

Aeronautics Days 2006

ATM R&D Vision of the Future

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SESAR – THE INITIATIVE

SESAR

- Major Initiative
 - ✓ Master Plan 2008
 - ✓ Build and Validate 2008 – 2013
 - ✓ Deployment 2014 – 2020
- What can be achieved in the next 14 years ?
- What will be the role of ATM Research in support of that achievement ?
- What will the future beyond SESAR be ?



Initiative

Challenge

Design

Validation

The Future



SESAR – THE CHALLENGE

Due to the

- Time scale - 1st deployment in 8 years,
- Scope - whole European ATM System,
- Complexity - ATM a skill based, dynamic, safety oriented industry
- Diversity of airspace users - commercial, military, GA.

SESAR will need to be :

- Design oriented,
- Pragmatic and a
- Transparent process to ensure stakeholder buy-in.



SESAR will need support in making INFORMED design decisions

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R&D – A SUPPORT TO DESIGN

Design decisions must have a more solid foundation than 'expert judgment'.

SESAR - many design decisions will be made

ATM a system of systems - complex

- Dynamic
- Human centered
- 4-dimensional
- Weather sensitive
- Multiple actors and
- Multiple systems

R&D modeling capabilities exploitable as support to the design decisions

- Simulations : real-time, fast-time, network models
- 'War games'
- User interaction



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R&D – A SUPPORT TO VALIDATION (1/2)

SESAR expected to deliver improved ATM performance to airspace users

- Safe, and
- Efficient.



ATM performance measurement not yet a science.

How to make design decisions and be aware of the potential end system performance ?

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R&D – A SUPPORT TO VALIDATION (2/2)

R&D modeling capabilities as a support to validation

- Stakeholder involvement in risk taking design approval
- Trade offs to be made – predictability v flexibility, safety v capacity.
- Forecasting 'probable' ATM performance.
- Safety to be assured
- Environmental aspects to be quantified
- Operational acceptability a final hurdle



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R&D – BEYOND SESAR (1/2)

SESAR – in order to hit the deadlines the final ATM system design decisions will

- Make many compromises
- Avoid immature technologies, and
- Avoid uncertain outcomes

SESAR will be based on an evolutionary concept

- The paradigm shift will come afterwards
- On the foundations laid by SESAR

SESAR will leave

- A trail of questions that need answers, and
- Immature technologies still needing to be developed

This will be material for R&D to address in support of the world beyond SESAR.



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R&D – BEYOND SESAR (2/2)

Beyond SESAR the world for ATM becomes more complex

- Fuel reserves limited
- Environmental issues increase impact on ATM
- UAV's to account for
- VLJ to accommodate
 - VLJ pilots in upper airspace – pilot experience could become an issue
- Is there a capacity wall?
- Safety to be improved or will become like a game of 'roulette'
- Airports – bottlenecks or parking lot?

R&D must continue in parallel with SESAR in order

- To address the unanswered questions raised during design
- To develop the immature technologies

ACARE to remain the visionary “DRIVE”



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R&D THE FUTURE IS ...?

SESAR

- Will be a huge learning experience for system designers.
- Will be an evolutionary step - and will lay the foundation for a paradigm shift
- But will leave many questions unanswered and immature technologies un-used - all material for further R&D

R&D must run in parallel to SESAR - supporting and taking over the un-answered issues.



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R&D THE FUTURE IS ...NOW



QUESTIONS / ANSWERS

