SESAR

THE ROADMAP FOR DELIVERING HIGH PERFORMING AVIATION FOR EUROPE

European ATM Master Plan

Executive Summary for ANSPs

Edition 2015

EUROPEAN UNION

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Executive Summary

The Stakeholder Executive Summary for the ANSPs has been developed by the ANSPs experts of the group that has produced the European ATM Master Plan Edition 2015. It is an executive summary with the specific ANSPs perspective on the Master Plan. In the first part it contains the Executive Summary of the main European ATM Master Plan document.

Executive Summary

What is the European ATM Master Plan?

Within the framework of the Single European Sky (SES), the European Air Traffic Management Master Plan (hereafter referred to as 'the Master Plan') is the main planning tool for defining ATM modernisation priorities and ensuring that the SESAR (Single European Sky ATM Research) Target Concept 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.

Why act now?

ATM is a critical element in the European air transport value chain and key to connecting regions and making Europe a global hub for mobility and prosperity. To ensure the sustainability and competitiveness of aviation, Europe needs to have a clear vision on how to deliver a high-performing ATM system.

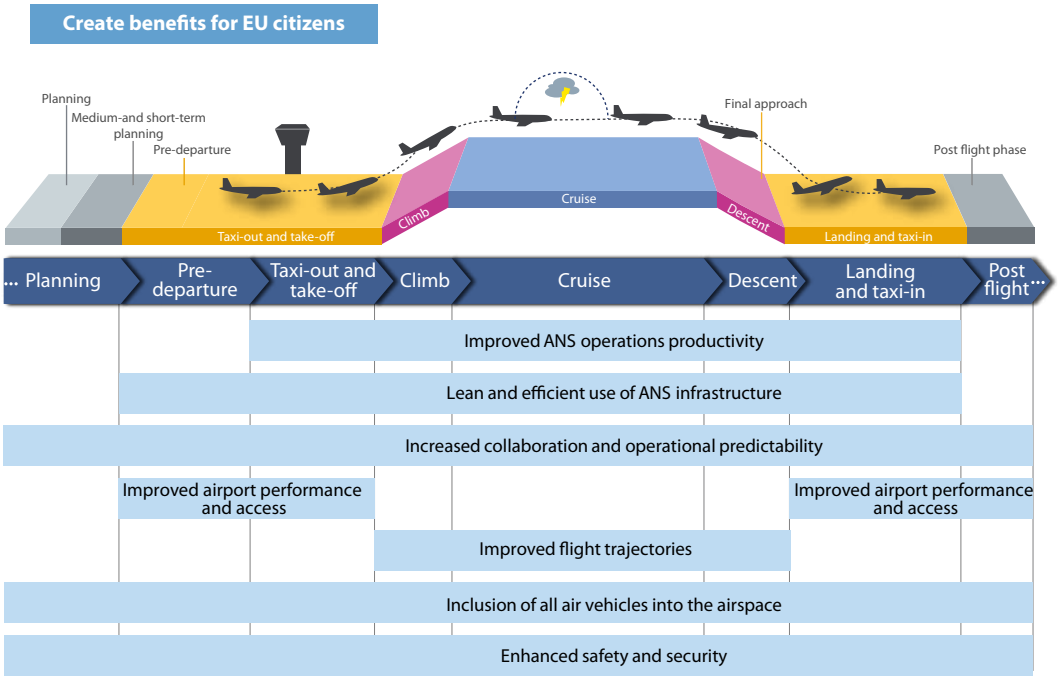
Since the 2012 edition of the Master Plan, several significant developments have taken place, such as the availability of the first SESAR Solutions, the start of deployment activities and the significant change to the long term traffic forecast. ATM modernisation therefore needs to reflect a greater focus on increased efficiency and effectiveness while sustaining or even improving the levels of safety and security. At the same time, it must also recognise the need to provide solutions to address critical capacity bottlenecks.

What's new in the 2015 edition of the Master Plan?

Mindful of these developments, this edition of the Master Plan:

- introduces a vision for the future European ATM system;
- presents the first wave of SESAR deployment, such as the Pilot Common Project (PCP) [1], and details the Key Features of R & D activities (SESAR 2020);
- provides new deployment scenarios for elements that are sufficiently mature to be brought into the deployment pipeline;
- makes explicit reference to remotely-piloted aircraft systems (RPAS) and rotorcraft as airspace users, as well as to cybersecurity elements within ATM;
- incorporates the results of a more comprehensive military involvement;
- reflects synergies and consistencies with the Deployment Programme and the Network Strategy Plan.

[1] Commission Implementing Regulation EU No 409/2013 specified the requirements for common projects. Common projects aim to deploy in a timely, coordinated and synchronised way ATM functionalities that are mature for implementation and that contribute to the Essential Operational Changes identified in the European ATM Master Plan (2012 edition). The first of these common projects is the Pilot Common Project (PCP).



What is the vision of the 2015 Master Plan?

Building on the 2012 edition of the Master Plan, this edition outlines the vision to achieve 'high-performing aviation for Europe' by 2035. The vision reflects the goals captured in the SES II initiative, which calls for 'more sustainable and better performing aviation' ([2]) and Flightpath 2050 — Europe's Vision for Aviation ([3]), which states that in 2050, 'The European aviation community leads the world in sustainable aviation products and services, meeting the needs of EU citizens and society'.

The vision builds on the notion of 'trajectory-based operations' and relies on the provision of air navigation services (ANS) in support of the execution of the business or mission trajectory — meaning that aircraft can fly their preferred trajectories without being constrained by airspace configurations. This vision is enabled by a progressive increase of the level of automation support, the implementation of virtualisation technologies as well as the use of standardised and interoperable systems. The system infrastructure will gradually evolve with digitalisation technology, allowing air navigation service providers (ANSPs), irrespective of national borders, to plug in their operations where needed, supported by a range of information services. Airports will be fully integrated into the ATM network level, which will facilitate and optimise airspace user operations. Going beyond 2035 towards 2050, performance-based operations will be implemented across Europe, with multiple options envisaged, such as seamless coordination between ANSPs or full end-to-end ANS provided at network level.

Furthermore, it is widely recognised that to increase performance, ATM modernisation should look at the flight as a whole, within a flow and network context, rather than segmented portions of its trajectory, as is the case today. With this in mind, the vision will be realised across the entire ATM system, offering improvements at every stage of the flight.

Reaching the performance ambition will also require a change in the way that solutions are deployed, as well as possible evolutions in the way services are provided. Through a four-phase approach, this change would see the high-level architecture gradually moving from locally specific architecture to a more interoperable, common and flexible service provision infrastructure at regional or network level (see Chapter 2).

([2]) Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions on SES II, COM(2008) 389/2, 25 June 2008.

([3]) Report of the High-Level Group on Aviation Research, 2011, EUR 098 EN.

SESAR's performance ambition

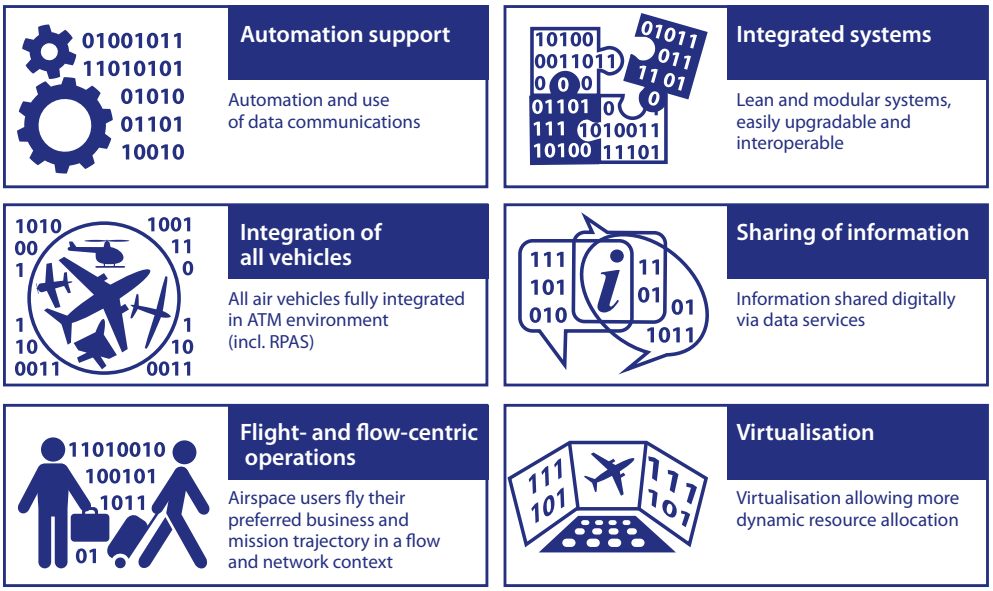
What is the ATM performance ambition for Europe?

The performance ambition supported by SESAR is aspirational and refers to the performance capability that may be achieved if SESAR Solutions are made available through R & D activities, deployed in a timely and, when needed, synchronised way and used to their full potential. While acknowledging that the performance gains at local level will also depend on local conditions, it shows that significant performance gains can be achieved in Europe in a number of key areas, namely the environment, capacity, cost efficiency, operational efficiency, in addition to safety and security. The ambitions described are compared to the situation in 2012 and rely on the optimal development and deployment of a series of operational changes through SESAR Solutions (see Chapter 3).

What is needed to achieve this performance ambition?

The technical evolution of the future system is now closely connected to these performance ambition levels. In order to deliver, SESAR will enable a step change in system capabilities

What is needed to achieve the performance ambition?



by 2035 with higher levels of automation, digitalisation and virtualisation.

The Master Plan identifies the related changes and groups them according to whether they are already in place, in the pipeline towards deployment, or planned as part of future R & D activities (see Chapter 4).

These changes are categorised according to four areas of ATM (Key Features):

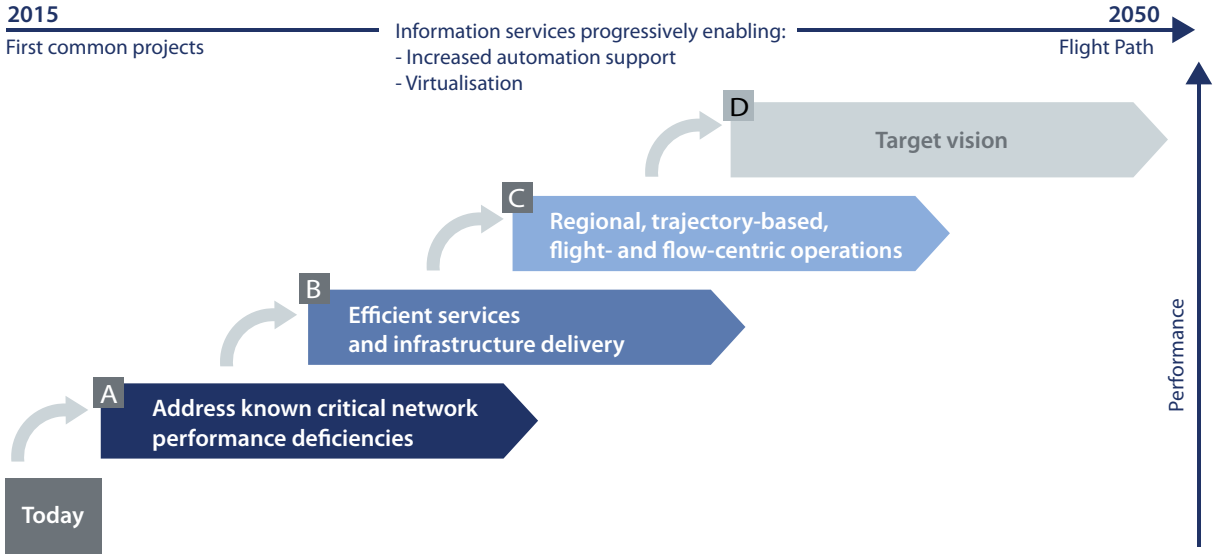
Further operational changes relating to RPAS and cybersecurity are also featured in the Master Plan. Key to success is the ATM workforce, which the Plan underlines as an integral part of the overall ATM system, and as the most critical source of its performance, safety and resilience. As in past and present operations, ATM performance will remain the result of a well-designed interaction between human, procedural, technological, environmental and organisational aspects.

What is the timeline for deployment?

The operational changes are enabled through improvements to technical systems, procedures, human factors and institutional changes supported by standardisation and regulation.

The Master Plan includes roadmaps of the identified changes, ensuring that their deployment is planned in a performance-driven and synchronised way (e.g. between ground and air deployments) to maximise the benefits gained. The Master Plan also gives targeted dates for deployment; however, these are subject to further considerations after validation and proper identification of supporting business cases.

Four-phase approach to improvements



Delivering expected benefits

Direct and quantifiable benefits for European ATM and aviation	Benefits for EU economy and society
- **ANS productivity:** reduced en-route and TMA costs per flight - **Operational efficiency for airspace users:** reduced fuel burn and flight time - **Capacity:** reduced delays, increased network throughput and throughput at congested airports - **Environment:** reduced CO_2 emissions - **Safety and security:** high standards	- Industrial leadership in ATM and aviation at the forefront of innovation - A more competitive EU aviation industry in the global aviation landscape - Increased mobility with a lower environmental impact - Significant contribution to EU GDP and job creation - High standards in terms of safety, security and social standards

What are the expected costs and benefits?

The realisation of the vision will not only bring significant direct and quantifiable performance gains to ATM and aviation, but it will also mean benefits for the EU economy and society in general, as described.

In terms of cost savings, the Master Plan estimates important improvements in several areas, depending on how SESAR is deployed. Two options are put forward: on the one hand an optimised deployment scenario with greater integration of the ATM infrastructure, and on the other hand a local deployment scenario.

It is estimated that cost savings and the value of all performance benefits would amount to annual recurring benefits ranging potentially from EUR 8 billion to EUR 15 billion per year in 2035, compared to a scenario where SESAR would not be deployed. These savings imply higher levels of coordination on how and where to invest, as well as the early application of standardisation and harmonisation of procedures. More critically, these savings also rely on the deployment of infrastructure with a long-term horizon which is optimised at network level, amounting to a total investment in the range of EUR 18 billion to EUR 26 billion in the period up until 2035 (see Chapter 6).

Why is the Master Plan important for global interoperability?

Aviation is a global industry and interoperability together with global harmonisation are key for its safe and sustained growth. The EU-US Memorandum of Cooperation (MoC) provides the framework for SESAR and FAA's NextGen coordinated approach in particular with regards to the International Civil Aviation Organisation's (ICAO) harmonisation efforts. This latest update of the Master Plan is timely as it will serve to contribute to the update of the ICAO's Global Air Navigation Plan (GANP) and the Aviation System Block Upgrades (ASBUs) in 2016.

The Master Plan: a shared and maintained strategy for the evolution of European ATM

The Master Plan is a regularly updated plan (every 2-3 years) which involves all stakeholders. It represents the strategy for the performance-driven evolution of the European ATM system for institutional as well as industrial players.

The Master Plan's successful implementation is a key enabler for high-performing aviation in Europe, providing increased connectivity, supporting sustainable economic growth and promoting European industrial leadership at a global level.

Stakeholder Executive Summary for ANSPs

Executive Summary for ANSPs

The European ATM Master Plan is the main planning tool for the SESAR programme and the modernisation of the European ATM network. As the common reference for all affected stakeholders, it outlines the key operational and technological changes foreseen to achieving the European SES performance objectives. From a snapshot perspective, the present Master Plan Executive Level describes the current state of these changes in the evolution process. It comprises mature and reliable elements, when referring to near-term facts like completed validation results. It also provides a preview of SESAR 2020 up to a long-term vision, performance and business views, which are based on ambitious estimations or expert judgement. Hence, these views need to be progressively verified and revised based on new findings while it is recognised that the performance gains at local level also depend on local conditions and on the evolution of traffic.

The main purpose of the European ATM Master Plan is to provide full visibility on the results achieved so far and the planned way to go. It offers the best available guidance for the next steps by connecting existing results with the next-stage key features of SESAR 2020 in a comprehensive preview as well as a long-term SESAR vision.

Based on an initial and high-level estimation of costs and benefits, the Master Plan identifies promising "Essential Operational Changes" which provide significant network performance benefits. Hence they still need to be validated by the R&D programme, therefore the timelines for deployment are subject to further considerations after validation and proper identification of supporting business cases based on mature R&D results.

The potential of SESAR is highlighted in the Performance and Business Views, which deliberately are based on very ambitious estimations - especially the cost reduction potential shown in the business view of the document which seems to be too ambitious at least for those ANSPs who have already introduced relevant functionalities and/or performed consolidation of control centres. They should be taken as a common challenge for all involved stakeholders to shape and test all candidate solutions during the development phase in order to reach the intended ambition levels as close as possible.

While the aspirational nature of the ATM Master Plan is essential to encourage the achievement of best value for money in R&D, it is also clear, that caution from all actors is needed, before firm decisions on e.g. deployment or regulation can be made. The SJU has been established and started to provide mature R&D results as an important ingredient for subsequent investment decisions and supporting regulatory steps. At the end of the development cycle, this allows to combine reliable R&D results with up-to-date actual performance needs based of real traffic-evolution and other constraints at local or network level. The SJU programme complemented by the SESAR Deployment Management arrangements build a unique mechanism that ensures unprecedented improvements of effectiveness and performance. Now that the three phases of the SESAR life cycle are active: definition, development and deployment it is of utmost importance for the success of SESAR that the joint mechanism concerning the execution of the ATM Master Plan is not hampered.

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