AT-One
the ATM Research Alliance

NLR DLR

European Research Centres Position and Contribution in European R&D for SESAR

1st CEAS Conference, Berlin

Karl-Heinz Keller, 11. Sept. 2007

AT-One combines the strength of NLR and DLR in ATM Research

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Challenges

ATM Network inefficiencies, estimated to be

- ~€ 2 Billion for cost effectiveness
  - € 1.4 Billion for en-route fragmentation
  - € 0.6 Billion for associated low productivity
- ~€ 1.4 Billion associated with flight inefficiencies
- ~€ 1 Billion associated with ground delays

Ambitious objectives for the European ATM Infrastructure

- Triple capacity
- Reduce by 50% ATM costs
- Increase safety by a factor of 10
- 10% reduction of environmental impact per flight

Addressed through SESAR - consistent with ACARE-SRA

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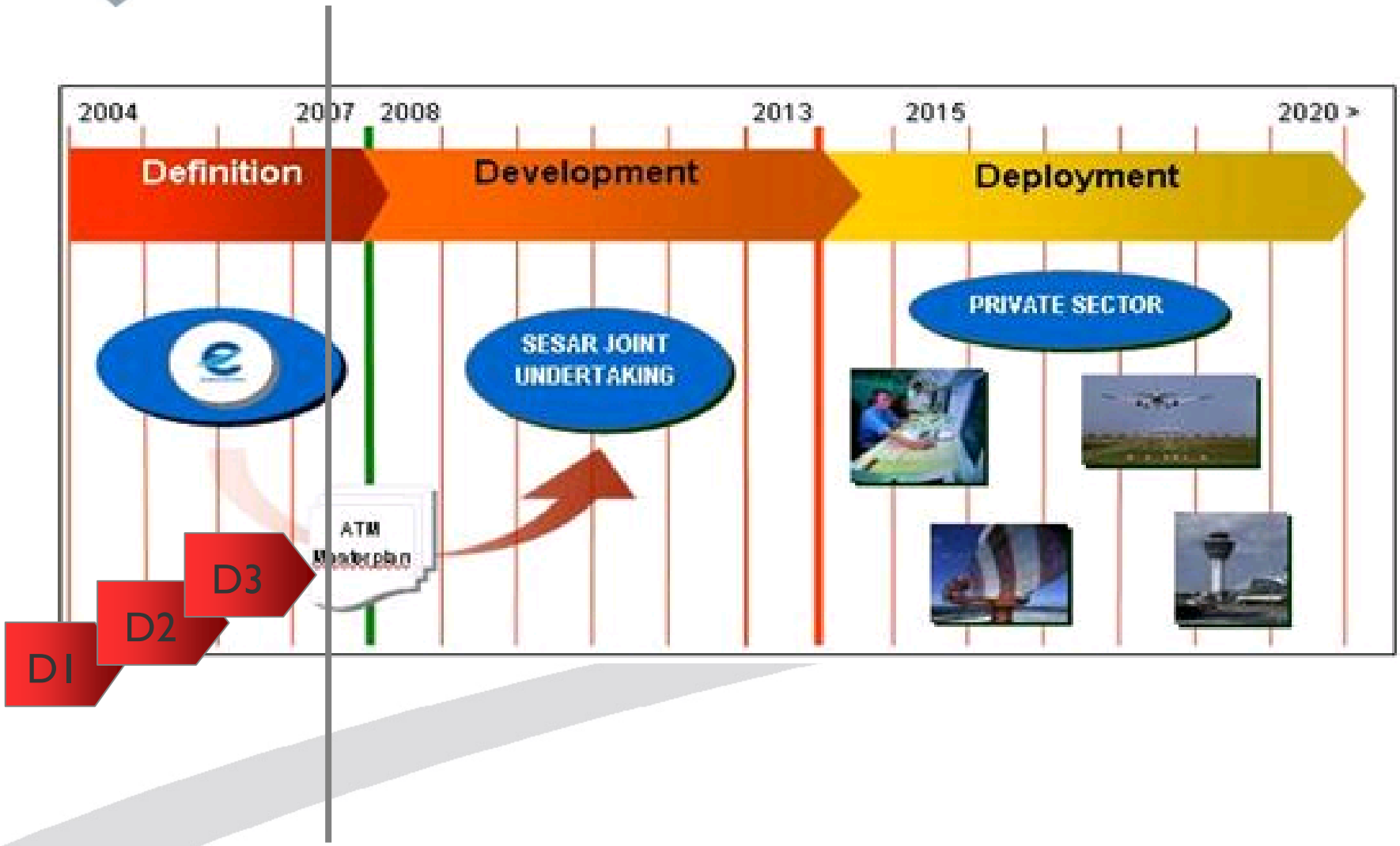
Phases of SESAR



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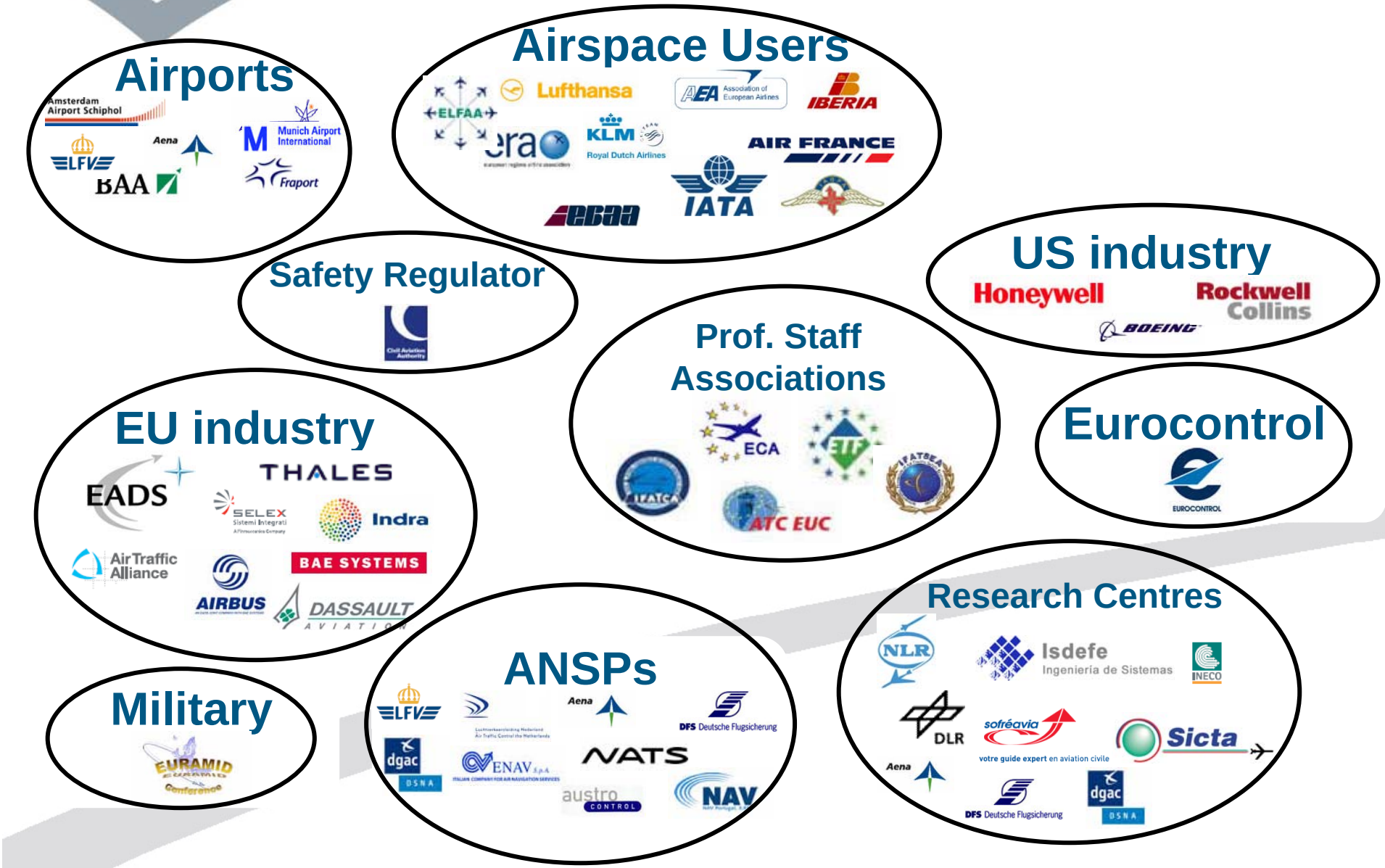
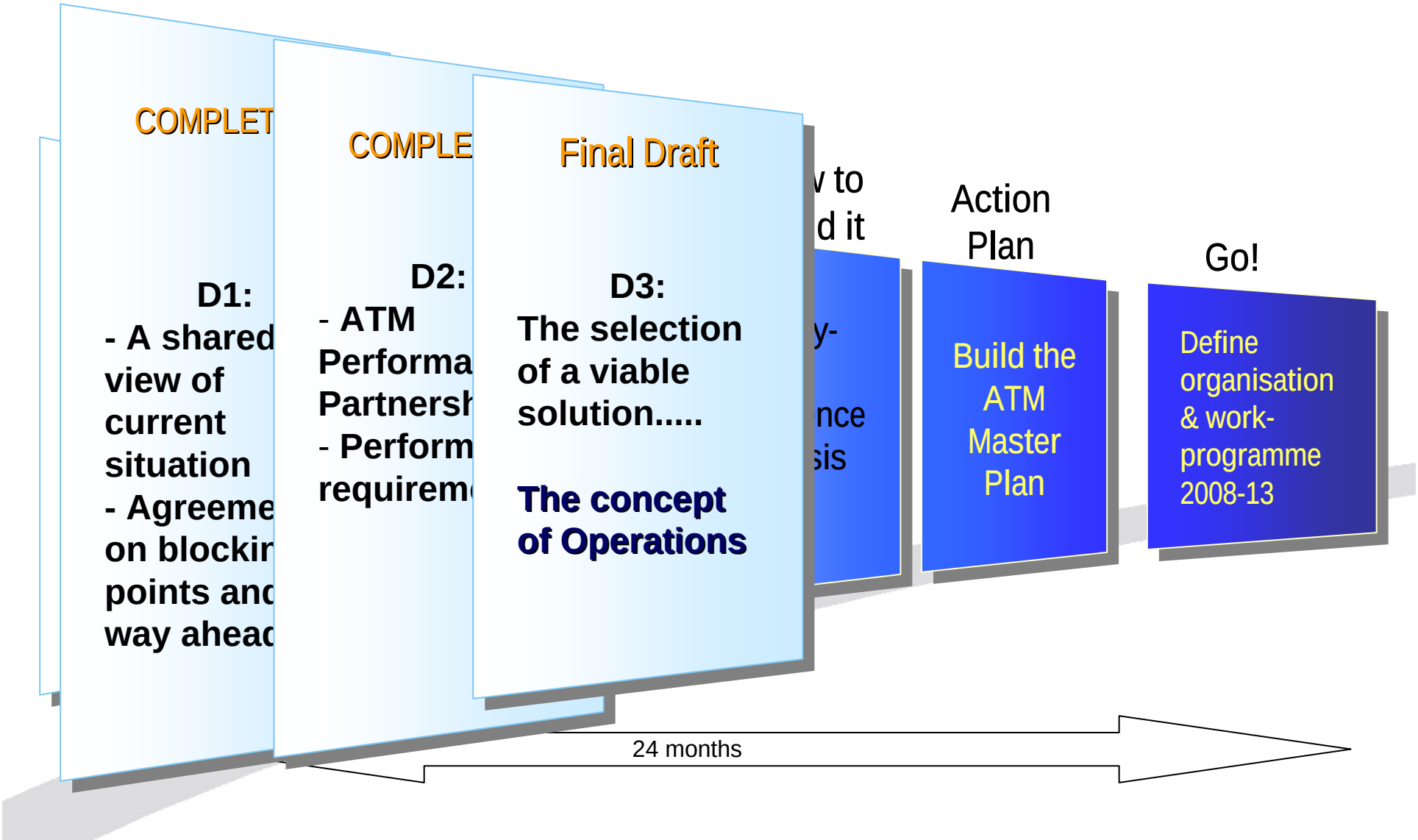
SESAR Partner



SESAR - Research Centre Team (RCT)

- Teaming up of Research Centres and ANSP R&D Dep.
- Contribution in *SESAR Definition Phase* as associated partner; contracted work share (100 person months for all members of RCT; total project 3600 PM)
- Additional contribution on a voluntary basis provided by few research centres
- Representing the bridge between short- / mid term improvements and the long term perspective

SESAR – The Definition Phase



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D2: Main Conclusions

- A performance-based approach for the future ATM System
- By 2020: prepare ATM network to handle up to three times more traffic than today, for 50% less ATM costs per flight and gradually improved safety level
- ATM will deliver to minimize the effect on environment
- Identified short-term improvements with potential for operational savings by increasing capacity
- More efficient use of existing airspace and airport resources through available procedures and techniques.
- The SESAR Joint Undertaking (JU) is an important move forward development phase of SESAR.

Key Findings and D3 preview

- Today's concept not adequately geared to maintaining schedules of commercial airspace users
  ➜ "first come, first served" to "deliver-on-time"
- Adaptability of current System is limited
  ➜ interoperability, SWIM-features needed
- To break through the "capacity barrier", a "paradigm shift" in the current concept of operations is needed
  ➜ increased use of automation anticipated
- D3 New Approach: Business Trajectory
  ➜ user preferred trajectories based on air-ground integration, use of supportive tools and better NAV-performance

D3 Stakeholder Forum in Berlin, 2007-10-17!

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Phase 2: Development

Content:

Development of new systems and standards for an ATM system

- all Stakeholder involved
- all R&D efforts coordinated and concentrated
- achieve a modernized European ATM system

Organization:

SESAR Joint Undertaking (SJU)

- Public Private Partnership
- One Management for R&D
- Funding members: European Commission & Eurocontrol

- SJU Administrative Board
  (chaired by EC, establishing guidelines for Executive Director)
- Budget 2,1 B€ (EC (FP7&TEN), ECTL, Industry; 700M € each)
- Call for expressions of interest open until 2007-09-15

SJU – Implications

SESAR Joint Undertaking -
Single management entity

Consistency and cost effectiveness

Performance-oriented management

Aircraft operators participation in decision-making

No ATM R&D will be funded outside of SESAR

ASDA – founded in February 2007

ASDA is the Association for the Scientific Development of ATM in Europe representing independent European organizations active in Scientific Research & Development in ATM

- Main scope is to actively identify and define long term R&D goals on a European level
- Promote science and research in the field of Air Traffic and to organize and support R&D consultation processes related to R&D with ATM stakeholders.
- Representing and promoting the interests and aims of independent R&D organizations in international ATM R&D programs and/or organizations;
- Participation in research programs and projects in order to pursue the above mentioned objectives
- **07/07/02: The EC has formally appointed ASDA Board Member as ASDA's representative for the scientific Community in the SESAR JU Administrative Board**

Research Centers - Combined Forces in AT-One

- **Experience**

  competence and leadership capabilities in many European and National research projects (i.e. EC: EMMA, D: LUFO, etc)

- **Independency**

  neutral position gives AT-One the opportunity to get acceptance by all stakeholders and the states

- **Long term perspective**

  research centres like DLR have the ability to take a look ahead in time. They can develop highly advanced tools for ATM. I.e.:“Virtual Tower” (end of 90th), Planning systems for controllers (mid of 80th, known as AMAN)

- **Facilities**

  a great variety of simulation models (RTS/HiL, FTS) and a fleet of research aircraft, including an Airbus A320 and the skill to use these for validation

Long Term Research

Areas of interest

- Highly automated ATC, new roles and responsibilities for controller, pilot and UAV remote operator
- Network centered information and decision management
- Air-Ground delegation: self separation, autonomous flights, UAS - sense and avoid
- Airspace and Airport Cluster design and operations
- UASs integration in civil used airspace
- …

Research Centre – Validation Capabilities

- **Super ATM-Simulator**
  AT-One improves its integrated air-ground simulation capabilities through closer linked networks of simulation modules, scalable to the validation demand
- **Airport Control Centre** (i.e.)
  For the evaluation of TAM, internal project FAMOUS (Future Airport Management Operation Utility System) is addressing the implementation, test and validation of a complete Airport Operation Centre

Summary & Conclusion

- SESAR JU will manage the ATM Master Plan developments and implementations
- Almost no ATM research founding outside of SESAR
- Research Centres and Universities can contribute to highly applied and blue sky research in European ATM

- Voice of Researchers should be taken into account (as independent mediator)
- Research is the key for upcoming challenges

Thank you for your Attention

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NLR DLR

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Centre of Excellence for ATM
Independent
Innovative
Customer oriented
Complete Network of Research Facilities

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Facts & Figures

- Strategic Alliance of the DLR Institute of Flight Guidance and the NLR Air Transport Division
- Shareholders:
  50% DLR, 50% NLR
- Locations: Braunschweig, Amsterdam & Brussels
- Total employees: ~ 260
- Yearly Turnover: ~ 35 M€
- Background: additional 1400 employees in Air Transport Research

The largest ATM research organisation in the world

What is the Scope of AT-One?

AT-One provides ATM research & development, products and consultancy services to customers, in the areas of

- Arrival, ground, departure traffic management
- Airspace and en-route traffic management
- Integrated airport processes
- Validation
- Air-ground integration
- Air Transport Safety & Security
- Environment and Policy Support
- Human Factors & Training.

http://www.at-one.aero

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„Research did not deliver“

European Commission: „Research did not deliver!“

due to the fact, that

„…global failure of aviation community introducing technological changes in ATM business…“

Solution is proclaimed by ACARE SRA-2 (i.e. Research infrastructure):

„…Industry, Research Establishments and Academia should establish a cross stakeholder group to define Europe’s research infrastructure requirements and preservation based on those laid down in the SRA…“