THE SESAR STORY SO FAR

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SESAR Innovation Days
25 November 2014
Why SESAR?

- European ATM - Essential component in air transport system (worth €8.4 billion/year*)

- Complex infrastructure = Inefficiencies

* Source: Eurocontrol - **Source: European Commission
The Single European Sky High Level Performance Goals

- Increase current capacity × 3
- Increase safety by a factor of 10
- Reduce the environmental impact by 10% per flight
- Reduce ATM costs by 50%
The Single European Sky

Implementing the Single European Sky

Performance
- Performance scheme
- Performance Review Body
- Functional Airspace Blocks
- Network Manager
- National Supervisory Authorities

Safety
- EASA
- Crisis coord. cell

Technology
- SESAR
- European ATM Master Plan
- SESAR Joint Undertaking
- Common projects

Airports
- Airport observatory

Human Factor
- Specific sectoral dialogue Committee
- Consultative expert group on social dimension of the SES

FROM INNOVATION TO SOLUTION
A PPP involving all actors required to change ATM
# Research for the benefit of our stakeholders

<table>
<thead>
<tr>
<th>ANSPS</th>
<th>Suppliers and manufacturers</th>
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<tr>
<td><strong>Air traffic controllers, pilots and engineers</strong></td>
<td><strong>Regulators and standardisation bodies</strong></td>
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<td>• Deliver a better quality of service at a lower unit cost for airspace users</td>
<td>• Gain access to the market</td>
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<td>• Seamlessly interoperate with service providers across the network</td>
<td>• Develop their products in an innovative and competitive environment</td>
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<td>• Have confidence that the user requirements are met</td>
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<td><strong>Airport operators</strong></td>
<td><strong>Air Passengers</strong></td>
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<td>• Have tools and systems that are built to their needs</td>
<td>• Build their activities based on validated solutions agreed across the European ATM stakeholder community</td>
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<td>• Ability to operate in an increasingly complex environment</td>
<td><strong>Scientific Community</strong></td>
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<td><strong>Airspace Users (civilian &amp; military)</strong></td>
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<td>• Have access to more integrated systems and data sharing</td>
<td>• Benefit from shorter and more reliable journeys, lower costs and enhanced safety.</td>
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<td>• Greater predictability and more efficient operations</td>
<td><strong>Scientific Community</strong></td>
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<td>• Operate closer to their business or mission needs, while reducing fuel costs, service charges and reducing impact on the environment</td>
<td>• Use scientific knowledge to challenge the status-quo</td>
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<td>• Deliver the results needed for the achievement of the Single European Sky initiative</td>
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Operational & technological improvements developed by the SESAR partnership in six key operational improvement areas:

- Moving from airspace to 4D trajectory management
- Traffic synchronisation
- Network collaborative management and dynamic capacity balancing
- Airport integration and throughput
- System wide information management
- Conflict management and automation

Solutions are validated through the SESAR Release process, demonstrated through Large scale demonstrations & documented in "Solution packs"
SESAR results

- **68 validation exercises** completed with results published indicating cost-efficiency, environmental and safety benefits
- **20 new validation exercises** underway (Release 4)
- **Preparations for Release 5 (PCP focussed)**

- **17 SESAR Solutions** (building blocks for deployment planning):
  - Moving from Airspace to 4D trajectory Management
  - Traffic Synchronization
  - Network Collaborative Management and DCB
  - Airport Integration and Throughput
  - SWIM
  - Conflict Management and Automation

Download SESAR Solution Packs
www.sesarju.eu
Demonstrating SESAR Solutions Worldwide

- 66 demonstration projects
- 30,000+ flight trials
- More than 50 locations
WP-E explores novel, unconventional areas, involving new technologies, concepts and ideas.

The scope covers ATM, CNS and related research activities not covered in the SESAR mainstream program.

40 research projects, 3 research networks, 20 PhDs and a Young Scientist Award.
Encouraging scientific excellence in ATM

With guidance from SESAR Scientific Committee

- 17 Projects 13 PhDs
- 11 Projects 7 PhDs
- 6 Projects
- 3 Projects
- 3 Projects

Focussing on:
- Business Agility
- Decision Support
- Environment & Meteorology
- CNS/ATM (Automation)
- Operating Concepts
- The Human Factor

Towards Higher Level of Automation in ATM

Mastering Complex Systems Safely

System Architecture & System Design

Enabling Change in ATM

Information Management, Uncertainty & Optimisation

FROM INNOVATION TO SOLUTION
WP-E Research Networks

- WP-E total **40 projects** of which **22** are ongoing and **18** are closed
- The three Research Networks coordinate research, knowledge development and manage PhD research
- **HALA!** – Towards Higher Levels of Automation in ATM
- **Complex World** – Mastering Complex Systems Safely
- **ALIAS** – Addressing the Liability Impact of Automated Systems
SESAR Projects

2 Demo projects
1 ER project
1 PCP project

3 Solutions
2 ER projects
16 Demo projects

3 solutions
3 ER projects
2 PCP projects

2 solutions
9 ER projects
3 demo projects
2 PCP projects

1 solution
8 ER projects
3 Demos
2 PCP projects

1 solution
2 ER projects
1 PCP project
LONG TERM RESEARCH & INNOVATION IN SESAR 2020
Bridging stakeholder needs with R&I

Delivering best-in-class, globally interoperable and high-performing Air Transport for Airspace Users and Citizens
- Enabling the delivery of safe, cost-efficient and environmentally responsible Air Vehicle & ATM operations, systems and services

High Performing Airport Operations
Capacity, Safety, Environment, Efficient, Effective, Networked

Optimised ATM Network Services
Collaboration, Balancing Demand & Capacity, Environment, Efficiency

Advanced Air Traffic Services
Synchronisation, Capacity, Safety, Environment, Cost

Enabling the Aviation Infrastructure
- Providing shared technical services across the aviation domain
- Communications, positioning, navigation, timing and SWIM information
- Air vehicle operations, systems & services
**Three main Research Phases of SESAR R&I Pipeline**

1) **Exploratory Research**
   - Concentrates on early maturity Excellent Science and initial applications to ATM.
   - Uses open calls.

2) **Industrial Research & Validation (Applied Research & Pre-industrial Development) through partnership**
   - Concentrates on maturing and validating through Applied Research, Pre-Industrial Development and Validation of high benefit applications for ATM.
   - Uses an industrial PPP with involvement of all stakeholders.

3) **Demonstration Activities**
   - Concentrates on taking the concepts and technology to a wider geographic and stakeholder application
   - The bridge to deployment through risk reduction
   - Uses a mixture of industrial PPP and open calls.
• In very early stages research V0 level (e.g. WP-E projects), transfer of research results is difficult into the SESAR main-stream program

• The need to strengthen the link of the ATM research community and SESAR stakeholders through ATM Applications Oriented topics in SESAR 2020

• SESAR 2020 will aim at bridging the results from Exploratory Research, Industrial Research and Large Scale Demos
SESAR 2020 Program

• Bring benefits to SESAR SJU Industrial stakeholders, through the transfer of Exploratory Research results to Industrial Research

• The objectives of SESAR 2020 Exploratory research are to sustain and grow the future ATM research community

• The exploratory research ideas, concepts, methods and technologies can contribute, to the successful evolution of the next generation of European ATM system
Thank you for your attention