Required Navigation Performance
RP2	Reference Period 2
RPAS	Remotely Piloted Aircraft Systems
RTC	Remote Location
RWY	Runway
S	
SACTA	Automated Airtraffic Control System
SAF	Safety
SBAS	Satellite Based Augmentation System
SDM	SESAR Deployment Manager
SES	Single European Sky
SESAR	Single European Sky ATM Research
SJU	SESAR Joint Undertaking
SLoA	Stakeholder Line of Action
SMI	Safety Management Indicator
SMS	Safety Management System
SOA	Service Oriented Architecture
SPI	Surveillance Performance and Interoperability
SSR	Secondary Surveillance Radar
STAM	Short-Term ATFCM Measures
SWIM	System-Wide Information Management

T	
TBS	Time Based Separation
TCP/IP	Transmission Control Protocol / Internet Protocol
TCT	Tactical Controller Tool
TMA	Terminal Manoeuvring Area
TTA	Target Time of Arrival
TWR	Tower
U	
UDPP	Users Driven Prioritisation Process
UUP	Update Airspace Use Plan
V	
VCCS	Voice Communication and Control System
VoIP	Voice over Internet Protocol
VOR	Very High Frequency Omnidirectional Radio
W	
WAM	Wide Area Multilateration
WP	Work Package

SESAR JOINT UNDERTAKING

founding members

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