



# **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



### 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

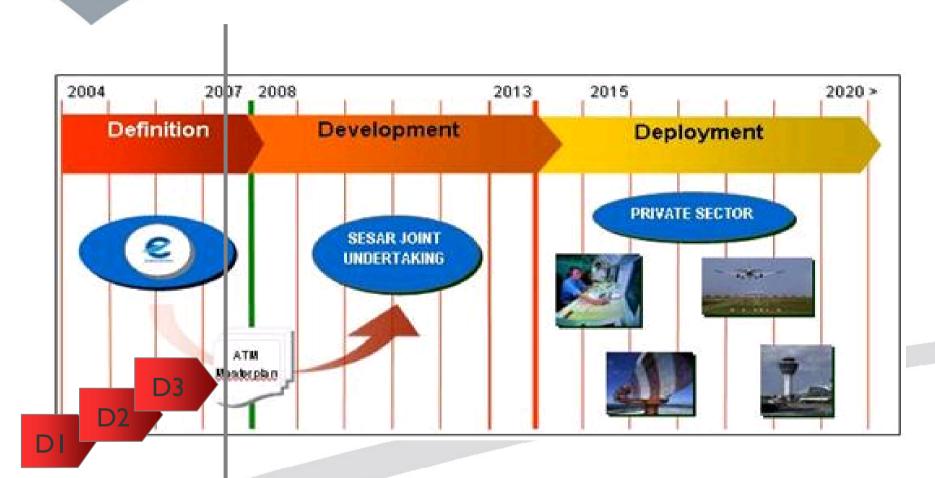
- Triple capacity
- > Reduce by 50% ATM costs
- Increase safety by a factor of 10
- > 10% reduction of environmental impact per flight

Addressed through SESAR - consistent with ACARE-SRA



#### **Phases of SESAR**







#### **SESAR Partner**



























#### **Safety Regulator**









### **US** industry









AirTraffic Alliance























ENAV SAA



























## 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



#### COMPLET **COMPLE Final Draft** v to Action d it Plan Go! **D2**: D3: D1: - ATM The selection - A shared Define Build the Performa of a viable view of organisation ATM **Partnersh** solution..... nce & workcurrent Master - Perform sis programme situation Plan requirem 2008-13 The concept - Agreeme of Operations on blockir points and way aheac

24 months



#### 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!



#### **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
- O7/07/02: 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



# AT-One The ATM Research Alliance

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





### Facts & Figures



Strategic Alliance of the DLR Institute of Flight NLR Divisions

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.





#### "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..."