The European ATM Master Plan
Connecting the dots

THE MASTER PLAN DEFINES THE PRIORITIES FOR EU FUNDING

- Why we need to act
- What needs to be done
- When it needs to be done
Public investments play a pivotal role

- **2005-08**
  - **Definition Phase**
  - **€ 50 Million**
  - **100% EU funding**

- **2008-24**
  - **Development Phase**
  - **€ 3.7 Billion**
  - **33% EU funding**

- **2015-XX**
  - **Deployment Phase**
  - **~ € 30 Billion**
  - **~ 10% EU funding**
  - (current financial perspectives)

**SECURING THE LINK BETWEEN PUBLIC AND PRIVATE ENGAGEMENT**
A transparent and collaborative process

- Broad stakeholder involvement
  - EC
  - Eurocontrol
  - Operational stakeholders
  - Manufacturing industry
  - PRB
  - EASA
  - EUROCAE
  - SDM
  - EDA

- Partnership as the key to success
  - Agree where there is a need to act
  - Articulate a clear vision
  - Set the right priorities

THE KEY IS TO AGREE THE RIGHT AMBITION LEVEL THAT ALL CAN SHARE
WHY WE NEED TO ACT
The context has evolved

The opportunity was taken to “rethink” SESAR
Key challenges addressed

When we talk about SESAR we talk about SES

To-date the main driver was to build capacity

We have today all conditions for a change

Consistency with SES regulatory framework. SESAR performance ambition level is now cross-readable with SES Performance pillar

The main driver moving forward is to help address the cost issue

This update brings closer than ever the 3 processes of the SESAR lifecycle that are now activated (Definition>Development>Deployment)

WHEN ITS NOT IN THE ATM MASTER PLAN IT IS NOT IN SESAR/SES
Towards higher levels in ANS productivity

SIGNIFICANT IMPROVEMENT IN OTHER PERFORMANCE AREAS ARE ALSO TARGETED

Without SESAR

With SESAR

ATM MP horizon

Real terms - €

2012

2035

€/flight

1000

500

0

960

10-20%

820

30-40%

530
WHAT NEEDS TO BE DONE
Connecting technology & performance

Role of enabling technology in other industries

- Electricity
- Banking
- Postal
- Technology

PRB, flight path, ICB and CANSO vision

IS ATM SO DIFFERENT COMPARED TO OTHER BUSINESS?
LOOKING AT THE FLIGHT AS A WHOLE, WITHIN A FLOW AND NETWORK CONTEXT

SESAR vision targets 7 improvement areas

- Improved ANS operations productivity
- Lean and efficient use of ANS infrastructure
- Increased collaboration and operational predictability
- Improved airport performance and access
- Improved flight trajectories
- Inclusion of all air vehicles into the airspace
- Enhanced safety and security
SESAR to enable step-change in system capabilities

**Automation of routine tasks**
Automation and use of data communication to ease controllers & support staff workload

**Integration of all vehicles**
All air vehicles fully integrated in ATM environment (incl. RPAS)

**Flight-centric operations**
Air users fly their preferred, more direct route in a flow and network context

**Integrated systems**
Lean and modular systems, easily upgradable and interoperable

**Sharing of information**
Information shared digitally via common information platform

**Virtualization**
Virtualization allowing dynamic capacity management
Achievement of SESAR ambition will require the implementation of critical enabling infrastructures

<table>
<thead>
<tr>
<th>New CNS Infrastructure</th>
<th>New controller tools &amp; practices</th>
<th>System wide information &amp; service</th>
<th>Trajectory based management</th>
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</thead>
<tbody>
<tr>
<td>Data-link Communication</td>
<td>Virtual center to enable decoupling of infrastructure from service provision</td>
<td>ATM information shared digitally via a common platform (SWIM)</td>
<td>Trajectory based ATM system</td>
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<tr>
<td>• Multilink (LT¹ SATCOM datalink, LDACS³, Aeromacs)</td>
<td>• Flexible load balancing</td>
<td>• Common data model (AIRM, runtime registry)</td>
<td>• Gate-to-gate trajectory information (incl. taxi) is shared by all actors</td>
</tr>
<tr>
<td>Precision Navigation</td>
<td>• Common standards to enable interoperability</td>
<td>• AOP/NOP integration</td>
<td>• Optimised trajectories taking into account priorities and constraints</td>
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<tr>
<td>• GBAS, SBAS, GNSS, A-PNT⁴</td>
<td>• Sectorless ATM</td>
<td>• Cyber-security proofed</td>
<td>• Synchronized AIM/MET⁶ information</td>
</tr>
<tr>
<td>Future of Surveillance</td>
<td>• Advanced airspace management tools.</td>
<td>• Military-civil inter-ops.</td>
<td>• Network Management and Demand and Capacity Balancing</td>
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<tr>
<td>• Multi-layered infrastructure (SSR, ADS-B⁵, Wide-area Multilateration)</td>
<td>Human machine interface technologies to enhance automation</td>
<td>Harmonized delivery of ATM services</td>
<td>• Airport Integration and Throughput</td>
</tr>
<tr>
<td>Adequate CNS to integrate all air vehicles²</td>
<td>• Conflict detection and resolution tools</td>
<td>• Open standards</td>
<td>FROM INNOVATION TO SOLUTION</td>
</tr>
</tbody>
</table>
| • Low cost ADS-B⁵, GNSS and datalink solutions | • Advanced CWP functions (e.g. multi-touch) | • Service delivery using the common information platform | 1. Long Term; 2. RPAS, UAS, Rotorcraft; 3. Digital Aeronautical Communication System; 4. Ground-Based Augmentation System, Global navigation satellite system, Alternative Positioning, Navigation, and Timing; 5. Automatic dependent surveillance – broadcast; 6. Aeronautical Information / Meteorological information;
Stronger emphasis on global interoperability

SESAR/NextGen State of Harmonization reflected

All elements are traceable and feed into the ICAO Global Air Navigation Plan
Master Plan priorities have been fully reflected in SESAR 2020

**DEFINITION**

Range of possible options were assessed during the Master Plan update process.

**DEVELOPMENT**

SESAR 2020 programme reflects Master Plan priorities (scope, timing etc …)
A reshaped R&D programme

THE SESAR 2020 PROGRAMME STRUCTURE

EXPLORATORY RESEARCH

- FIRST CALL ISSUED
- NEXT CALLS 2017 2019 2020

LARGE SCALE DEMOs

- Wave 1: 2016-2019
- Wave 2: 2019-2021

Delivering best-in-class, globally interoperable and high-performing Air Transport for Airspace Users and Citizens

High Performing Airport Operations
Optimised ATM Network Services
Advanced Air Traffic Services
Enabling the Aviation Infrastructure
RPAS Integration

2 waves: 2016-19 & 2019-21, synchronised with the European ATM Master Plan update cycle
Putting the research community in the driving seat

**SESAR exploratory research drives the development and evaluation of innovative or unconventional ideas, concepts, methods and technologies; that can define and deliver the performance required for the next generation of European ATM system, and thus contribute to its successful evolution**

Reviewed, updated and approved by the SESAR Scientific Committee

**CONCENTRATES ON EARLY MATURITY EXCELLENT SCIENCE AND INITIAL APPLICATIONS TO ATM, FEEDING THE EUROPEAN ATM MASTER PLAN**
WHEN IT NEEDS TO BE DONE
Deployment progressively moves from structural enablers to target vision

Information Services enabling progressive:
- Increased automation support
- Virtualization

Regional, trajectory based, flight and flow centric operations

Efficient services & infrastructure delivery

First structural Enablers in place, local pain points addressed

Today

2015
First Common Projects

FUTURE OF DEPLOYMENT AND DEVELOPMENT DELIVERY DATES ARE LINED UP WITH THIS APPROACH
SESAR will enable change in ATM model to achieve the ambition

First structural changes in place, local pain points addressed

Efficient services & infrastructure delivery

Regional, trajectory-based, flight centric operations

Target vision

Countries

C1  C2  C3  C4

Countries

C1  C2  C3  C4

Countries

C  C  C  C

Multiple options e.g. End-to-end ANS Service Provision

Range of possible evolution options will increase as solutions mature

WE DO NOT DEFINE HOW MODELS SHOULD EVOLVE. ANY DECISION WILL HAVE TO BE TAKEN BY RELEVANT DECISION MAKERS
To summarize

- The ATM Master Plan has a **structuring impact** on both development and deployment activities now running in parallel.

- Technology options **are prioritised** are directly hooked to SESAR performance ambitions and to the SES policy.

- We look at the research community to help us feed the ATM Master Plan with **innovative ideas** and further shape the SESAR Vision.