Wissenschafts- und Wirtschaftsplattform OST

Technische Universität Berlin

Brandenburgische Technische Universität Cottbus - Senftenberg

DLR Deutsches Zentrum für Luft- und Raumfahrt

Technische Universität Dresden

*OST: Opportunities through Science and Technology

SCIENCE AND INDUSTRY PLATFORM for Climate-friendly Aviation Engines and their Mission-oriented Integration – an Initiative of the Aviation Region OST* Germany

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Rolls-Royce Research Partner Seminar
16 and 17 September 2024

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*OST: Opportunities through Science and Technology

Motivation – Climate-friendly Aviation

- Social and political demand for climate-neutral aviation by 2050
  [European Green Deal, Flightpath 2050 – Europe‘s Vision for Aviation, Aviation Strategy BMWK]
- Mission-oriented concepts for hybridisation, electrification and the use of H_2 and SAFs
- Technology modules must be developed and validated well in advance
- Safe and reliable operation of all components in the system throughout its entire service life requires a holistic approach

Light airplanes | Short distance until 2028 | Regional until 2030 | Small & Medium until 2035 | Long distance until 2045

Approx. 40 km | Approx. 500 km | Approx. 2000 km | Approx. 5000 km | Approx. 15.000 km | Range

All electric

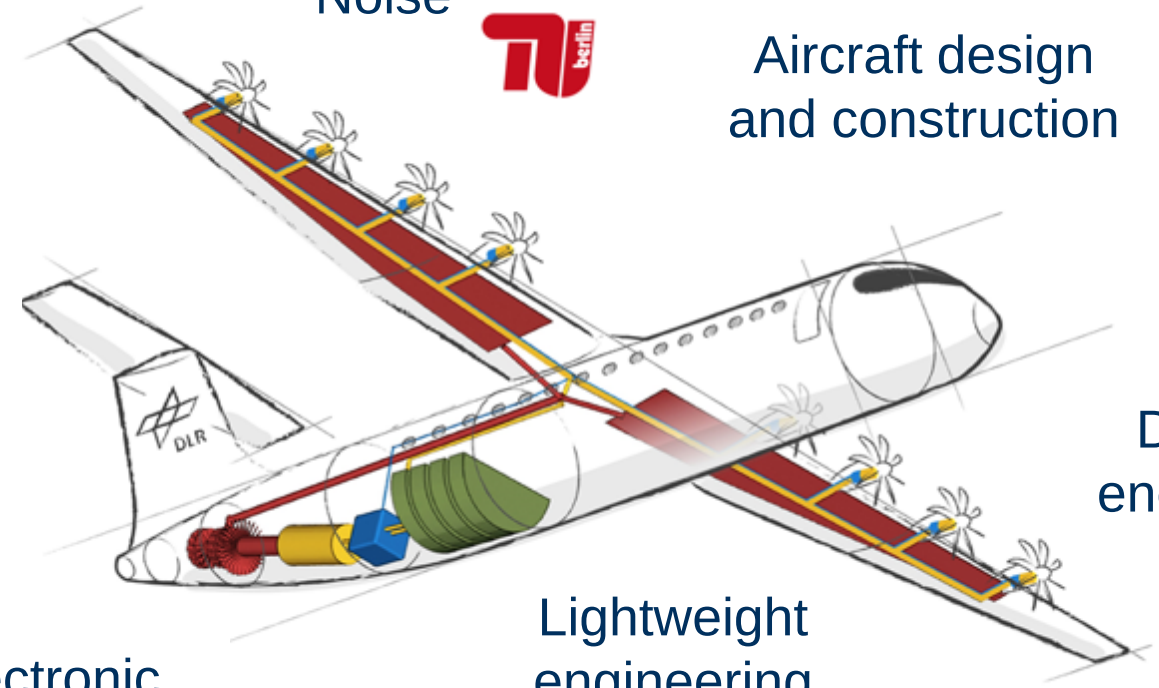
Hybrid electric / H_2

Challenges in the Transformation of Aviation

Noise

Aircraft design and construction

Flight control and navigation



Drive system and energy management

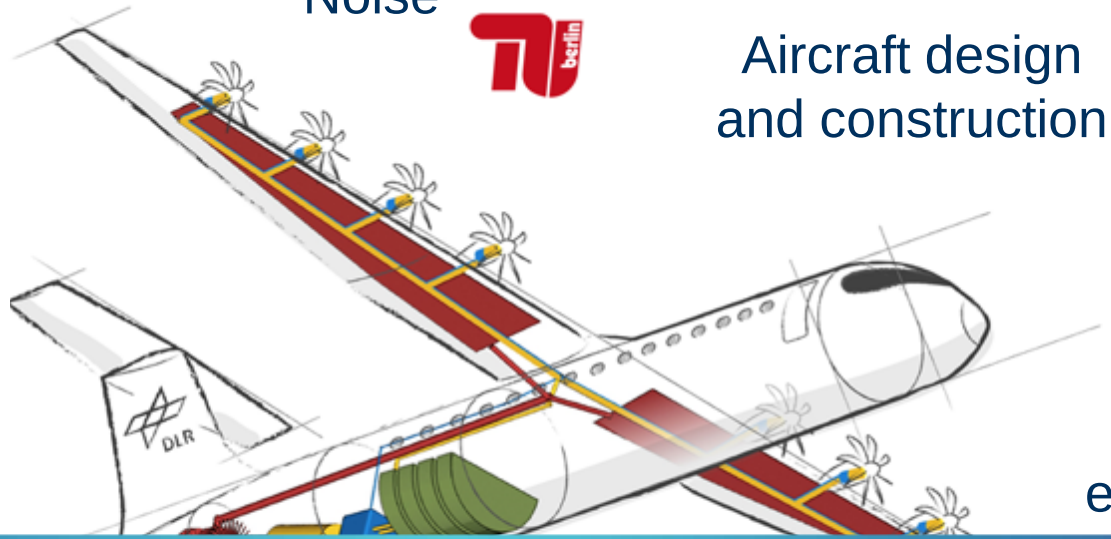
Electronic components

Lightweight engineering

Challenges in the Transformation of Aviation

Noise

Aircraft design and construction



Flight control and navigation

Drive system and energy management

Complexity and new problems require cross-regional collaboration at different levels:

- Components and subsystems
- Propulsion system
- Complete aircraft
- Aviation system

Existing expertise in the transformation of future aircraft in eastern Germany

TU Dresden

- Research profile: energy, mobility and environment/hydrogen strategy
- DRESDEN-concept (lightweight engineering, H2, electrical technologies, AI, product virtualisation, transport system optimisation)
- Rolls-Royce UTC “Lightweight Structures and Materials and Robust Design”
- Turbomachinery and flight propulsion
- Established aviation network with regional, national and international high-tech companies

German Aerospace Center

- Institutes of:
  Electrified Aero Engines, Cottbus;
  Propulsion Technology, Engine Acoustics Department, Berlin;
  Methods for Product Virtualization, Dresden
- Climate-friendly aero-engines, individual components, overall architecture
- Aviation requirements and environmental impacts, system control

BTU Cottbus

- Center for Hybrid Electric Systems Cottbus (chesco)
- (Hybrid) electric aviation propulsion systems
- Rolls-Royce UTC ‘Multidisciplinary Process Integration’
- Aviation propulsion, micro gas turbines, combustion processes
- Networking with the Lausitz Science Park and other BTU structural strengthening projects

TU Berlin

- Holistic approach of the aerospace system
- Aerodynamics, propulsion technology, hybridisation, alternative energy sources and converters
- Sustainability, robustness and transdisciplinarity of air transport in an intermodal environment
- “Urban Air Mobility”

Wissenschafts- und Wirtschaftsplattform EOSTA

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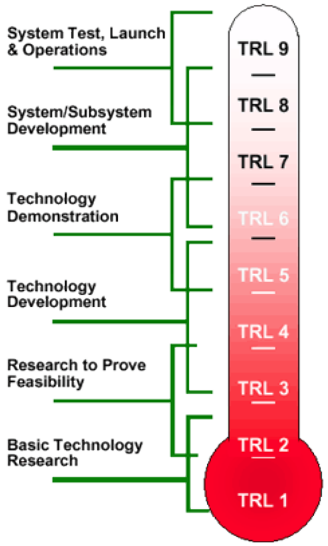
Objective of the open SCIENCE AND INDUSTRY PLATFORM

Establishment of a comprehensive, open platform for strategic research and development of mission-oriented aviation propulsion systems and their system integration

- Cross-regional synergetic cooperation between science and industry in the eastern German states
- Ongoing technology and development screening
- Pre-competitive, project-related exchange
- Strategic coordination of research projects with strong integration of SMEs
- Validation of research results in a unique, trendsetting research and testing infrastructure

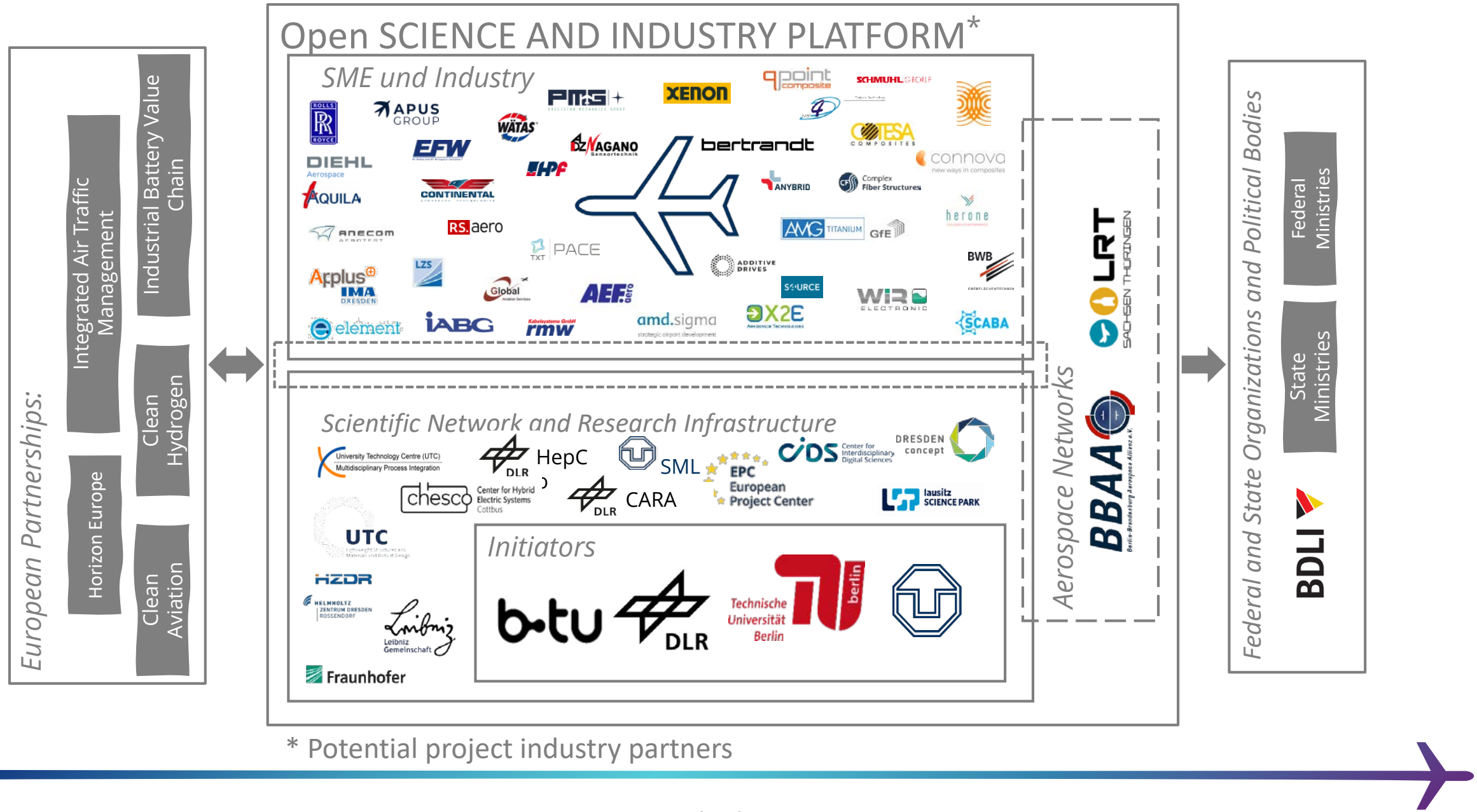
MAIN AREAS OF CO-OPERATION 1/2

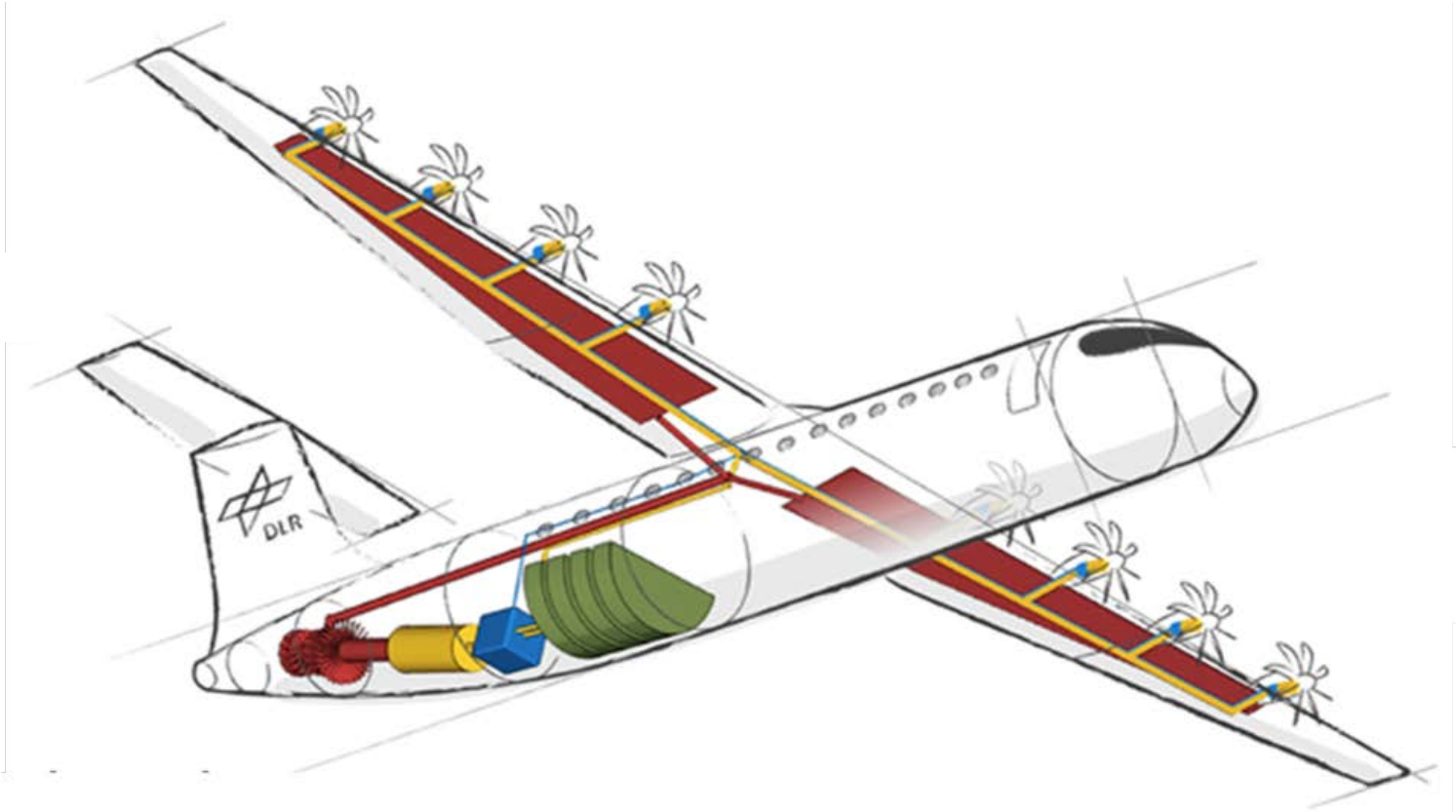
- Development of sustainable aviation engines and their mission-oriented integration
  - ➢ Innovative, product-oriented research in close cooperation of science and industry
- System analyses of propulsion systems with focus on electrification and development of benchmarks
  - ➢ Complementary use of existing expertise at the participating regions
- Deployment, expansion and pooling of infrastructure for component- and system-based testing of propulsion systems up to technology readiness level 6
- Optimisation of mission-specific deployment profiles by coupling real and digital development processes using digital twins on high-performance computers
- Definition and establishment of real-world laboratories for the development and testing of design and approval regulations in close coordination with European and German approval authorities (EASA and LBA)



MAIN AREAS OF CO-OPERATION 1/2

- Strengthening regional aviation research and increasing the attractiveness for the settlement of further industrial companies by
  - Development of a competence platform and the resulting opportunities for acquiring funding
  - Technology transfer with a focus on local companies and integration of existing associations
- Development of interdisciplinary teaching curricula for target-oriented training and further education in the field of electrified aviation systems
  - Strengthening of the economy through competent technical personnel and the creation of new jobs
  - Addressing the paradigm change in regulatory framework conditions


European Partnerships:
Integrated Air Traffic Management
Industrial Battery Value Chain
Clean Hydrogen
Horizon Europe
Clean Aviation
Open SCIENCE AND INDUSTRY PLATFORM*
SME und Industry
Scientific Network and Research Infrastructure
Initiators
Aerospace Networks
Federal and State Organizations and Political Bodies
Federal Ministries
State Ministries
BDLI
* Potential project industry partners



Open platform for strategic research and development of mission-oriented aviation propulsion systems and their system integration

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Many thanks for your attention!

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Vielen Dank!