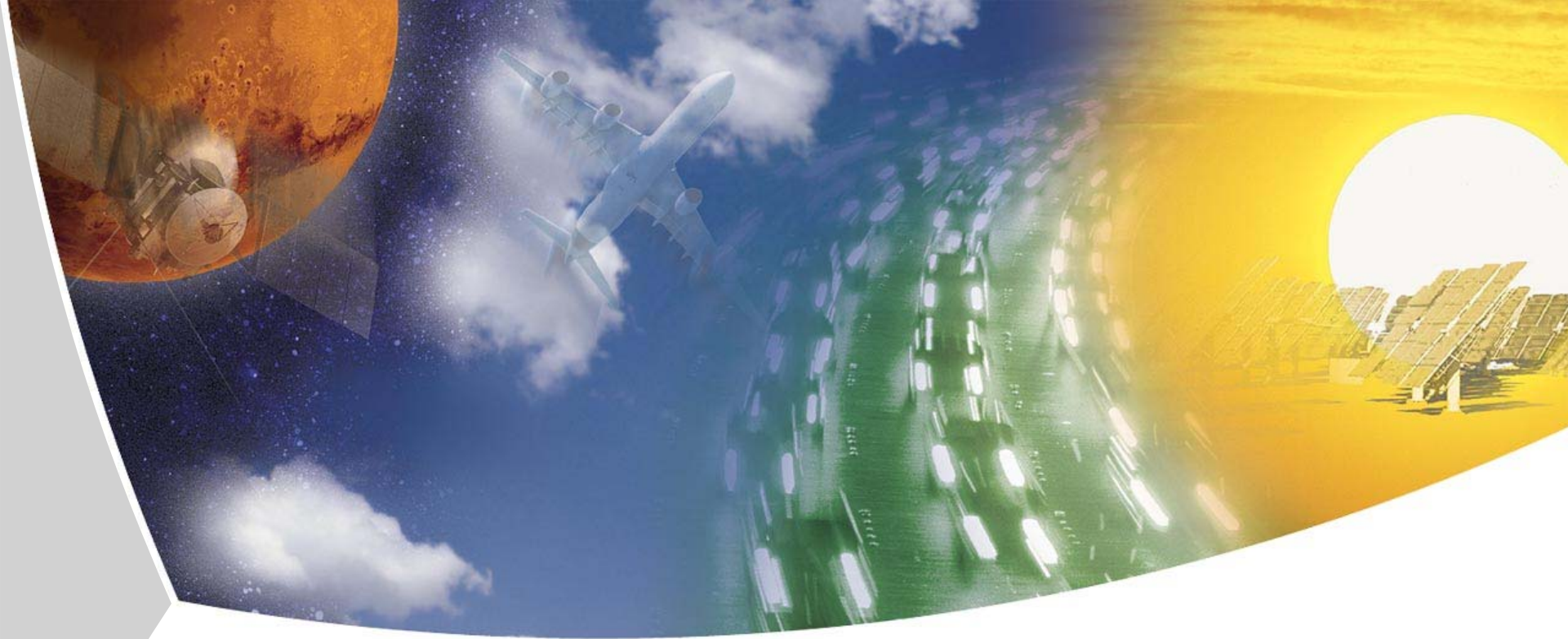




DLR - German Aerospace Center

Research Programms in Aeronautics

Авиационные исследовательские программы



29th of October 2009

Deutsches Zentrum
für Luft- und Raumfahrt e.V.
in der Helmholtz-Gemeinschaft

Key areas

- **Aeronautics**
- Space
- Space Agency
- Transport
- Energy



Sites and employees

6.200 employees working
in 29 research institutes and
scientific and technical facilities

- at 9 sites
- in 6 field offices
(7 field offices of the Project
Management Agency)

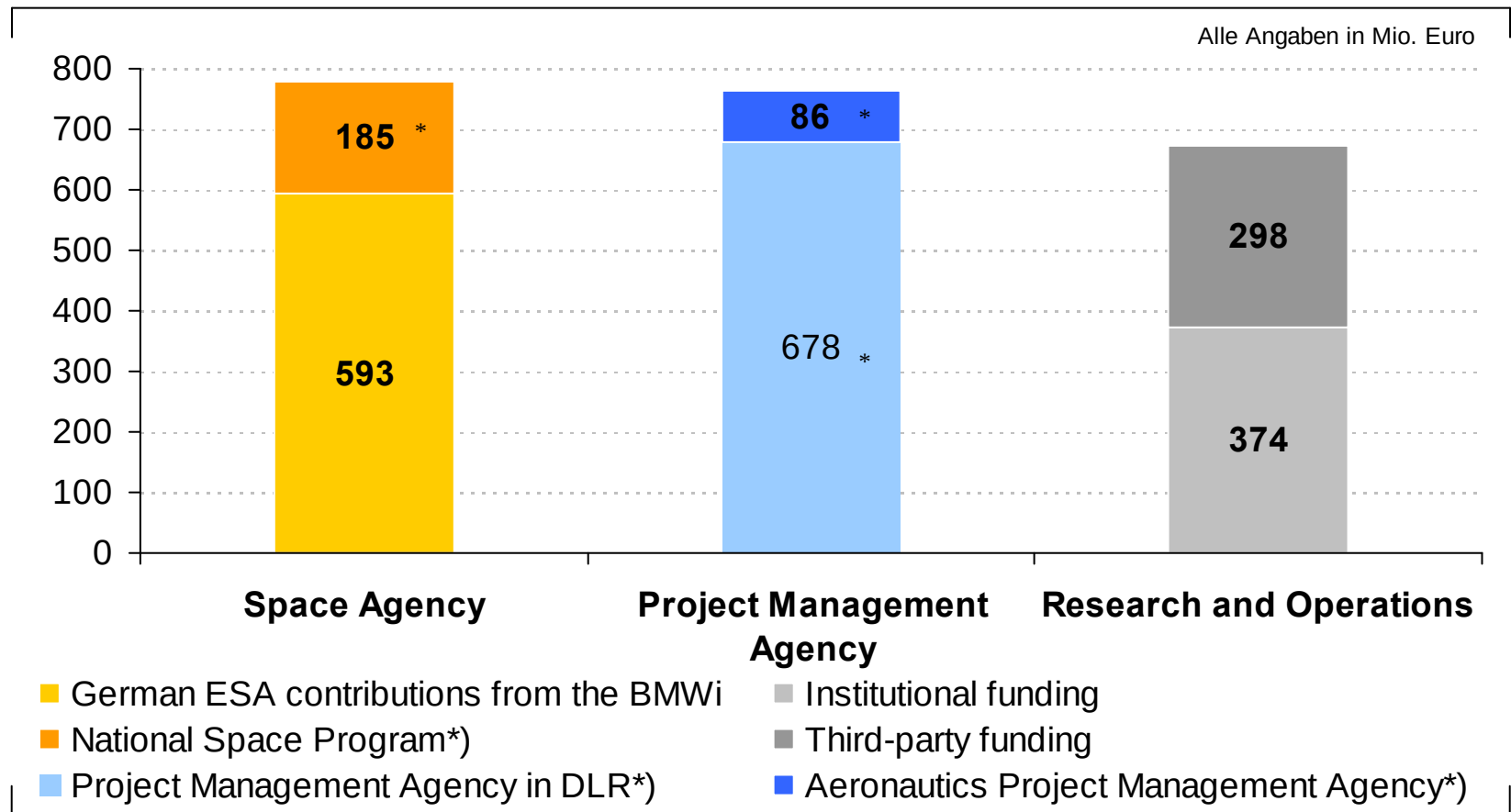
Offices in Brussels,
Paris and Washington.

DLR participates in the:

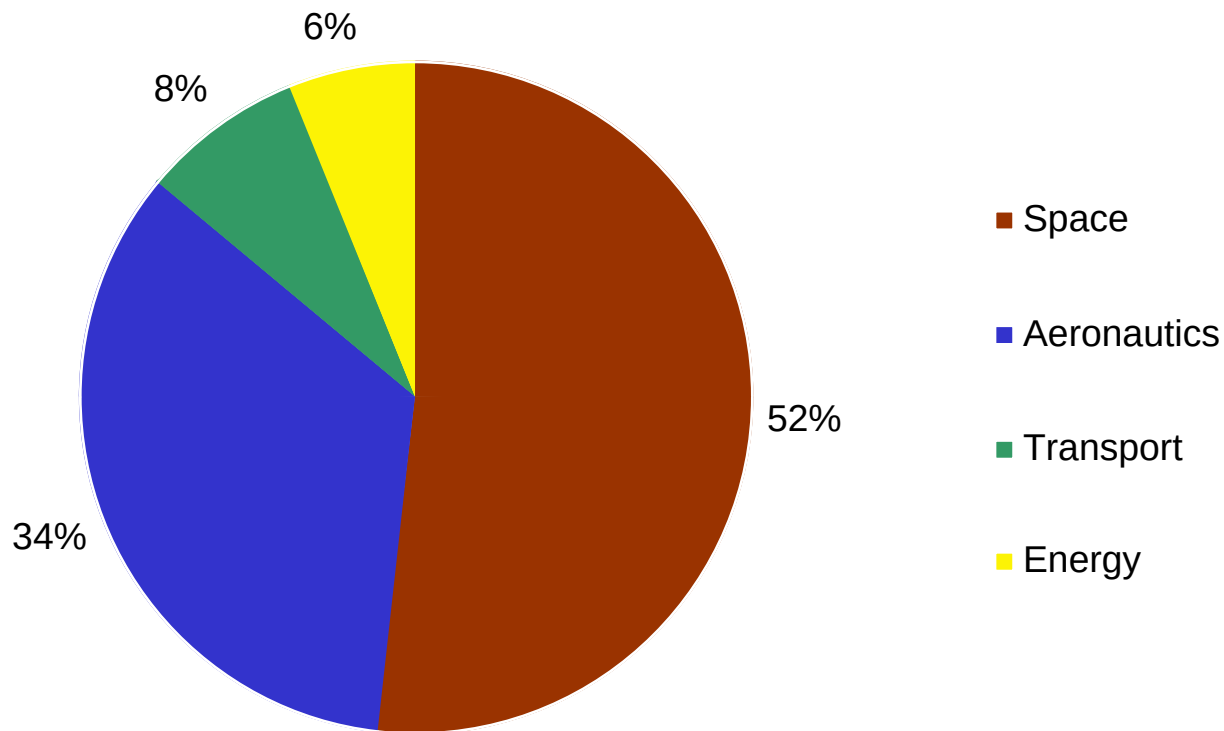
- ◆ European Transonic
Wind Tunnel (ETW)
- ◆ German-Dutch Wind
Tunnels (DNW)



Financing of DLR and research funding 2009 (planned) 2.114 Mio.€

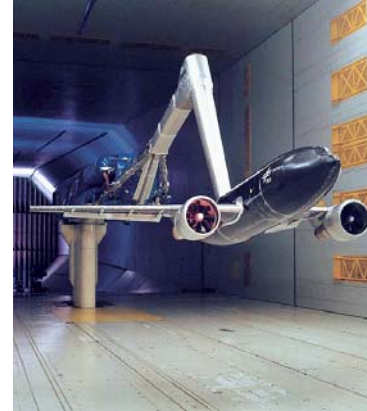


Percentage of overall income from research and operations



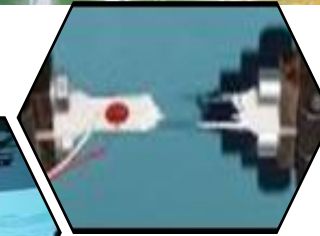
Large-scale facilities

- Research aircraft and helicopter fleet,
- Windtunnels,
- Engine (rocket and aircraft) test rigs,
- Autoclaves,
- Solar furnace, solar fields,
- Traffic tower.
- German Space Operations Center (GSOC),
- German Remote Sensing Data Center (DFD).



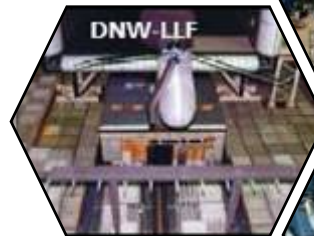
Test Infrastructures

Tower Simulator



Material Testing

Rotor Test Stand



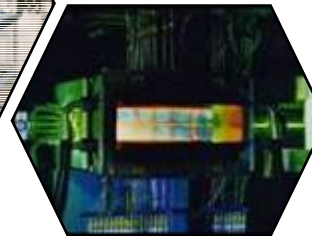
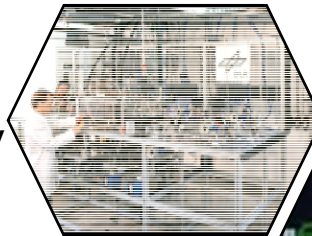
Ground Vibration Testing



Cockpit Simulator

•
•
•

Fuel Cell Laboratory



Experimental Combustor

Test Activities

- Basic Research
- Materials Characterization
- System Identification
- Validation of Numerical Tools
- Process Simulation
- Component Testing
- Industrial System Tests



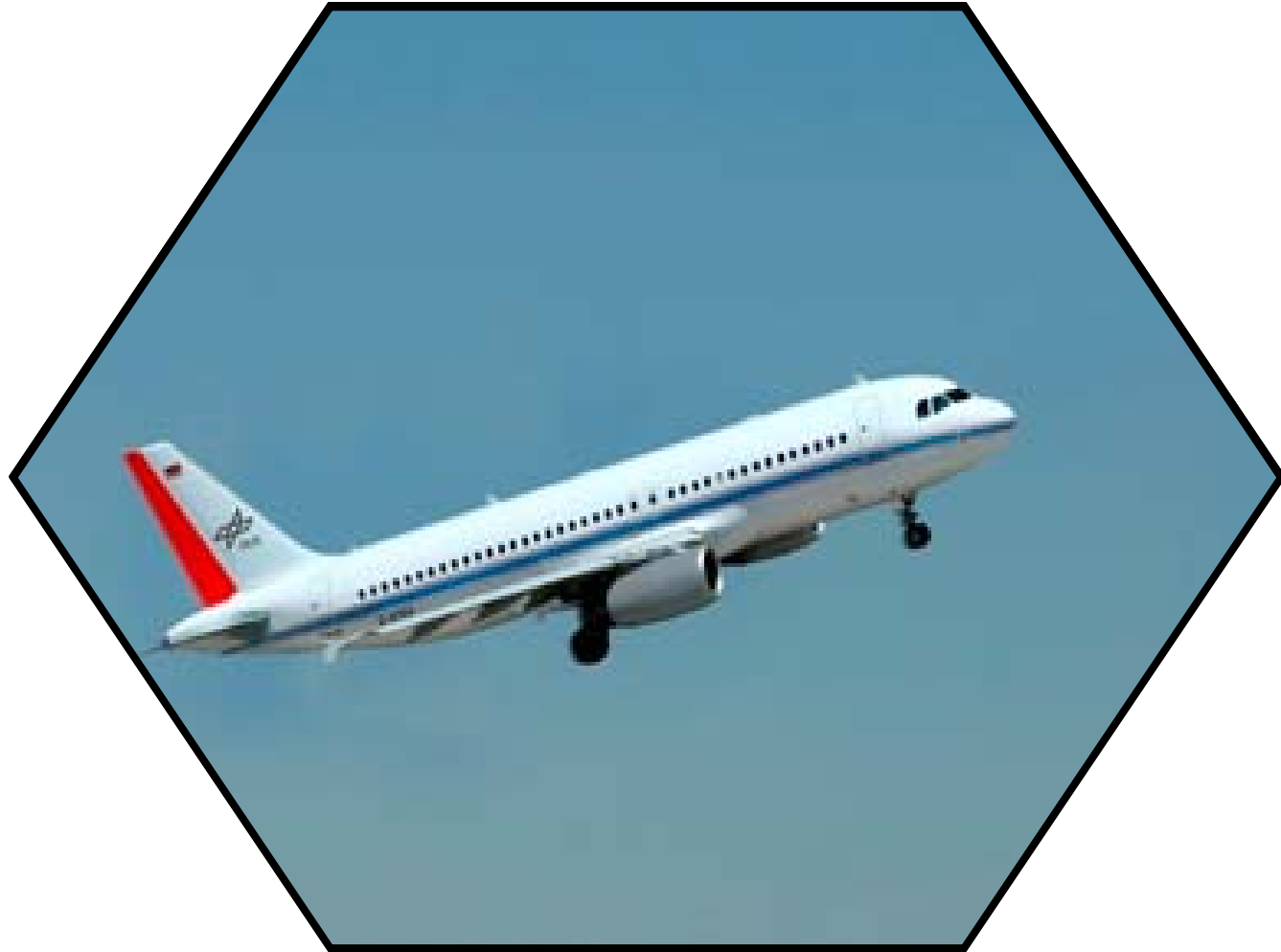
Research Aircraft

Applications

- Flight Systems
- Flight Physics
- ATM
- Atmosphere
and Environment

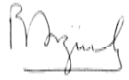
Latest Procurements

- FHS (EC 135)
- HALO (G 550)
- ATRA (A 320)



VISION 2020: Challenges and Associated Goals

Group of Personalities



Pedro Argüelles



John Lumsden



Manfred Bischoff



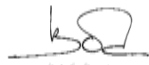
Denis Ranque



Philippe Busquin



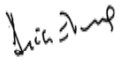
Søren Rasmussen



B.A.C. Droste



Paul Reutlinger



Sir Richard Evans



Sir Ralph Robins



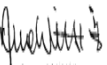
Walter Kröll



Helena Terho



Jean-Luc Lagardère



Arne Wittlöv



Alberto Lina

■ Quality and Affordability

- *Reduced passenger airfares*
- *Increased passenger choice*
- *Modernized freight operations*
- *Reduced time to market by 50%*

■ The environment

- *Reduction of CO₂ by 50%*
- *Reduction of NO_x by 80%*
- *Reduction of external noise by 50%*
- *Substantial progress towards 'Green MMD'*

■ Safety

- *Reduction of accident rate by 80%*
- *Drastic reduction in human error and the consequences*

■ The Efficiency of the Air Transport System

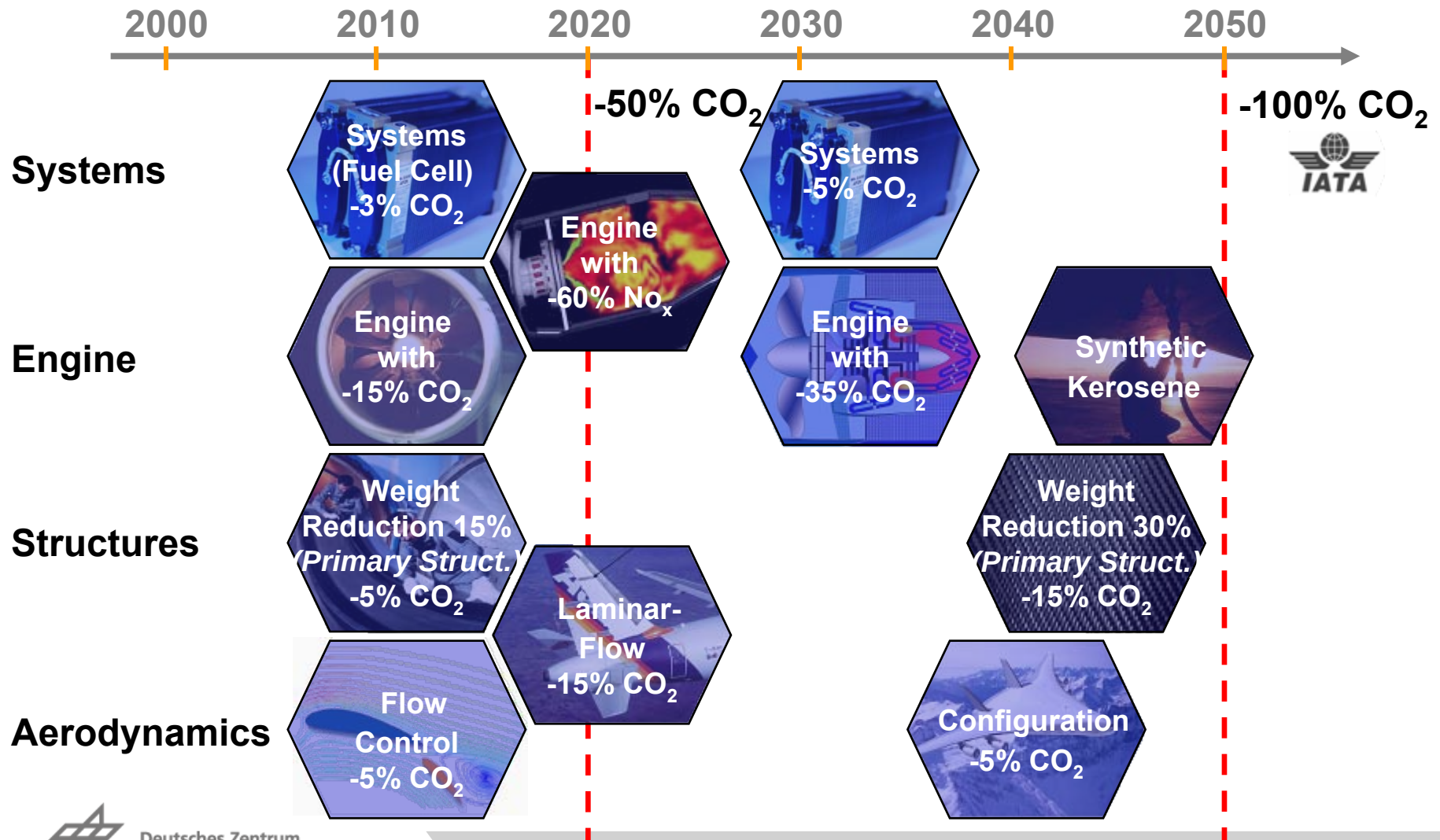
- *3X capacity increase*
- *99% of flights within 15 min of schedule*
- *Less than 15' min waiting time in the airport for short distance flights*

■ Security

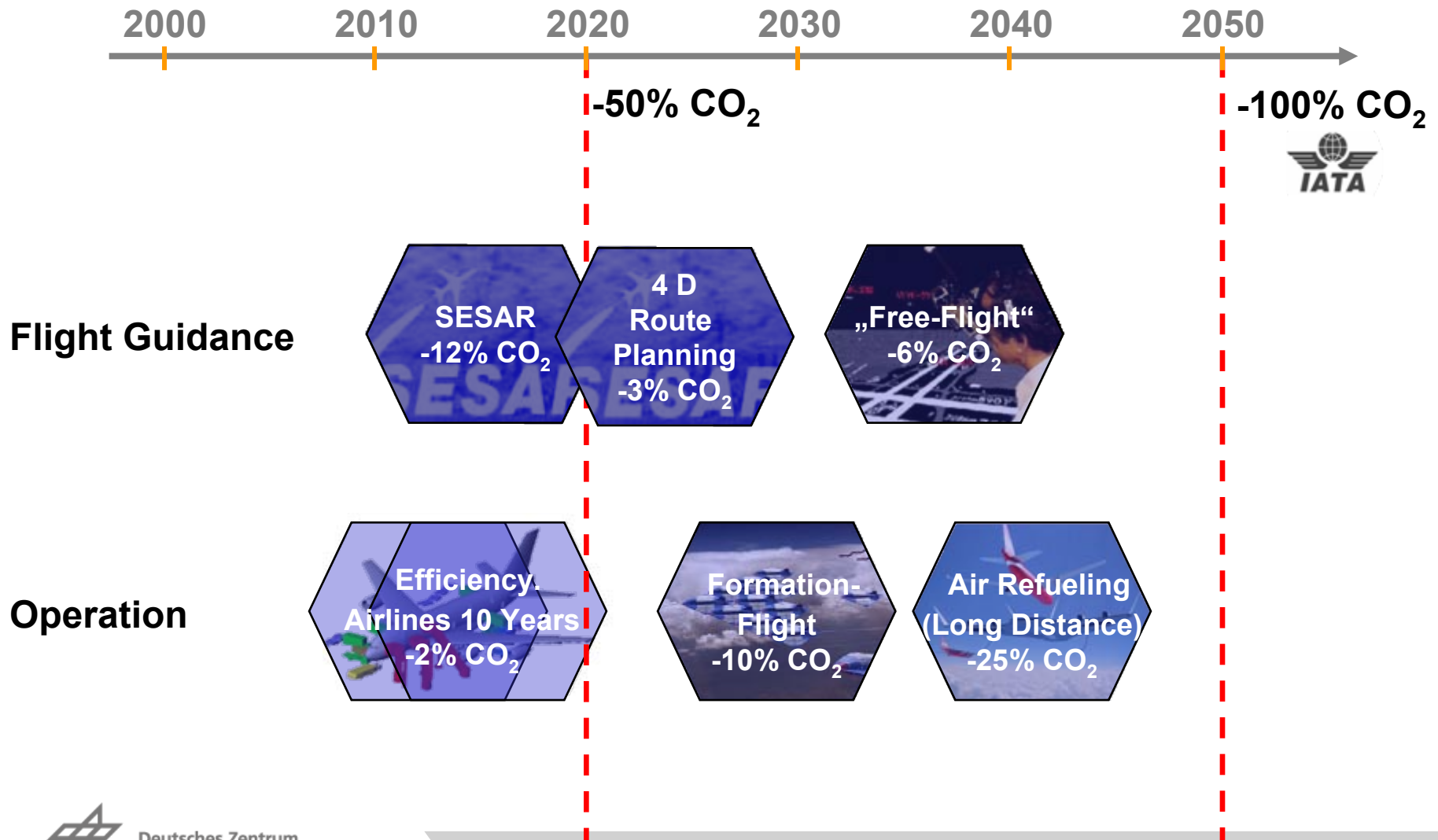
- *Airborne – terrorism prevention*
- *Airport – prevention of unauthorized access (persons or products)*
- *Air navigation - safe control of hijacked aircraft*



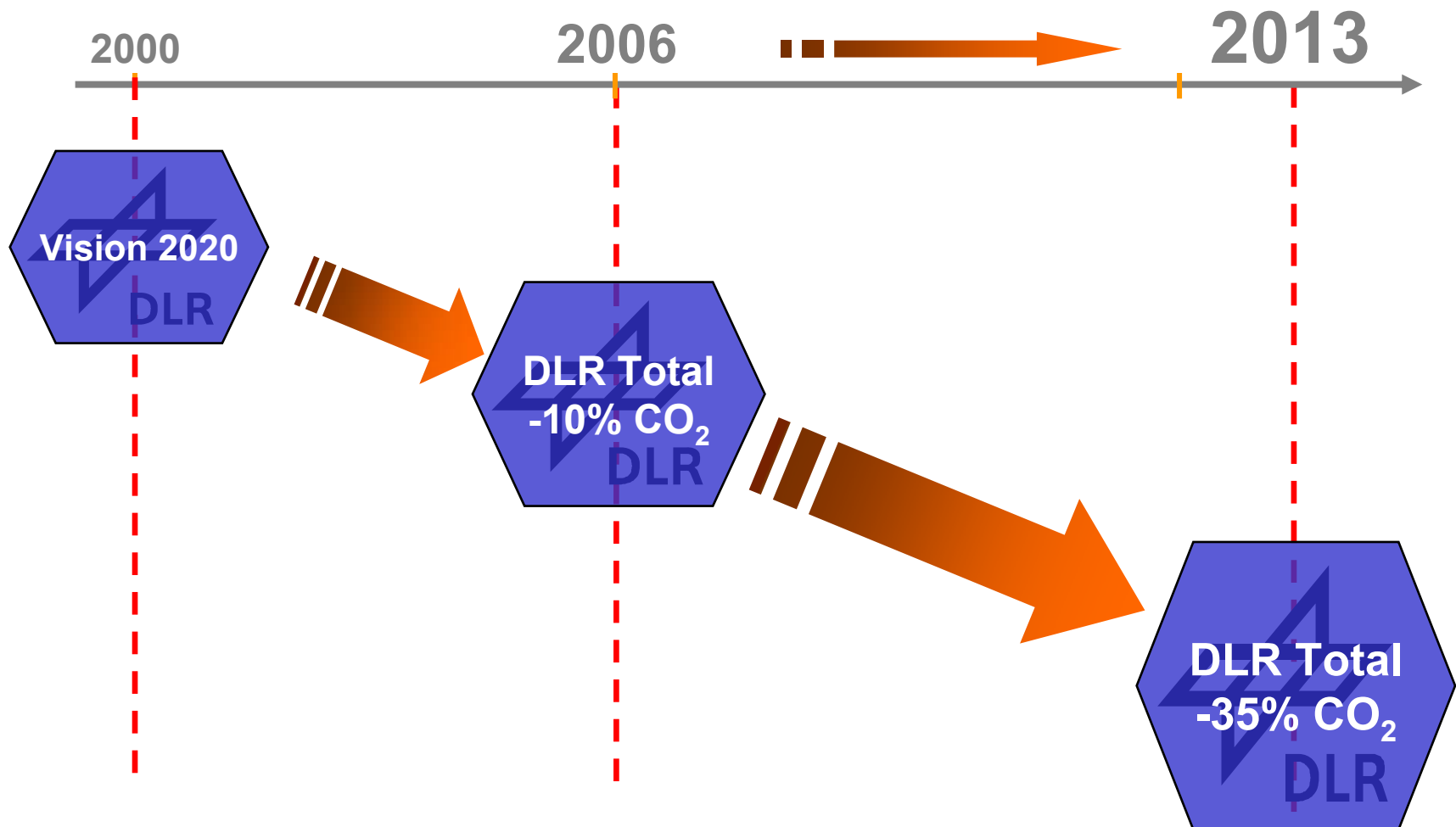
Aircraft Specific Technology



Operation Related Technology

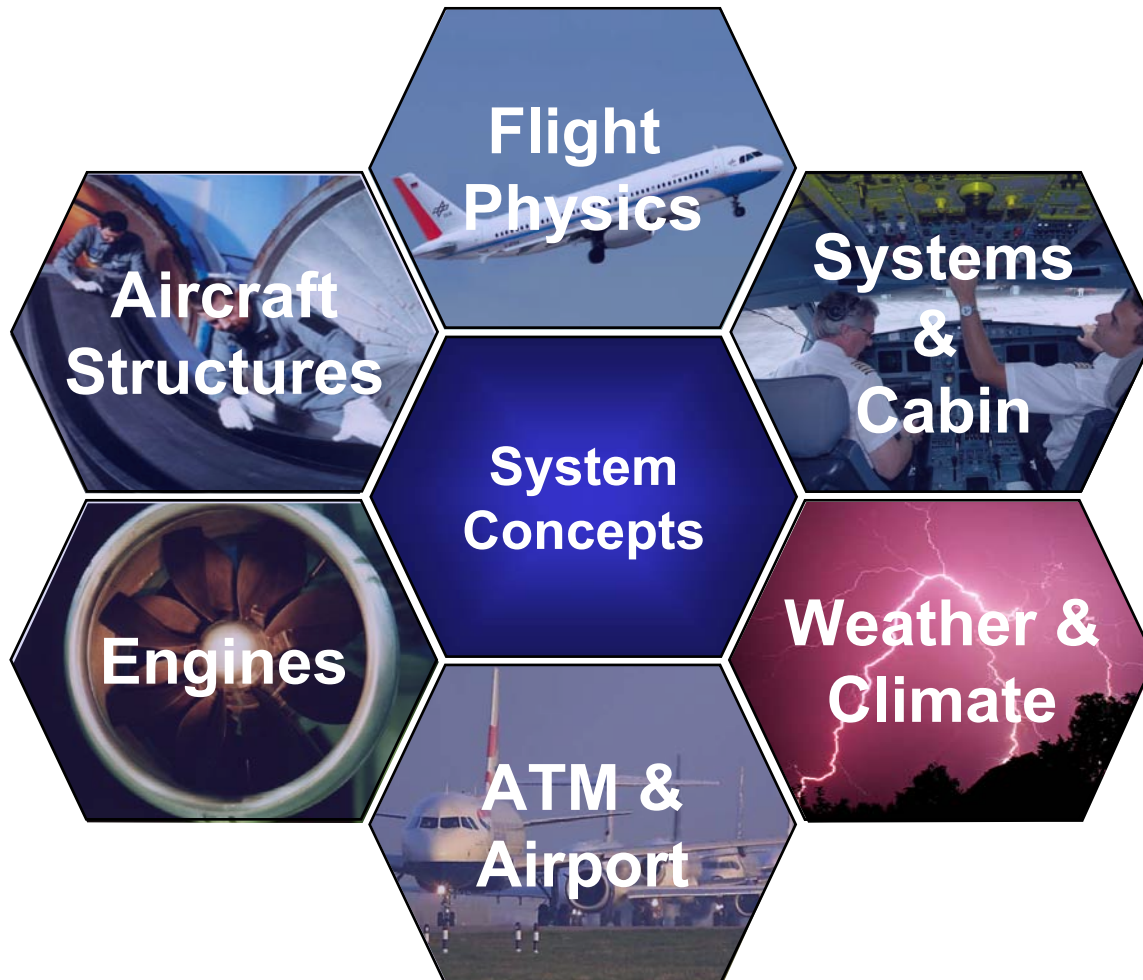


DLR Contribution to Vision 2020



Areas of Aeronautics Research at DLR:

System Competence in Research



Scientific Disciplines

Materials

Structures

Aerodynamics

Aeroacoustics

Aeroelasticity

Flight Systems

Flight Guidance

Robotics/Mechatronics

Communication Techn.

Propulsion Techniques

Combustion Techn.

Thermodynamics

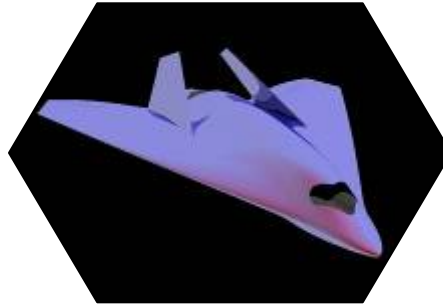
Atmospheric Research

Flight Medicine

▪
▪
▪

Volume

- **HGF Program: Civil aeronautics research:** **426 PY** (for 2009)
- **Defence related aeronautics research:** **132 PY** (2008)

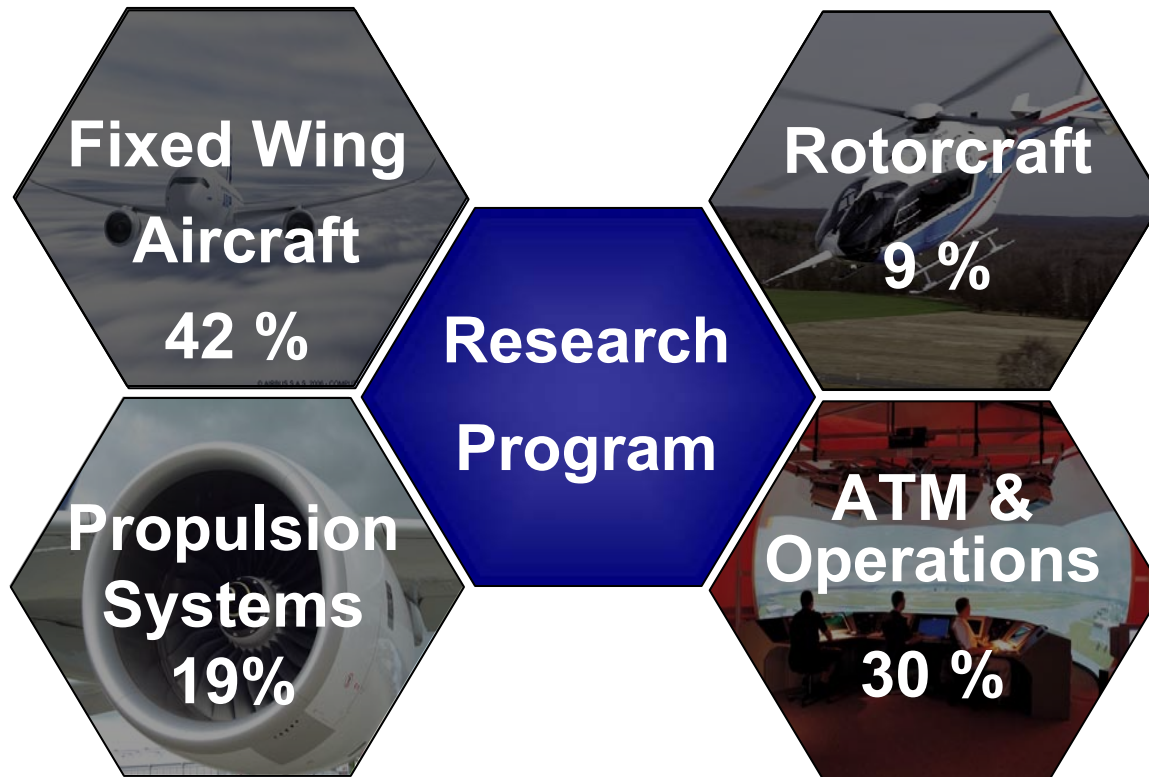


Additional third party funding: **~ 35 % of total activities**

Main sources:

- Industry**
- European research programs**
- National research programs (LuFo)**

Program Structure (1)

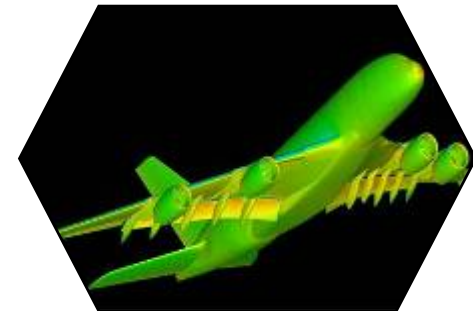


4 Program Topics, addressing products and services of the major air transport segments

Program Structure (2)

Integrated (Cross-Sectional) Activities:

- **Air Transport Concepts and Technology Evaluation**
- **Development of Tools and Processes**
(Numerical Simulation, Validation, Tests)
- **Environment and Climate Aspects**
(Noise, Emissions)



Research Partners and Customers !

**Airbus
Liebherr
Diehl
EADS MAS
Grob**

**Fixed Wing
Aircraft**

**Eurocopter
Liebherr
SKF**

Rotorcraft

**Research
Program**

**Propulsion
Systems**

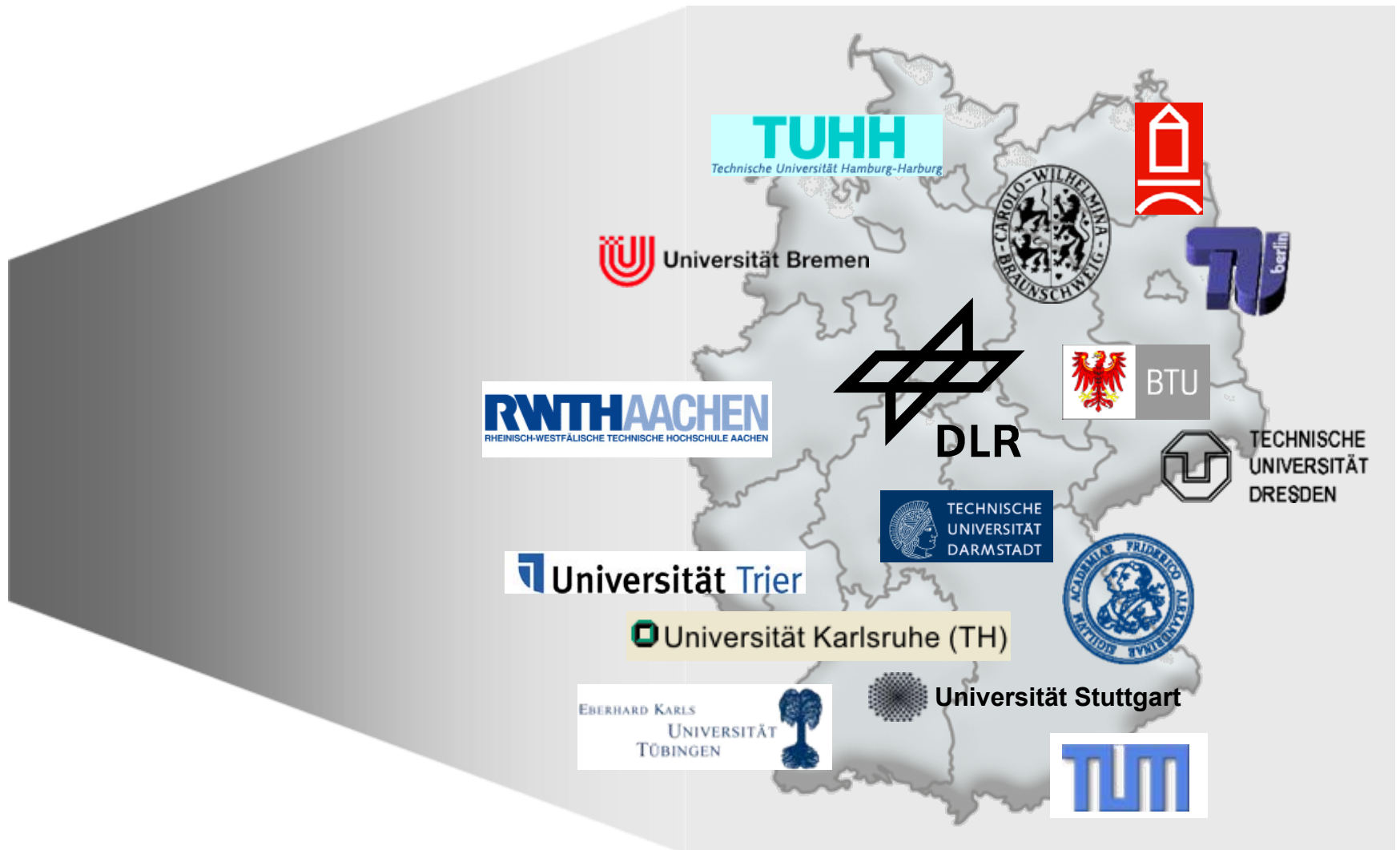
**ATM
&
Operations**

**MTU
Rolls Royce**

**DFS
Eurocontrol
Diehl
Lufthansa
Airports**



Universities



European Cooperation

- **EREA** Membership
- Close Collaboration with **ONERA** on
 - Fixed wing A/C Research
 - Rotorcraft Research
- Close Collaboration with **NLR** on ATM: **AT-One**
- Joint Operation of Windtunnels with **NLR**: **DNW**
(extended to **ATA** with **ONERA**)
ETW (assisted by NLR, ONERA, DTI, DLR)

