

# SESAR

Performance Framework, Concept and Master Plan

Dr. Colin Meckiff, EUROCONTROL

Presented at  
**ENRI International Workshop on ATM/CNS**  
March 2009, Tokyo, Japan

European Organisation for the Safety of Air Navigation



# SESAR

The programme

European Organisation for the Safety of Air Navigation



## Why SESAR?

- Traffic forecast to double by 2030
- Growth must come with significant performance improvement
- ATC pushed to its limits; obsolescent technologies; airspace fragmented

### Needs:

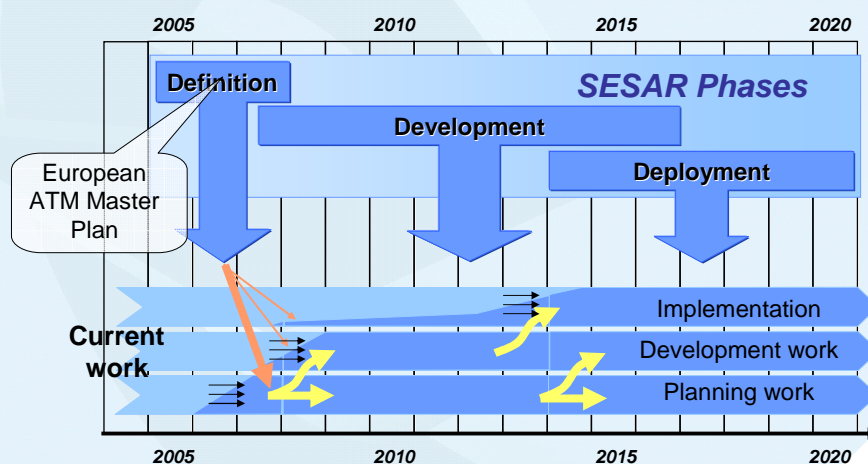
- Turn off fragmented approach
- Accelerate evolution in response to challenges
- Synchronise plans and actions
  - from research to operations
  - airborne and ground deployments

### SESAR

- Technical/operational change, supported by Single European Sky legislation
- Direct involvement of aviation industry in all phases
- Address European needs and global interoperability



## Cohesive programme, stepwise implementation



## SESAR Definition Phase

- Under the responsibility of EUROCONTROL
- Co-funded by European Commission
- Industry-wide consortium 
  - substantial EUROCONTROL effort contribution

€ 60 Million  
2 years  
300 man-year



### + Project Associates:

ATM research centres,  
military ATM,  
staff/professional org.,  
US industry (Boeing,  
Honeywell, Rockwell)  
+ sub-contractors



## SESAR Development Phase

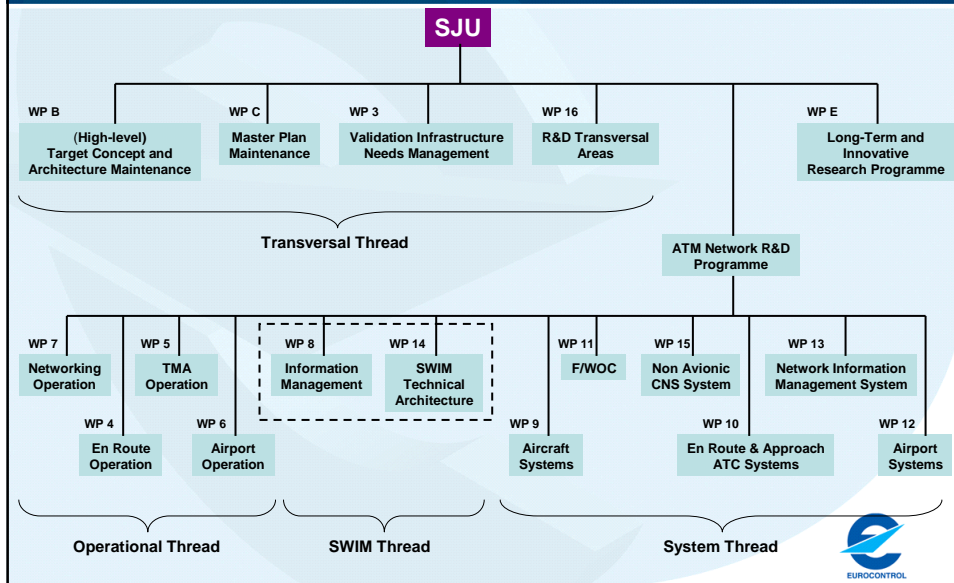
### *Joint Undertaking*

- Public-Private Partnership
  - Founding members: EC & EUROCONTROL
  - Other members: industry, third party states
  - €2,100 million over 8 years
- Manages the SESAR Development Phase
  - Execute the ATM Master Plan
  - One single ATM R&D programme in Europe
  - A dedicated international cooperation agenda

Web site: [www.sesarju.eu](http://www.sesarju.eu)



# SJU work programme



# SESAR

Performance driven

# SESAR goal: performance

*Performance targets derived from needs of society & airspace users*

*Progressive deployment, when/where needed*

2020 targets:  
✓ Capacity: +73% overall  
✓ Safety: improvement factor 3  
✓ Environment: max. contribution  
✓ Costs to airspace users: -50%

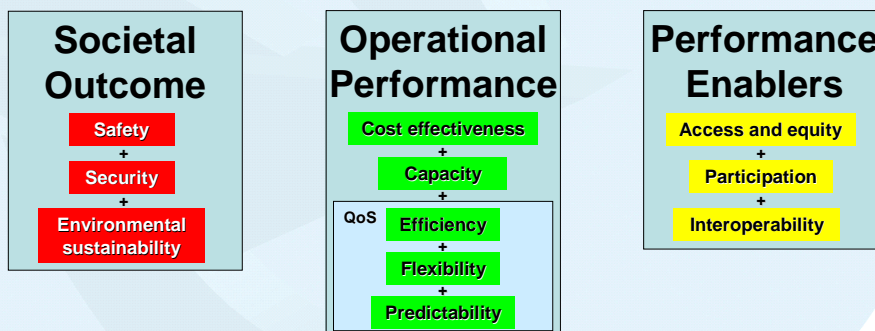
Design goals for scalable future capability:  
➤ Capacity: handle 3 times traffic  
➤ Safety: factor 10  
➤ Environment: -10% effects/flight  
➤ Costs to airspace users: -50%

Also addressed:  
security, efficiency, flexibility,  
predictability, global interoperability,  
access, equity, participation

(Reference: 2005)

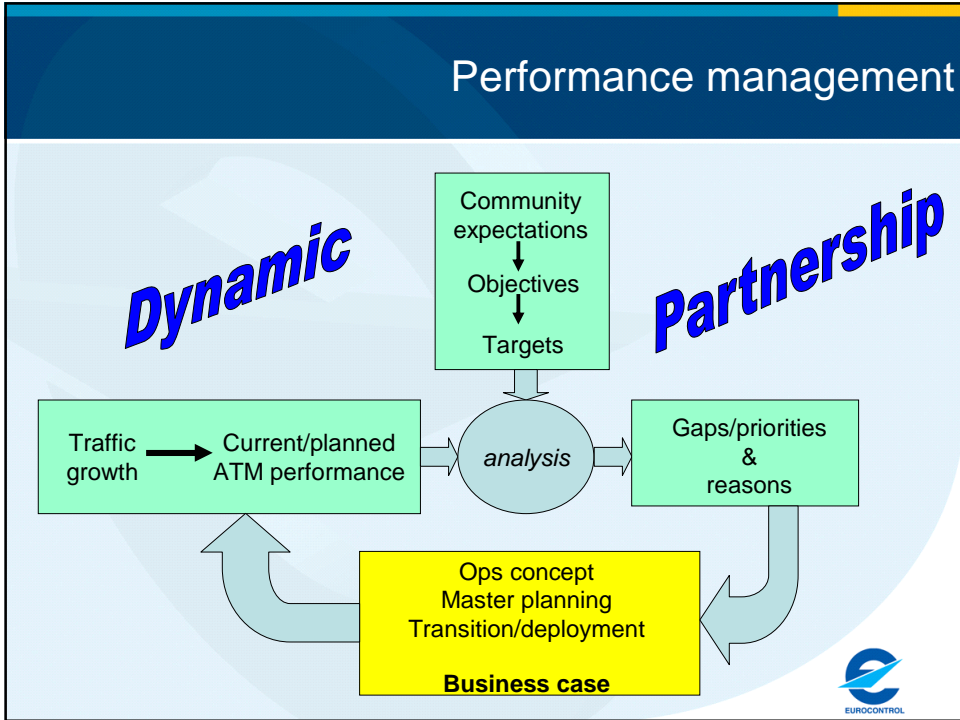


# Key performance areas



The ICAO Key Performance Areas



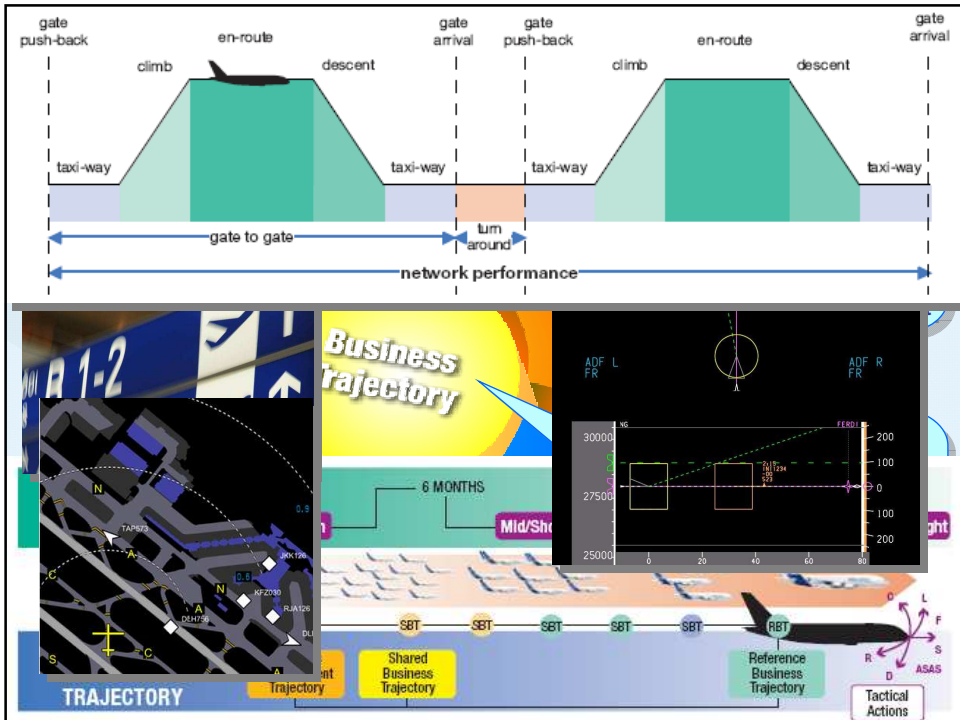


# SESAR

## Target solution



European Organisation for the Safety of Air Navigation



# SESAR

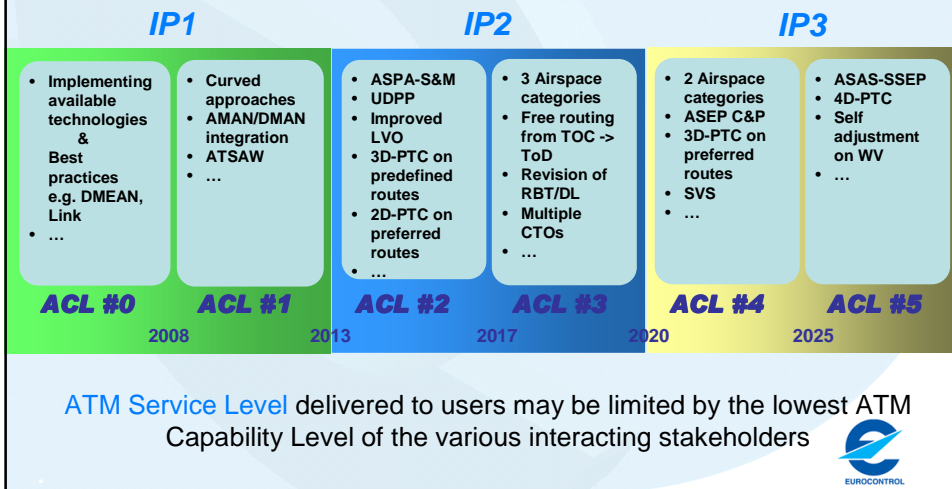
## The Plan

European Organisation for the Safety of Air Navigation



# ATM deployment sequence based on capability & service levels

Implementation based on **ATM Capability Level**: sets of functional evolutions for Aircraft, ATC Centres, Airports, Network Management



www.atmmasterplan.eu



The screenshot shows the 'The European Air Traffic Management Master Plan Portal' website. The page features a navigation menu with 'THE MASTER PLAN', 'BROWSE DATA', 'NEWS & PRESS', and 'HELP'. A search bar is located on the right. The main content area is divided into several sections:

- About the Master Plan:** A text block explaining the portal's role as the official reference source for the ATM Master Plan, updated periodically. It mentions the SESAR project and the SESAR Definition Phase (2006-2008).
- Browse Master Plan Data:** A section titled 'by Master Plan Chapter' with a list of chapters: 'About the ATM Master Plan', 'Building the ATM Master Plan', 'Implementing the ATM Target Concept', 'Benefits & Financing', and 'Risk Management'. Below this, there are links for 'by Stakeholder', 'by Key Performance Area', 'by ATM Service Level', and 'by ATM System Architecture'.
- Sign-up for our Email Service:** A form with an 'Enter your e-mail' field and a 'Subscribe to RSS feed' link.
- Popular Documents:** A list of documents including 'D1 - The Air Transport Framework', 'D2 - The Performance Target', 'D3 - The ATM Target Concept', 'D4 - The Deployment Sequence', 'D5 - SESAR Master Plan', and 'D6 - Work Programme for 2008-2013'.
- Popular Searches:** A search bar for popular queries.

The footer of the page includes the copyright notice 'Copyright © 2008 EUROCONTROL' and the 'Feedback' link, along with the EUROCONTROL logo.



The screenshot displays the 'The European Air Traffic Management Master Plan Portal'. The header includes the website name and navigation links for 'FAQ', 'CONTACT', 'LEGAL', and 'SITEMAP'. A search bar is located in the top right corner. The main navigation menu is divided into 'THE MASTER PLAN', 'BROWSE DATA', 'NEWS & PRESS', and 'HELP'. The 'BROWSE DATA' menu is expanded, showing options to filter content by 'MASTER PLAN CHAPTER', 'STAKEHOLDER', 'KEY PERFORMANCE AREA', 'ATM SERVICE LEVEL', 'ATM SYSTEM ARCHITECTURE', and 'USING OBJECT BROWSER'. The 'About the Master Plan' section contains introductory text and a 'Download' button. The 'Take The Tour' section has a link for an overview. The 'Popular Documents' list includes 'D1 - The Air Transport Framework', 'D2 - The Performance Target', 'D3 - The ATM Target Concept', 'D4 - The Deployment Sequence', 'D5 - SESAR Master Plan', and 'D6 - Work Programme for 2008-2013'. The footer contains copyright information for EUROCONTROL and a feedback link.

This screenshot is identical to the one above but features a search overlay. The overlay is a vertical list of search terms: 'LINES OF CHANGE', 'OPERATIONAL IMPROVEMENTS', 'OPERATIONAL IMPROVEMENT STEPS', 'TRANSVERSAL IMPROVEMENTS', 'TRANSVERSAL IMPROVEMENT STEPS', 'ENABLERS', 'ICAO OPERATIONAL CONCEPT COMPONENTS', and 'ICAO GLOBAL PLAN INITIATIVES'. The rest of the page content, including the navigation menus and document list, remains visible in the background.

Code	Title	Year
ACM-0001	Harmonised EUROCONTROL ECAC Area Rules for OAT/OTR and SAT Interface	2008
ACM-0002	Dynamic Hub Area (DMA)	2010
ACM-0003	Harmonised EUROCONTROL ECAC Area Rules for OAT/OTR and SAT Interface	2008
ACM-0004	European OAT/OTR Transit System	2010
ACM-0005	Multiple Route Options to Airspace Organisation Scenarios	2007
ACM-0006	Further Improvements to Route Network and Airspace Inst. Cross-Border Secularisation and Further Routing Options	2012
ACM-0007	Free-Defined ATS Routes Only When and Where Required	2010
ACM-0008	Use of Free Routing for Flight in Cruise Trade FAB Above Level XXX	2015
ACM-0009	Use of Free Routing from TCC to TAD	2010
ACM-0010	Use of Free Routing from Terminal Area Operations exit to Terminal Area Operations entry	2010
ACM-0011	Optimised Trajectory in Defined Airspace at Particular Times	2009
ACM-0012	Terminal Airspace Organisation Adapted Through Use of Best Practices, PRNAV and PLVA Where Suitable	2007
ACM-0013	Continuous Descent Approach (CDA)	2007
ACM-0014	Advanced Continuous Descent Approach (ACDA)	2012
ACM-0015	Continuous Climb-Descent	2007
ACM-0016	Tethered Arrival	2015
ACM-0017	Advanced Continuous Climb-Descent	2013
ACM-0018	Route/Classification Management	2007
ACM-0019	Dynamic Shaded Sectors Unconstrained by Predetermined Boundaries	2015
ACM-0020	Dynamic Management of Terminal Airspace	2017
AUC-001	ATPM SBA Sweeping	2007
AUC-002	Use of Dynamic Identification Process (UDIP)	2010
AUC-003	Enhanced Flight Plan Filing Facilitation	2011



The European FAQ | CONTACT | LEGAL | SITEMAP

[Print the report](#)

**Operational Improvement Step** [\[1\]](#) [See all Operational Improvement Steps](#)

**Code :** AOM-0702 **Title :** Advanced Continuous Descent Approach (ACDA)

**Version :** 1.1 **ATM Service Level** [\[1\]](#) : Level 2 **IOC** [\[1\]](#) : 2013 **FOC** [\[1\]](#) : 2017

**Line of Change :** L02 - Moving from Airspace to Trajectory Based Operations

**Operational Improvement** [\[1\]](#) : L02-08 - Optimizing Climb/Descent

**Implementation Package** [\[1\]](#) : IP2 - Accelerating ATM to Implement the 2020 Target Concept

**ICAO Global Plan Initiatives :** GPI-12 - Functional Integration of Ground Systems with Airborne Systems

**Operational Context** [\[1\]](#) : Airport, TMA

**Description :** This improvement involves the progressive implementation of harmonised procedures for CDAs in higher density traffic. Continuous descent approaches are optimised for each airport arrival procedure. New controller tools and 3D trajectory management enable aircraft to fly, as far as possible, their individual optimum descent profile (the definition of a common and higher transition altitude would be an advantage).

**Rationale :** Clean environmental approach paths, reduced noise level and emissions (although the accuracy with which paths are flown may exacerbate the impact for those directly under the route).

**Comments :** None

Key Performance Area	Magnitude	Conclusions
Capacity	-	
Efficiency	+++	
Environmental Sustainability	+	

**Rationale :** Clean environmental approach paths, reduced noise level and emissions (although the accuracy with which paths are flown may exacerbate the impact for those directly under the route).

**Comments :** None

Key Performance Area	Magnitude	Conclusions
Capacity	-	
Efficiency	+++	
Environmental Sustainability	+	

## Conclusion

- SESAR brings a new dimension to European ATM
- It is driven by performance needs
- It is for all airspace users
- It provides for a clear development and implementation path
- Institutional arrangements are in place to make SESAR a success



# SESAR

## Backup slides: technologies



## Capability Level 0/1: SESAR foundations

- 5-year rolling European SES Implementation Plan
  - Local, sub-regional initiatives complement European objectives
  - Adoption and exploitation at Pan-European level is necessary

DMEAN	A-SMGCS/CDTI	FABs	eFDPs	FUA
Link 2000+ CASCADE	PENS	EAD/CHAIN	ATC automation (FASTI, ATC tools like AMAN, DMAN, MTCB, multi-sector planning)	
TMA2010+	Common procurement	P-RNAV/ARNav5/ ARNav6		



## Capability Level 1: Communication



### Deploy VDL2/CPDLC

- Pioneer trials
- Incentives
- Implementing rule



### Deploy IP backbone to interconnect states

Supporting SWIM & VoIP



## Capability Level 1: Surveillance / navigation



### Deploy 1090 ES and MLAT

- Traffic awareness
- Surveillance performance



### Deploy EGNOS

- Precision navigation for some users



## Capability Level 2: Brake-to-vacate



Develop and validate data-linked brake-to-vacate for higher runway throughput



# Capability Level 2: Airport surface



**Develop and validate 802.16aero technology and standards for secure ATS & AOC communications**



# Capability Level 2: Airport lighting



**400 tonnes  
CO2/year**



**20 tonnes  
CO2/year**

**LED lighting to significantly improve airport environmental performance**



## Capability Level 2/3: Precision navigation



### Capability level 2

#### Develop and validate

- Improved RTA
- Initial trajectory sharing
- Basic constraints
- Enabling initial 4D

### Capability level 3

#### Develop and validate

- Multiple RTA
- Gate-gate trajectory exchange
- Auto conformance/downlink
- Wind grids
- Advanced constraints
- Enabling full 4D



## Capability Level 2/3: Surveillance



Develop and validate  
wake vortex and weather  
detection

Develop and validate sensors  
for improved safety, security,  
capacity for approach and  
airport



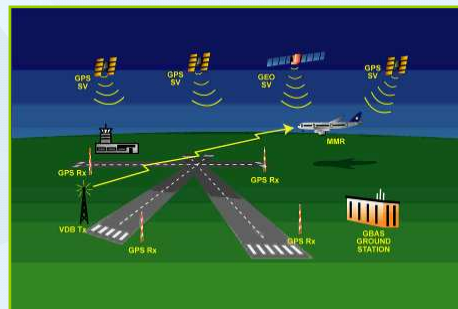
## Capability Level 2/3: ASAS



**Develop and validate standards for spacing and initial separation applications**



## Capability Level 3: Approach and landing



**Develop and validate sensor technology for EVS**

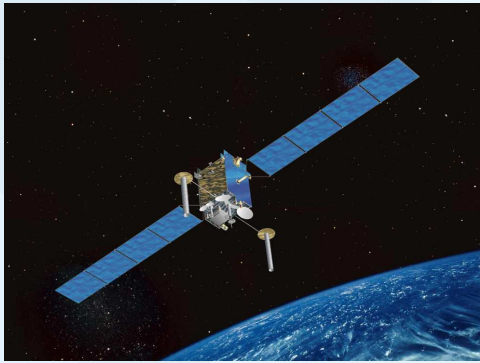
**Develop and validate multi-GNSS receiver for GBAS II/III**

**- enabling all weather operations**





## Capability Level 4: Future datalink



**Develop and validate solutions (narrowband/  
wideband/SATCOM)**  
**- Confirm L Band, SATCOM choices**