



THE ROADMAP FOR DELIVERING HIGH PERFORMING AVIATION FOR EUROPE

European ATM Master Plan

Executive Summary for Airspace Users

Edition 2015



EUROPEAN UNION



EUROCONTROL

Executive Summary

The Stakeholder Executive Summary for Airspace Users has been developed by the Airspace Users experts of the group that has produced the European ATM Master Plan Edition 2015. It is an executive summary with the specific Airspace Users 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

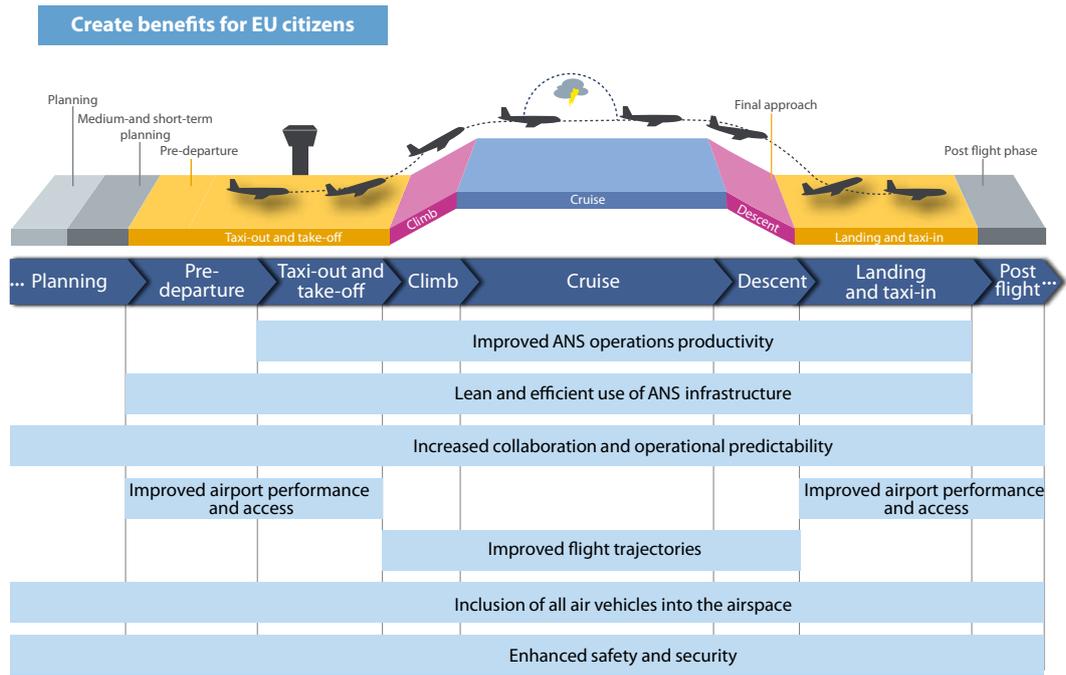
place, such as the availability of the first SESAR Solutions, the start of deployment activities and the significant change to the long term traffic forecast. ATM modernisation therefore needs to reflect a greater focus on increased efficiency and effectiveness while sustaining or even improving the 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?

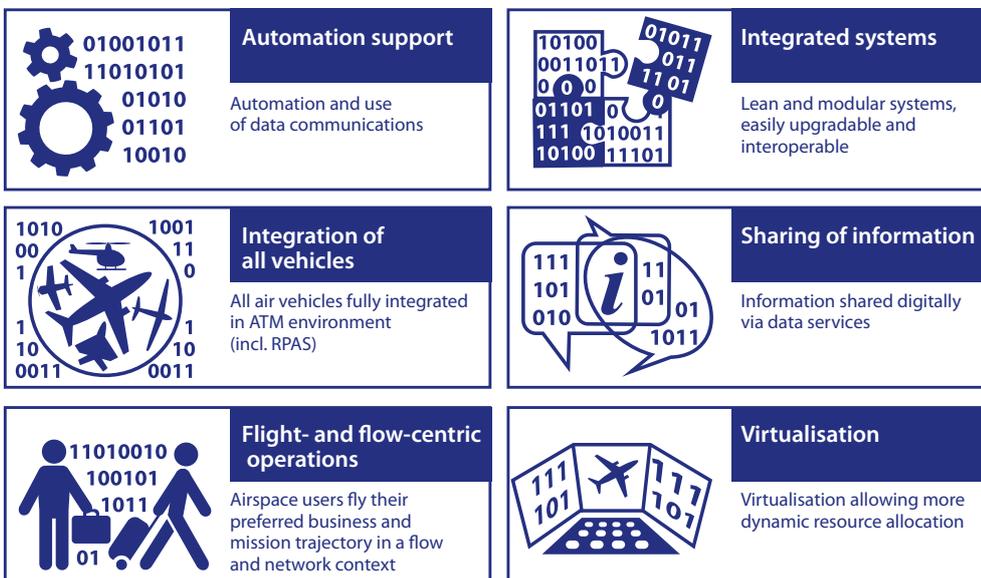
The performance ambition supported by SESAR is aspirational and refers to the performance capability that may be achieved if SESAR Solutions are made available through R & D activities, deployed in a timely and, when needed, synchronised way and used to their full potential. While acknowledging that 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

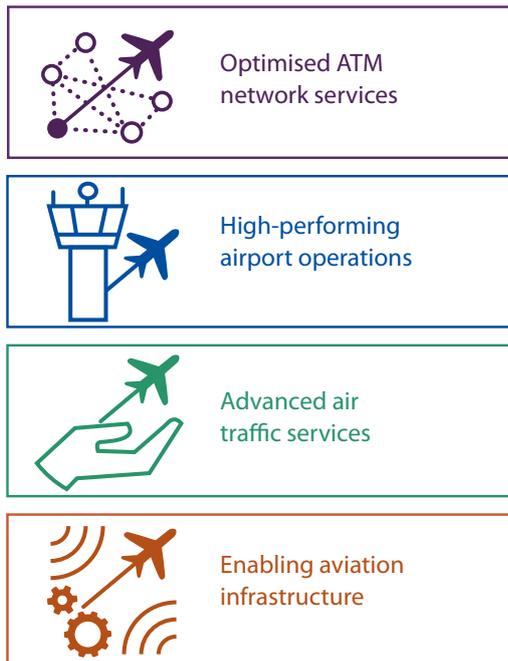
What is needed to achieve the performance ambition?



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):

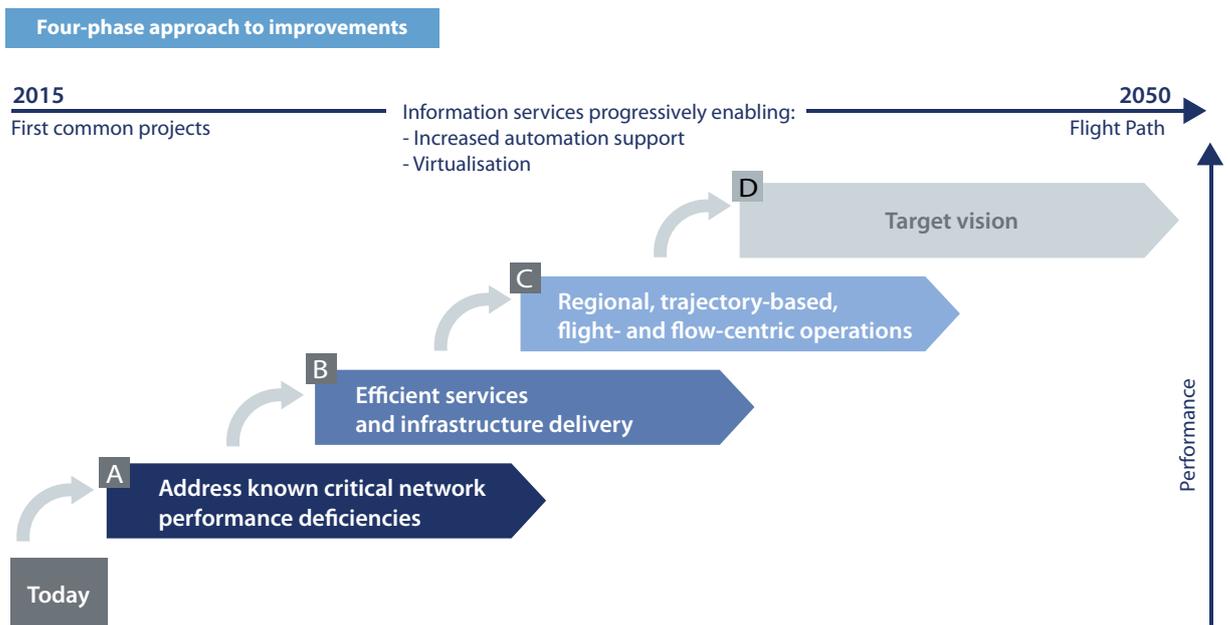


Further operational changes relating to RPAS and cybersecurity are also featured in the Master Plan. Key to success is the ATM workforce, which the Plan underlines as an integral part of the overall ATM system, and as the most critical source of its performance, safety and resilience. As in past and 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.



Delivering expected benefits

Direct and quantifiable benefits for European ATM and aviation

- **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 CO₂ emissions
- **Safety and security:** high standards

Benefits for EU economy and society

- 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 Airspace Users

Executive Summary for Airspace Users

The ultimate goals of the technological modernisation of air traffic management through the deployment of the Single European Sky Air traffic management Research project (SESAR) are to enable a reduction of air traffic management unit costs, increased operational efficiency for Airspace Users by reducing fuel burn and flight time, an increase in capacity leading to less delays and a reduction of CO₂ emissions. All these elements will increase the environmental benefits of SESAR solutions, and are fully linked to the overall air traffic management performance scheme.

ATM modernisation is a key enabler for an efficient and well-functioning aviation system. It is therefore vital that the performance improvements in the Master Plan are delivered and the targets are met. To that end any risk of delay in the realisation of this performance ambition should be closely monitored and mitigated. Airspace Users also support the view expressed in the plan that the SESAR performance ambitions contribute to, but do not replace, the SES high level goals set in 2005. On the 15th of December 2015 all members of the Administrative Board 2015 of the SESAR Joint Undertaking (SESAR JU) formally approved the 2015 Edition of the European ATM Master Plan accompanied by a number of comments and recommendations which are also outlined below for the next review of the Master Plan – the main planning tool for Air Traffic Management (ATM) modernisation in Europe.

All eight main Airspace User Association (AEA, ERA, IATA, ELFAA, IACA, EBAA, EHA, and IAOPA¹) have fully supported this common work.

We as Airspace Users (AU) have built over a period of 12 months in strong collaboration with the SESAR JU founding members and all aviation stakeholders, under the lead of SJU and chairmanship from EUROCONTROL, this latest Master Plan edition providing a comprehensive vision of the future ATM system, which sees increased levels of automation, digitisation and virtualisation and the management of the entire

flight end-to-end. In doing so, the vision promises a system which will be customer-centric,

performance-driven, efficient, intelligent and responsive to meet future aviation performance requirements in areas such as safety, security, environment, cost efficiency and capacity. Human Factor Performance items like Training and Safety, PBN, Drones/RPAS/UAV, Military issues and Cyber Security, etc. are taken on-board now. The important link to the US ATM Program NextGen has also been improved.

For the future, the EC said it wanted to see strengthened coordination between the SJU and SDM (one of the Airspace Users' points) and also between the SJU, EASA and the EU Standardisation Bodies also to avoid overlap of work.

The Airspace Users fully support the very ambitious vision and performance ambitions of the Master Plan and acknowledge the need to work together with all stakeholders to achieve them.

¹ **AEA:** Association of European Airlines
ERA: European Regions Airline Association
IATA: International Air Transport Association
ELFAA: European Low Fares Airline Association
IACA: International Air Carrier Association
EBAA: European Business Aviation Association
EHA: European Helicopter Association
IAOPA: International Council of Aircraft Owner and Pilot Associations



We as Airspace Users (AU) will continuously work with all stakeholders at SJU level, to ensure our 7 top priorities:

1. Strict Governance
2. Steering of the Performance
3. Reporting and Information by Key Performance Area (KPA)
4. Monitoring of target achievement per Key Performance Indicator (KPI)
5. Results and timing
6. NextGen and worldwide synchronisation
7. And all in alignment with the new EU Aviation Strategy Plan!

Thanks to SESAR, the EU is also able to play an influential role at a global level in particular in the context of the International Civil Aviation Organization's (ICAO) harmonisation activities.

This latest edition presents the SESAR vision of ATM – a critical element in the future air transport system – and details the development and deployment activities necessary to achieve this vision between now and 2035. The Master Plan follows the recent adoption by the European Commission of a new aviation strategy, giving fresh inputs and breath to the competitiveness of this important industry for Europe.

European stakeholders have demonstrated once again their commitment to lead the way in the global ATM and aviation market. In this global arena, the Master Plan will remain instrumental for aligning priorities and planning across world regions to ensure harmonisation and interoperability.

It is essential that during the implementation of the ATM Master Plan there is clear monitoring of the achievement of the ATM Master Plan Key Performance Indicators so as to ensure consistency and support to the agreed SES Performance Scheme targets. The effort of alignment between the SESAR and the SES Performance Scheme Key Performance Indicators should be continued to ensure that they contribute to the overall SES High-Level goals. Equally, there should be a regular assessment to ensure that the implementation of the ATM Master Plan is actually leading to improved cost (and operational) efficiency and a reduction in charges.

As part of the implementation process of the European ATM Master Plan there needs to be a continued and systematic coordination between the SJU and the Deployment Manager to avoid duplication of work and ensure consistency between the updated Master Plan and the actual deployment process across all areas.

Under the range of options for equipage incentives presented 'modulation of charges' is included under financial options. The Airspace Users objected to the inclusion of the use of modulation of charges as a means of equipage incentivisation. However, this comment was rejected by the SJU in the final draft. For the record the Airspace Users ask that this objection should be noted in the Master Plan as a position of the Airspace Users.

Finally the additional comments were made by the Airspace Users' community:

- NextGen and SESAR should work towards a converged standard using the concept of Most Capable Best Served (MCBS), enabling airlines and ANSPs to upgrade their respective fleets and ground infrastructures to reach convergence. Operation leading up to the convergence point should accept both FANS 1/A and ATN/B1 capability without operational penalty as applicable.
- A multi-frequency ATN solution should not to be implemented unless the solution is proven to provide the promised safety, capacity and efficiency benefits in a full scale environment.

The European air transport system is not operating at its optimum level and the much-needed modernisation of European airspace is progressing slowly. Airport capacity is expected to fall short of future demand growth. This means a risk of foregone opportunities for the European air transport industry and the European economy as a whole. IATA commissioned SEO Amsterdam Economics to independently quantify the economic impacts of European airspace modernisation and European airport capacity enhancements. The key findings are:



in 2035, compared to a 'do nothing' scenario (in which no further airspace modernisation would take place).

These benefits consist of:

More efficient air navigation services provision at a higher capacity, which translates into airline cost savings and lower air fares

- Shorter travel times because routings will be more direct
- Connectivity growth (more routes, more frequencies)
- Lower CO₂ emissions per flight.

Consumer benefits increase to EUR 125.7 billion in 2035 if also remaining airport infrastructure capacity constraints would be addressed.

The Benefits in the UK, Germany, France, Spain, Italy and Turkey account for almost 70% of the benefits.

Airspace modernisation results in EUR 494 billion of additional GDP by 2035. If remaining airport infrastructure capacity constraints were also removed, the GDP benefit increases to EUR 686 billion by 2035.

Total employment increases by 0.5% in case of airspace modernisation and 0.7% if any remaining airport capacity constraints were removed. In addition, trade, tourism, labour productivity, R&D and innovation would be positively affected.

If airspace is not modernised and airport capacity fails to keep up with aviation demand growth, these benefits for the European airline industry and European economy could be at stake (IATA Study 2016).

This further highlights the importance of SESAR and its role in achieving a more performing and sustainable European aviation.



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