THE FUTURE OF AIR TRAFFIC MANAGEMENT – SAFE & EFFICIENT

An Update on SESAR

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EIWAC Tokyo - 10 November 2010

founding members

EUROPEAN COMMISSION

EUROCONTROL

SETTING THE SCENE…..

EUROPEAN ATM CHALLENGES

Capacity:
Doubling of Air Traffic by 2030

Safety:
Improvements linked to growth

Environment:
Sustainable operations

Operations:
Seamless & Harmonised

Cost:
Affordable by customers

Technology:
Common and Interoperable

THE REGULATION

SJU is responsible for "... carrying out specific activities aimed at modernising the European air traffic management system by coordinating and concentrating all relevant research and development efforts in the Community" - Council Reg 219/2007

European-funded ATM research and development is consolidated into SESAR...

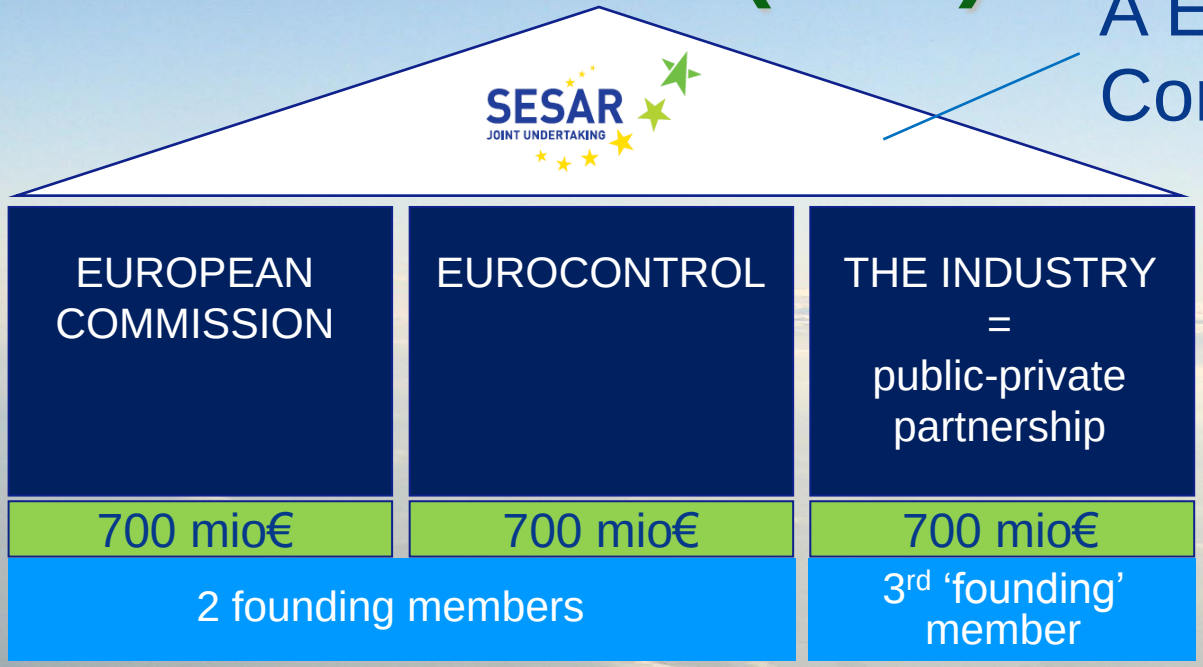
Success means coordinating with other relevant research and development efforts too.

SESAR WILL substantially change the Air Traffic Management (ATM) market in Europe …

... and beyond?

THE SESAR JOINT UNDERTAKING (SJU)

A European Union Community Body



Budget: € 2.1 billion (over 8 years)

Public-Private Partnership

- Innovation from the private sector
- Financial stability & enforcement power from the public sector

SJU INVOLVES ALL ACTORS

A Multi-Stakeholders approach at the heart of our way of working

PIECES OF SESAR DEVELOPMENT

Development Threads:

- 4-D Trajectory Management
- Information Management
- Collaborative Network Planning
- Enhanced Automation Support

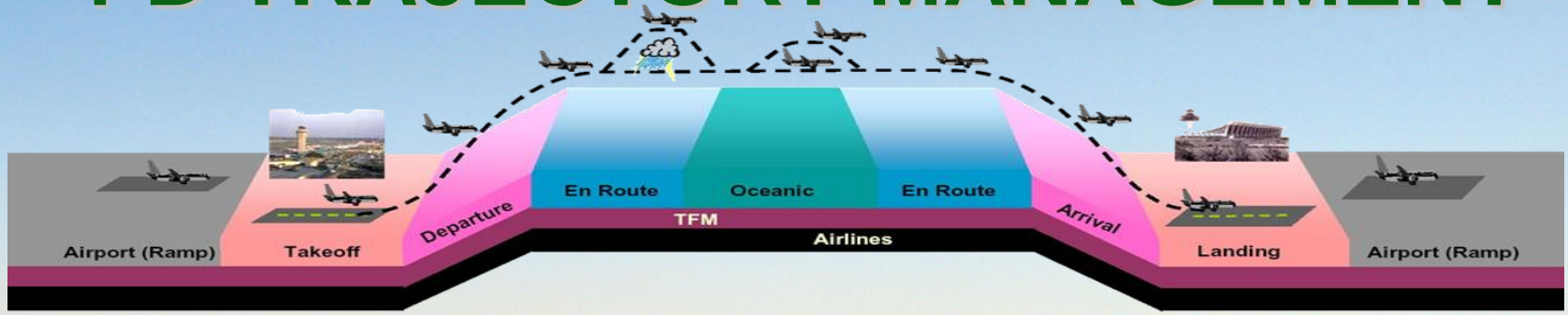
Integrating across:

- Airborne
- En-Route
- Terminal
- Airports
- Airline Operations
- Military Operations
- CNS Infrastructure (Inc. Space)

THE 4D TRAJECTORY PRINCIPLE

Building Precision in the sky

4-D TRAJECTORY MANAGEMENT



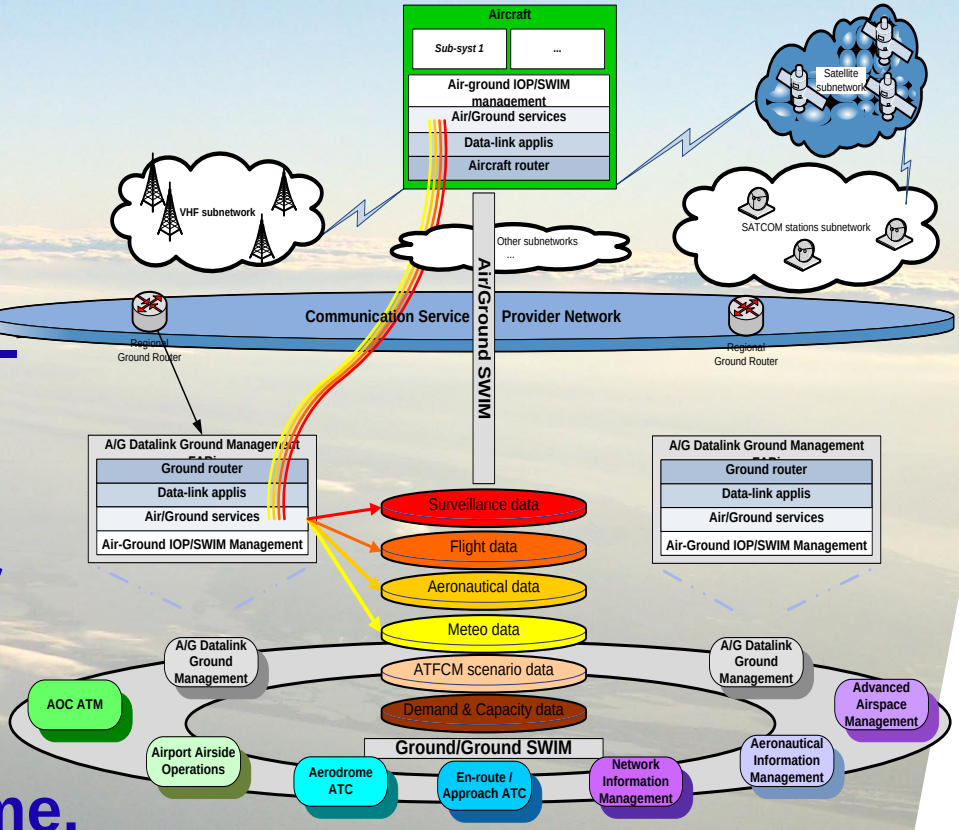
- **Position & Time - all phases of flight, all stakeholders**
- **The set of trajectories delivering preferred routes and timings, taking account of all constraints**
- **Predictable Civil Airline Operations & Military Mission Planning**
- **All phases of operation**
  - Ground - Airport Gate, taxi for departure
  - Airborne - Climb, Cruise, Descent, Arrival
  - Ground – Airport Taxi to gate
- **Depends on a predictable Airport Turnaround process**

THE SYSTEM WIDE INFORMATION MANAGEMENT

The Intranet for Air Traffic Management

INFORMATION MANAGEMENT

- Information is at the heart of ATM
- Develop the concept of 'System-Wide Information Management'
- Moving ATM from System-Centric to Information-Centric operations
- Establish the 'intranet' for aviation
- Access to accurate information at the right time, to the right systems and to the best people in support of taking the right decisions



High Performance Teamwork

COLLABORATIVE NETWORK PLANNING

- **“Collaborative policy processes are increasingly in use as ways of achieving results in an era distinguished by rapid change, social and political fragmentation, rapid high volume information flow, global interdependence, and conflicting values.”**

  Network power in collaborative planning - Booher & Innes

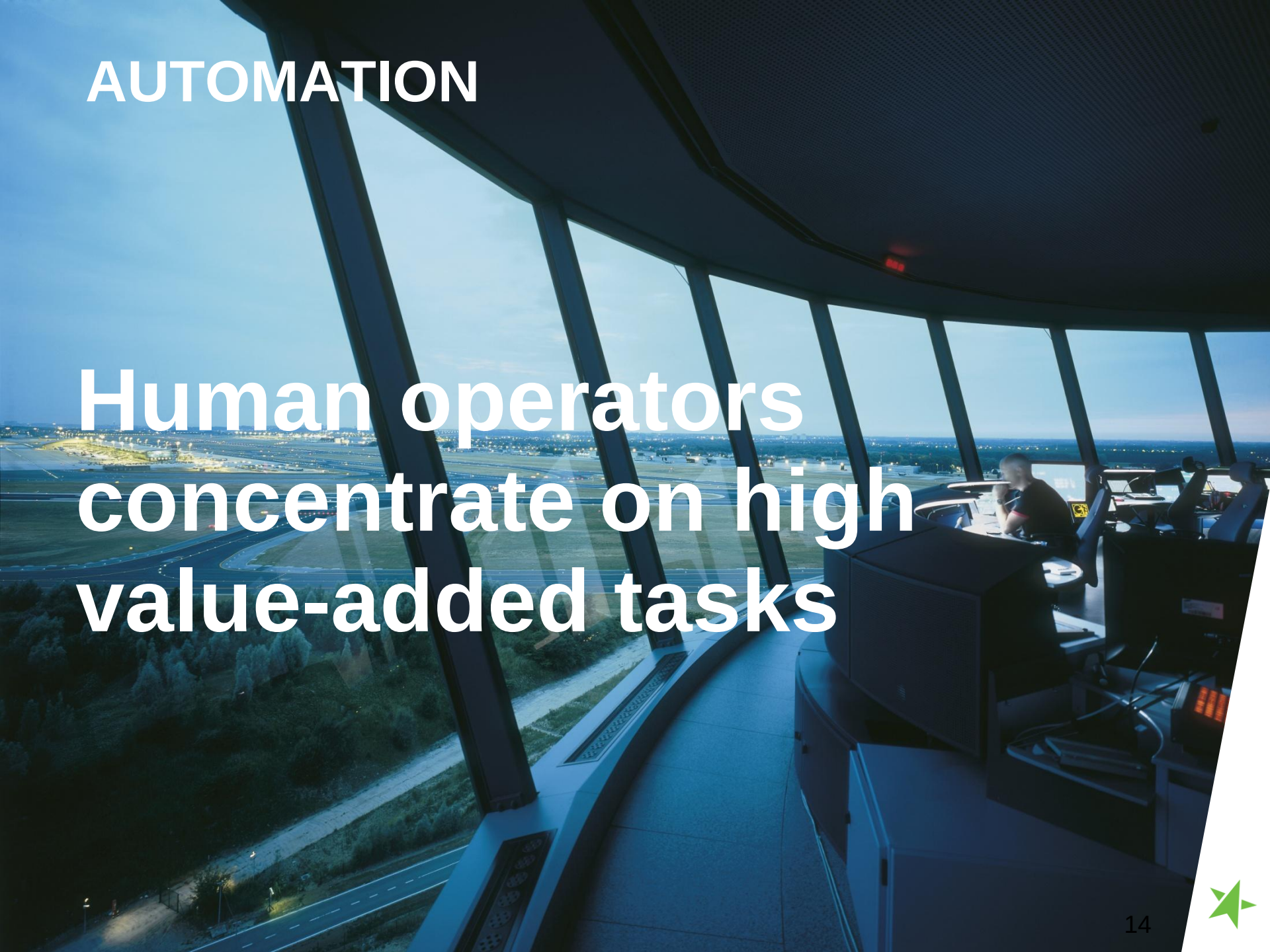
- **A managed network**

  Integration of airports and airborne systems in the ATM system

  Collaborative planning of network operations and demand/capacity balancing continuously reflected in the Network Operations Plan (NOP)

  “User Driven Prioritisation Process” allowing Airspace Users to trade between themselves and attribute delay allocation

  Network Manager as the mediator



AUTOMATION

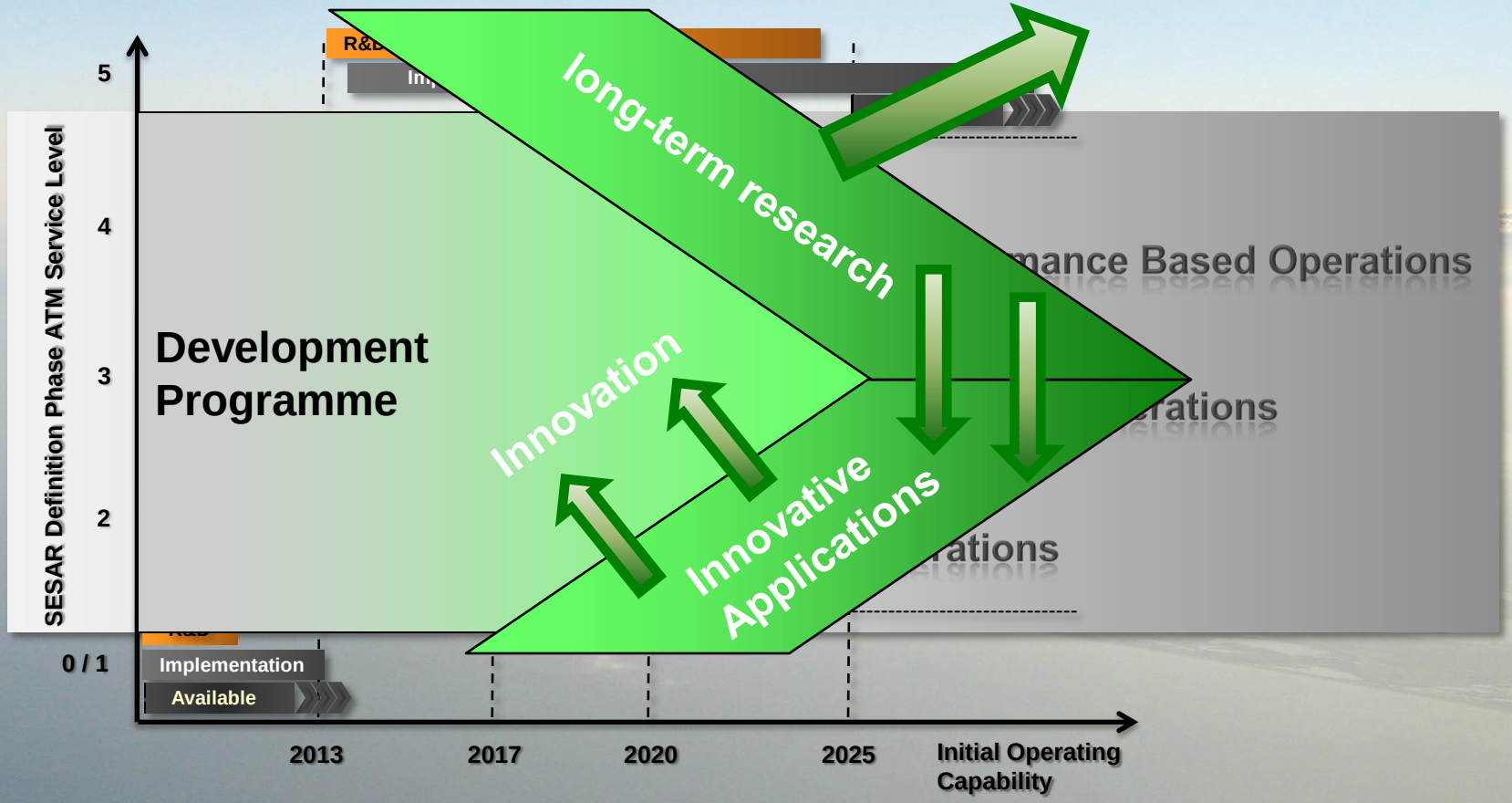
Human operators concentrate on high value-added tasks

ENHANCED AUTOMATION SUPPORT

SESAR maintains the human as central in the system, taking decisions and managing the operations

- In order to meet the challenges ahead the human needs even **greater levels of automation** support
- Advanced computer tools provide **decision-making support** and therefore a fundamental dependence on information relevance and timeliness – **Human Factors aspects are significant**
- The failure modes and recovery consequences for both **safety and business continuity** must be clearly understood
- **Security considerations** will become increasingly significant as systems use more commercial and open protocols and as interoperability improves

DEVELOPMENT vs. RESEARCH AND INNOVATION



SESAR DEVELOPMENT PHASE
WHERE ARE WE NOW?

PROGRAMME RAMP-UP COMPLETED

Agreements Signature MAY 2009

03/06/09 Launch Event

July 2009

400 contributors

20 projects launched

September

Airlines on board

November

First Project Plans Reviewed

March 2010

1300 Contributors

150 projects launched

October 2010

2000 Contributors

260 projects launched

First deliverables

85% of the programme will be in execution by year end

THE SESAR "FACTORY" IS IN PLACE

- **More than 300 projects:**
  - "Typical" project: duration 4 years, budget 7M€
  - Strong focus on delivery and performance
  - High dependencies but common methodology
- **Airspace Users directly involved in projects**

WORKING ARRANGEMENTS WITH OTHER STAKEHOLDERS

❑ Staff representatives

- Participation in the work programme with technical/professional input through annual work orders per association
- Quarterly meetings in place chaired by the SJU with all associations to follow-up the work orders and issues of concern.
- Recent quarterly meeting (Oct) focused on the SESAR validation roadmap and the staff participation to validation activities

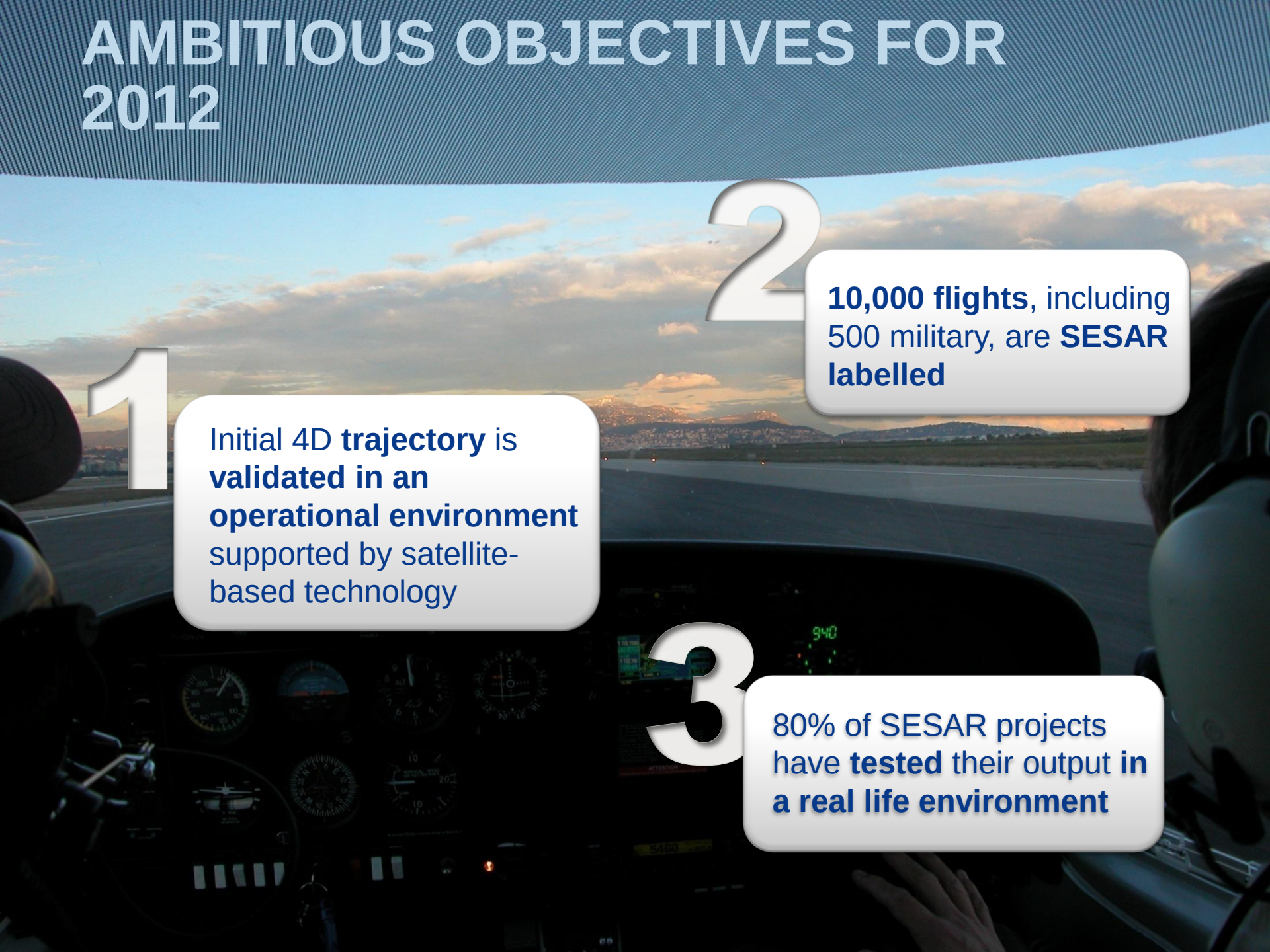
❑ National Supervisory Authorities

- CFI launched in April 2010
- MoUs to be signed

❑ EASA

- Discussions on-going
- MoU to be signed

AMBITIOUS OBJECTIVES FOR 2012



1

Initial 4D **trajectory** is **validated in an operational environment** supported by satellite-based technology

2

10,000 flights, including 500 military, are **SESAR labelled**

3

80% of SESAR projects have **tested** their output **in a real life environment**


5
The first remote tower is ready for operations
4
First SWIM pilots are in place to exchange data across at least 5 domains
7
Airspace users have signed up to the SESAR business case for time-based operations
6
SESAR benefits are demonstrated on city pairs connecting 8 European airports

SESAR RESEARCH PHASE WHERE ARE WE NOW?

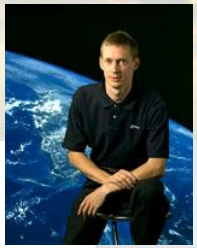
LONG TERM & INNOVATIVE RESEARCH

- **Includes Universities, Research Organisations and Industry**
- **Applying ideas from across many domains into ATM**
  - Automation
  - Complexity
  - Economics
- **Sponsoring of Research Projects**
  - Covering automation, complexity, economics and legal topics
- **Sponsoring of PhD Students**

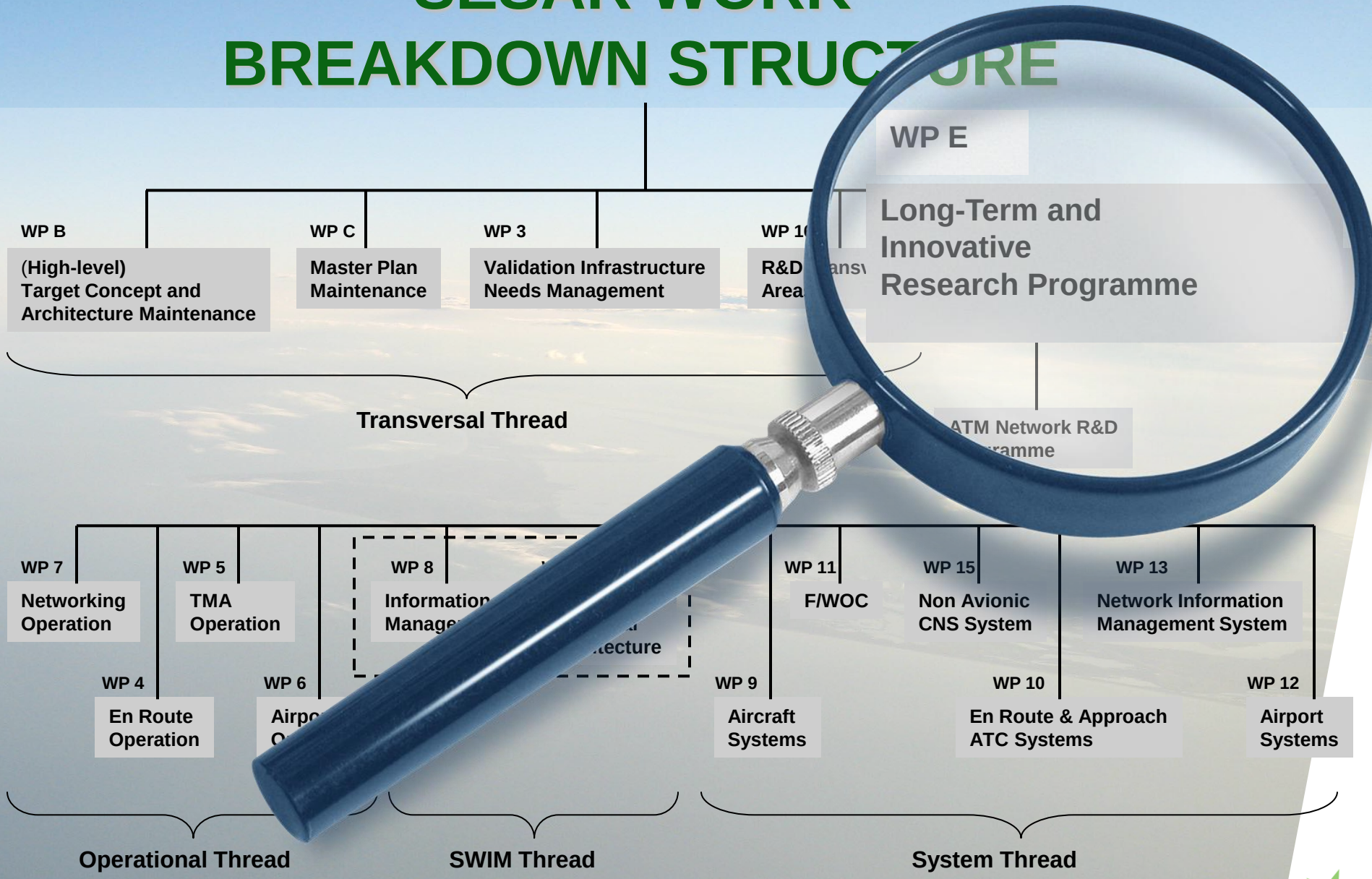
- **Providing a mechanism for Networking and exchange of ideas and results across all ATM research activities**
- **Objective is to foster Innovation and achieve results ready for development**

INVOLVMENT OF THE R&D COMMUNITY

- **Long Term Research**
  - Academia & Research Establishments forming networks of excellence, support to PhD students and active on projects that go beyond the SESAR 2020 scope
- **Scientific Committee**
  - 12 European scientific personalities; including an astronaut, professors & researchers
- **Provide advice to the SJU on:**
  - Scientific analysis of SESAR from different angles
  - Liaison between SESAR and the academic and scientific communities across Europe including education of the future “SESAR” engineers & scientists
  - Scientific value of the SESAR results



SESAR WORK BREAKDOWN STRUCTURE



PIECES OF SESAR RESEARCH

Research Themes:

Mastering Complex Systems Safely

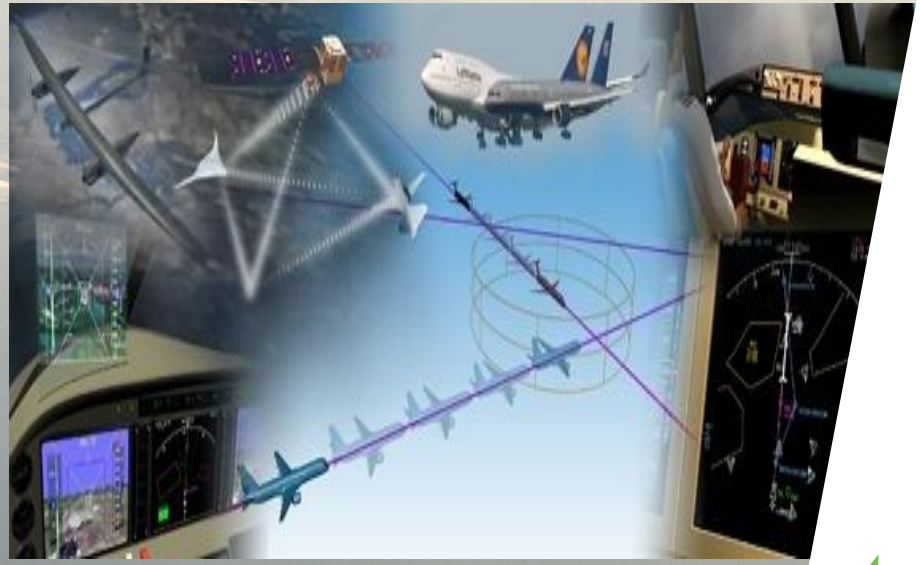
Towards Higher Level of Automation in ATM

Economics and Performance

Legal Aspects of Paradigm Shift

Focussing on:

- **Business Agility**
- **Decision Support**
- **Environment & Meteorology**
- **CNS/ATM (Automation)**
- **Operating Concepts**
- **Human Factors**



BUDGET BREAKDOWN

Total Budget for Long-term Research 23 M€

- Research Networks & PhDs 11.5 M€
- Research Projects 11.5 M€

Call 1 – 2 Research Networks 3.2 M€

Call 2 – 1 Research Network 1.6 M€

Call 1 – 20 Research Projects 6.5 M€

1/3 Small at c. 300K
2/3 Medium at c. 600K

ESTABLISHING RESEARCH NETWORKS

- **Groupings of organisations - Academia, Industry, Research Establishments**
- **Sharing common interest and expertise in a particular field of research**
- **Each will co-operate to develop, exchange and disseminate knowledge in its particular field**
- **Specific activities will include:**
  - Knowledge development (including scientific education, PhD studies)
  - Knowledge management
  - Animation of the network (workshops, exchange)
  - Organisation/engagement in events (conferences, seminars, symposia, …)

ESTABLISHING RESEARCH PROJECTS

- **WP-E projects are co-funded activities that fall outside the scope of mainstream SJU workpackages.**
- **Periodic calls for proposal will be prepared in accordance with a Thematic Programme, and advised by the Scientific Committee.**
- **Proposals will be solicited from both within and outside the networks. They will be evaluated by an independent panel of experts.**
- **Results will be expected to contribute to the relevant network(s).**

STATUS TODAY

- **Two Research Networks Launched**
  Mastering Complex Systems Safely
  Towards Higher Level of Automation in ATM

- **A Call for one more Research Network**
  Economics & Performance (Closes 26th October)

- **First Call for Research Projects**
  Closes 26th October

SUCCESS LOOKS LIKE ..

- **By 2012 we will have created:**
  - A Healthy body of research spread across a wide range of research organisations.
  - A repository of knowledge providing material for extending SESAR development beyond current timescales and scope.
  - A strong focus on innovation providing a healthy challenge to the status-quo in air transport.
  - Tangible results and a reputation for air transport research that attracts more students, research and investment.
  - The reputation for leading European results oriented research and innovation that is the envy of others.

SESAR LONG TERM & INNOVATIVE RESEARCH

MAKING A DIFFERENCE!