

DATA SCIENCE  
INTELLIGENT  
INDUSTRY 4.0



**DLR**

**in facts**

**and figures**

**2016**



# DLR

## at a glance

### Research and technology

The German Aerospace Center (DLR) provides ground-breaking services through the combination of research in aeronautics, space, energy and transport, as well as the cross-sectoral fields of security and digitalisation. With its scientific and technical expertise, DLR strengthens Germany's position as a scientific and economic location.

### Space Administration

DLR has been assigned the task of the German national space agency. Acting on behalf of the German Federal Government, the DLR Space Administration designs the German space programme and implements it in cooperation with national and international partners.

### Project Management Agencies

The DLR portfolio is complemented by the DLR Project Management Agency and the Project Management Agency for Aeronautics Research and Technology. These agencies support their clients in planning, implementing and communicating funding programmes and other measures in research, education and innovation.

## 20 sites

# 40 institutes and facilities, the Space Administration and Project Management Agencies

### Augsburg

- Institute of Structures and Design
- Institute of Composite Structures and Adaptive Systems
- Institute of Robotics and Mechatronics
- Institute of System Dynamics and Control
- Institute of Test and Simulation for Gas Turbines

### Berlin

- Institute of Propulsion Technology
- Institute of Vehicle Concepts
- The Remote Sensing Technology Institute
- Institute of Optical Sensor Systems
- Institute of Planetary Research
- Institute of Transport Research
- Institute of Transportation Systems
- DLR Project Management Agency

### Bonn

- Space Administration
- DLR Project Management Agency
- Project Management Agency for Aeronautics Research and Technology

### Braunschweig

- Institute of Aerodynamics and Flow Technology
- Institute of Composite Structures and Adaptive Systems
- Institute of Flight Guidance
- Institute of Air Transport and Airport Research
- Institute of Flight Systems
- Institute of Transportation Systems
- Flight Experiments
- Simulation and Software Technology

### Bremen

- Remote Sensing Technology Institute
- Institute of Space Systems

### Bremerhaven

- Institute for the Protection of Maritime Infrastructures

### Dresden

- Institute of Software Methods for Product Virtualization

### Göttingen

- Institute of Aerodynamics and Flow Technology
- Institute of Aeroelasticity
- Institute of Propulsion Technology

## Hamburg

- Institute of Aerospace Medicine
- Institute of Air Transportation systems
- Institute of Maintenance, Repair and Overhaul
- Institute of System Architectures in Aeronautics

## Jena

- Institute of Data Science

## Jülich

- Institute of Solar Research

## Cologne

- Institute of Aerodynamics and Flow Technology
- Institute of Propulsion Technology
- Institute of Air Transport and Airport Research
- Institute of Aerospace Medicine
- Institute of Materials Physics in Space
- Institute of Solar Research
- Institute of Engineering Thermodynamics
- Institute of Materials Research
- Space Operations and Astronaut Training
- Simulation and Software Technology
- DLR Project Management Agency

## Lampoldshausen

- Institute of Space Propulsion
- Institute of Technical Physics

## Neustrelitz

- Institute of Communications and Navigation
- Remote Sensing Technology Institute
- The German Remote Sensing Data Center

## Oberpfaffenhofen

- Microwaves and Radar Institute
- Institute of Communications and Navigation
- Remote Sensing Technology Institute
- Institute of Atmospheric Physics
- Institute of Robotics and Mechatronics
- Institute of System Dynamics and Control
- The German Remote Sensing Data Center
- Flight Experiments
- Space Operations and Astronaut Training

## Oldenburg

- Institute of Networked Energy Systems

## Stade



- Institute of Composite Structures and Adaptive Systems

## Stuttgart



- Institute of Structures and Design
- Institute of Vehicle Concepts
- Institute of Solar Research
- Institute of Technical Physics
- Institute of Engineering Thermodynamics
- Institute of Combustion Technology

## Trauen



- Institute of Propulsion Technology

## Weilheim



- Space Operations and Astronaut Training



SPACE



SPACE ADMINISTRATION



AERONAUTICS



PROJECT MANAGEMENT AGENCY



TRANSPORT



SECURITY



ENERGY

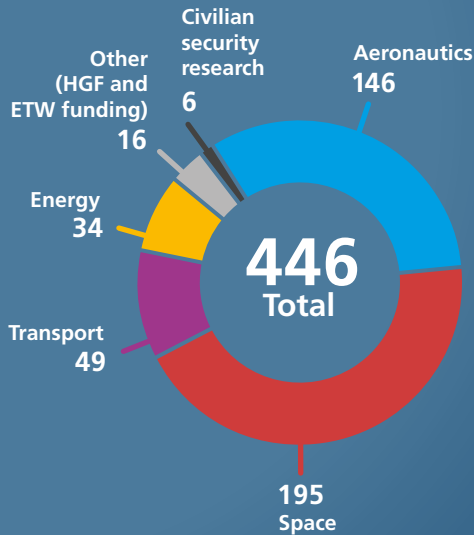




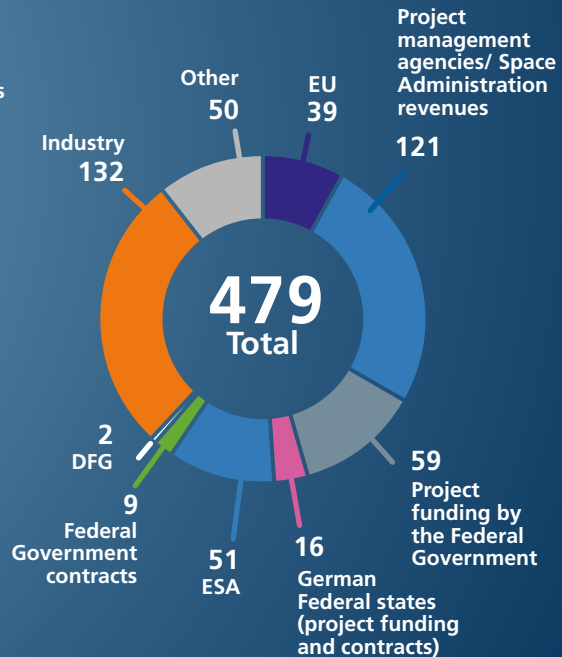


DLR's own research is financed up to 90 percent by funds provided by the German Federal Government, with the remaining 10 percent provided by the Federal States. In addition, DLR acquires funds from a variety of sources for its transfer and contract research. For example, it receives approximately 132 million euro from industrial contracts – an amount that testifies to the high quality and relevance of DLR's research and development activities. DLR also applies for national and European project funding.

## Institutional funding in 2016



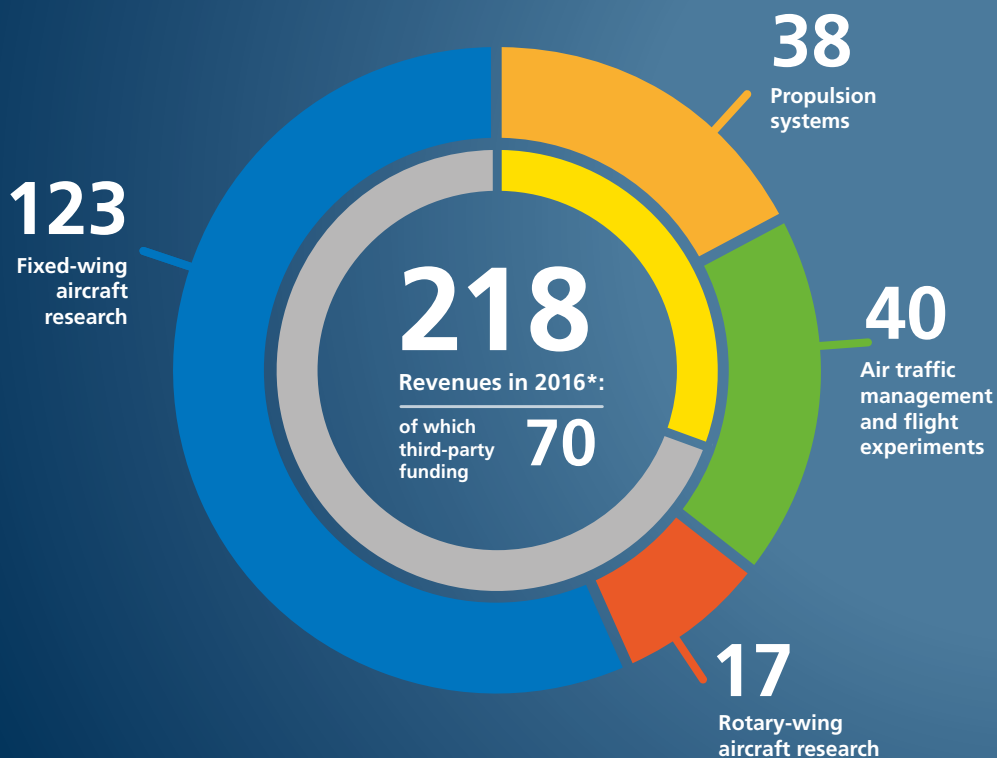
## Third-party funding in 2016



# Aeronautics

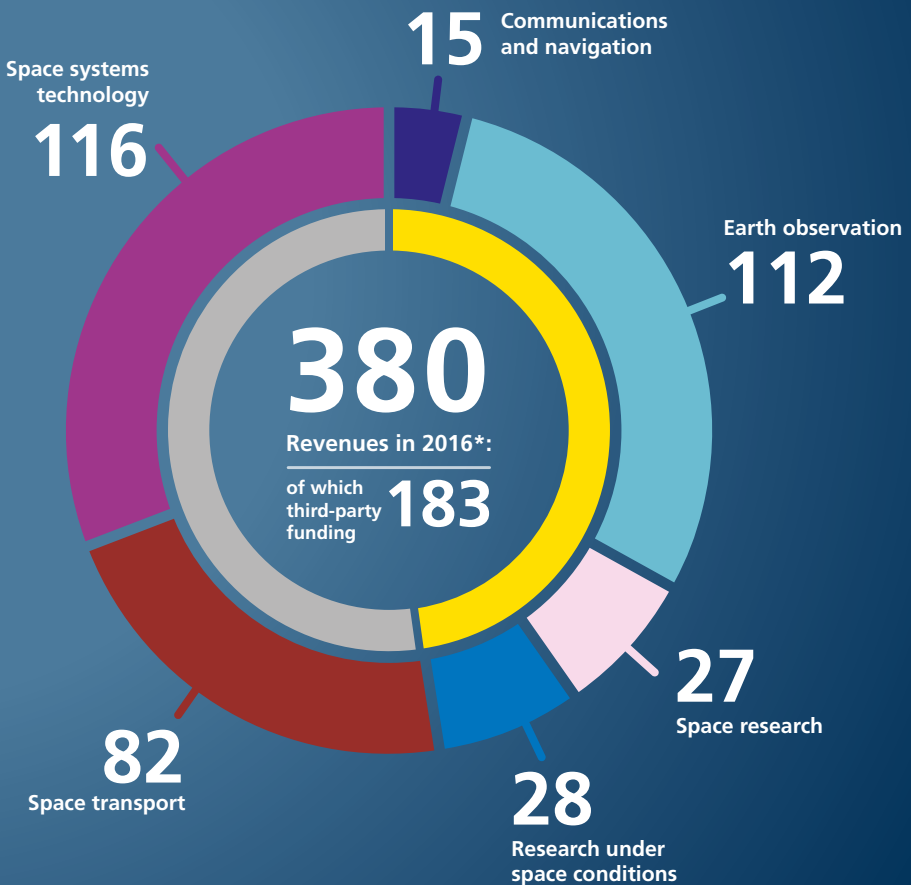


In the area of aeronautics research, DLR has taken up the challenge of making the fast-growing air transport sector efficient and environmentally friendly. Among other issues, DLR scientists are conducting research to reduce aircraft noise and harmful emissions, and to further increase safety. Drawing on the scientific excellence of its institutes, its participation in wind tunnels and Europe's largest fleet of civilian research aircraft, DLR is in a position to consider air transport systems from a holistic perspective and hence to strengthen competitiveness of the national and European aviation industry.





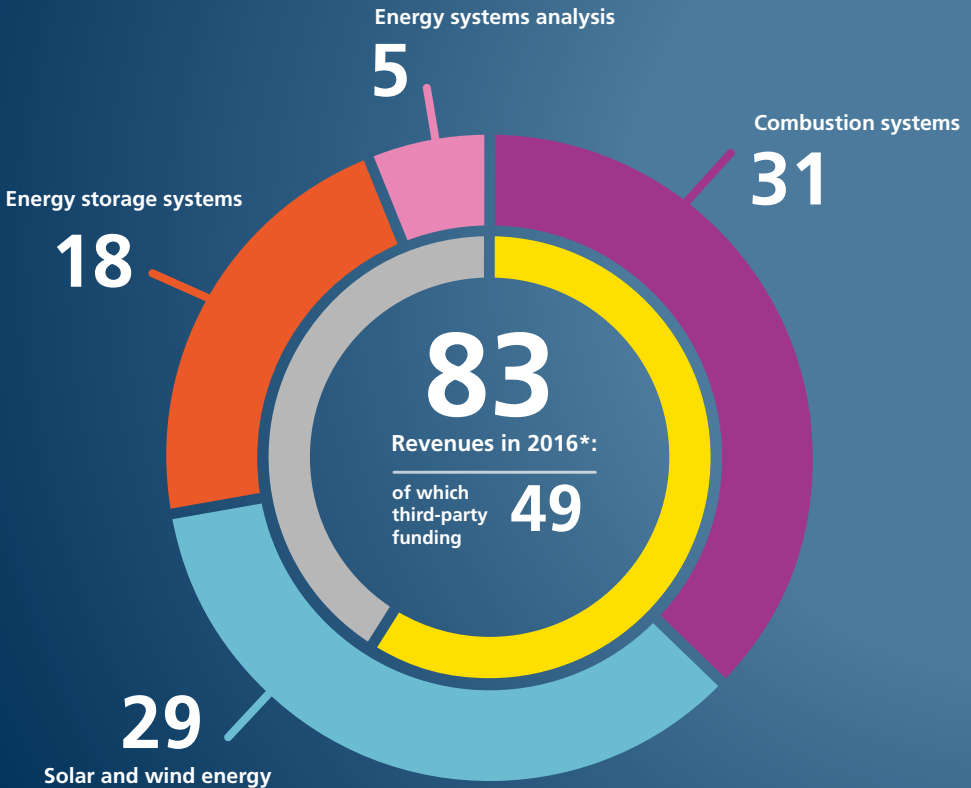
Space research has penetrated many areas of our daily lives. Therefore, DLR space activities focus on digitalisation, climate change as well as new communications and navigation technologies. For instance, the service life of satellites can be extended by transferring their maintenance to robots in orbit. These satellites provide continuous, accurate Earth observation and exploration data that fuel everyday services and scientific studies. In addition, DLR also analyses and tests sustainable and more environment-friendly launch vehicles and fuels.



# Energy



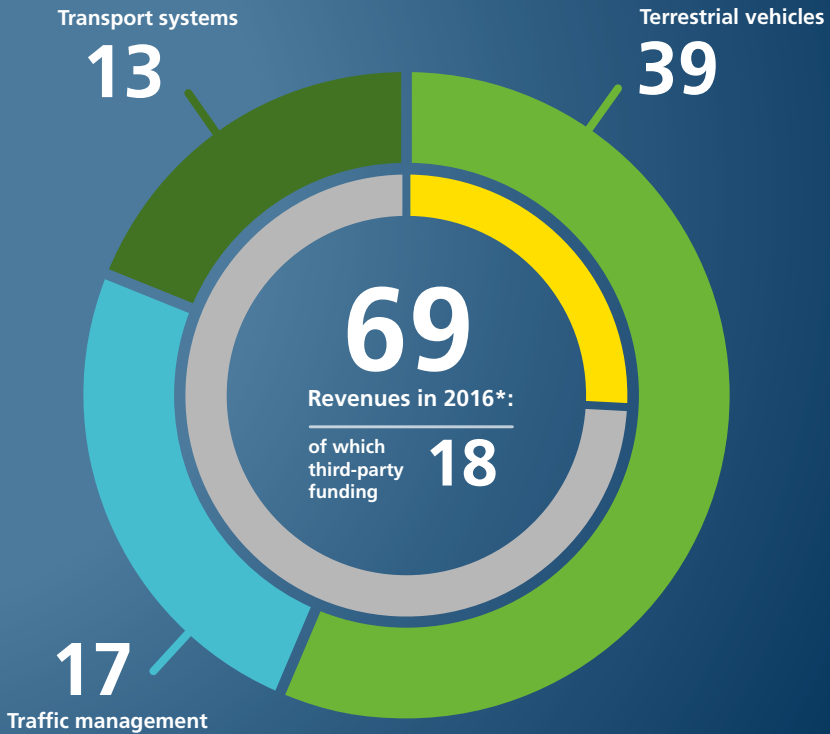
In Germany and the world over, work is being carried out on converting energy systems to climate-friendly, low-risk energy sources, alongside research into highly efficient exploitation technologies. For this, DLR's energy research provides technological possibilities and contextual knowledge through systems analysis. The primary goal of such work is a dual approach to sustainable and controllable energy production: firstly through the exploitation of fluctuating renewable-energy sources in conjunction with storage facilities, and secondly through the use of low-carbon or carbon dioxide free fuels in efficient energy converters.



# Transport



Realising sustainable mobility in a balance of interests between the economy, society, and the environment is the driving force behind DLR's transport research. As such, DLR focuses on the key challenges facing future mobility on the ground: efficiency, emissions and safety. In particular, the possibilities afforded by digitalisation are being harnessed to devise numerous different solutions that would allow greater automation, target new data sources, create an intensive network of transport modes, and enable a comprehensive approach to transport interdependencies.



# Space Administration



Acting on behalf of the German Federal Government, the Space Administration designs and implements Germany's space programme, which integrates all of the country's space activities at the national and European level. These include the national space programme, DLR's space research and development



programme, and German payments to the European Space Agency (ESA) and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT). The principal client of the Space Administration is the German Federal Ministry of Economic Affairs and Energy.



# Project management



## agencies

Project management agencies provide vital services for German research, innovation and education. They support their clients in planning, implementing and communicating funding programmes and other measures.

The DLR Project Management Agency offers a wide range of consulting and support services, including European and international cooperation. Its principal clients are the German Federal Government, together with federal state authorities, but it also services foundations and institutions such as the European Commission. It is one of the largest project management agencies in Germany.

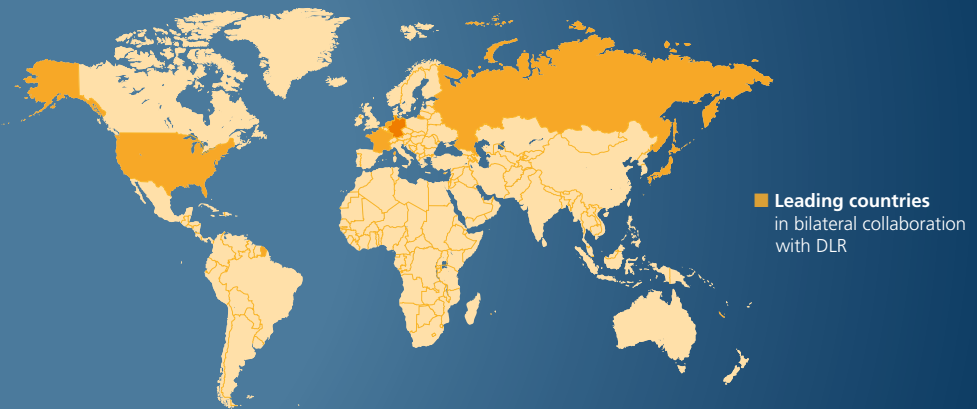
The Project Management Agency for Aeronautics Research and Technology assists the German Federal Ministry for Economic Affairs and Energy and the German states of Bavaria, Brandenburg, Hamburg and Lower Saxony in implementing their aeronautics research programmes. It also serves as the national point of contact for aerospace research within the Horizon 2020 EU framework programme.



# International cooperation



In order to tackle global challenges, solutions must be developed at an international level. DLR institutes work with universities, research institutions, public authorities, industry partners and stakeholders worldwide to address future-oriented topics and to develop adequate innovative solutions. In addition, DLR has been involved in research and exchange projects for many years. Its Space Administration and Project Management Agencies also advise and support stakeholders among the German research, education and innovation communities in their efforts to establish international networks.



DAAD –  
DLR Research  
Fellows

95

Visiting scientists  
from 67 countries

348

Assignments abroad  
(persons)

55

Partner organisations  
in over 60 countries

400

Selected  
international  
activities at DLR

3

International  
research stations

4

International offices

Year of reference: 2016

# Personnel



DLR's outstanding performance is made possible by its extremely qualified and highly motivated employees, who are all given the opportunity to develop themselves further at DLR. Equal opportunities are among our core principles. By maintaining flexible working hours, part-time arrangements and special support measures, we ensure that our employees can achieve a positive work-life balance.

**3323**

Non-scientific staff,  
of which 49.5% are female

**4636**

Scientific staff,  
of which 17.7% are female



**2468**



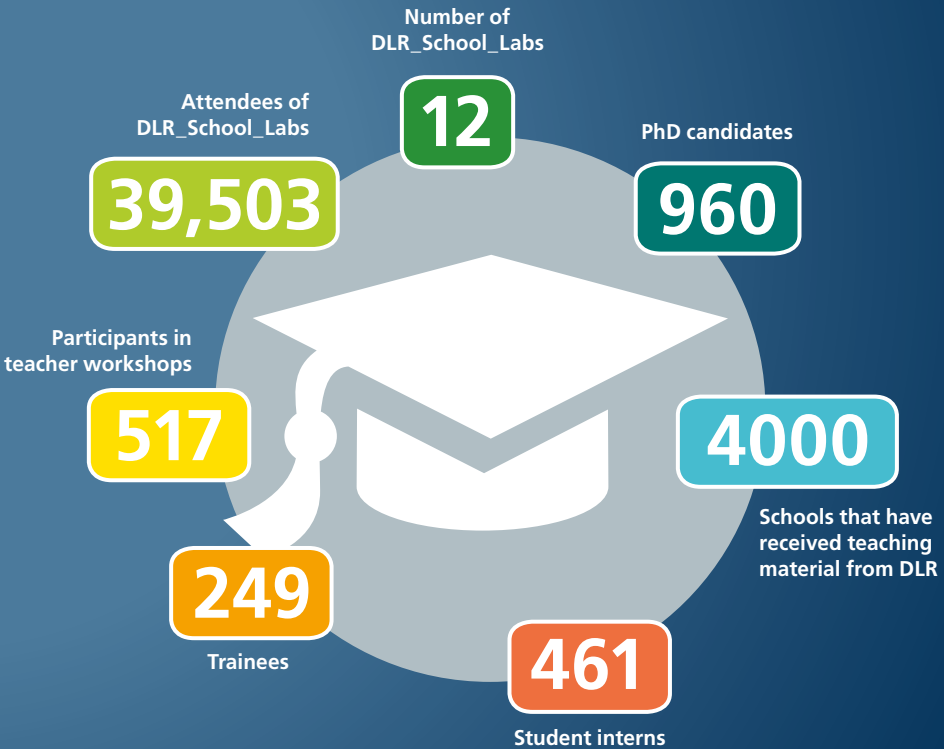
**5491**

Average age 39.4 years

# Promoting young scientists



DLR promotes young scientists through its integrated concept called DLR Campus. It ranges from activities for schools to degree-related initiatives that go all the way to doctorate level. For instance, sometimes in tandem with partner universities, DLR runs 12 School\_Labs in which young people are invited to experience the 'fascination of research'. There are also school competitions, an online youth portal and much more. Students can take part in summer schools or flight campaigns and complete internships at DLR. A first-class qualification programme is available to doctoral students.

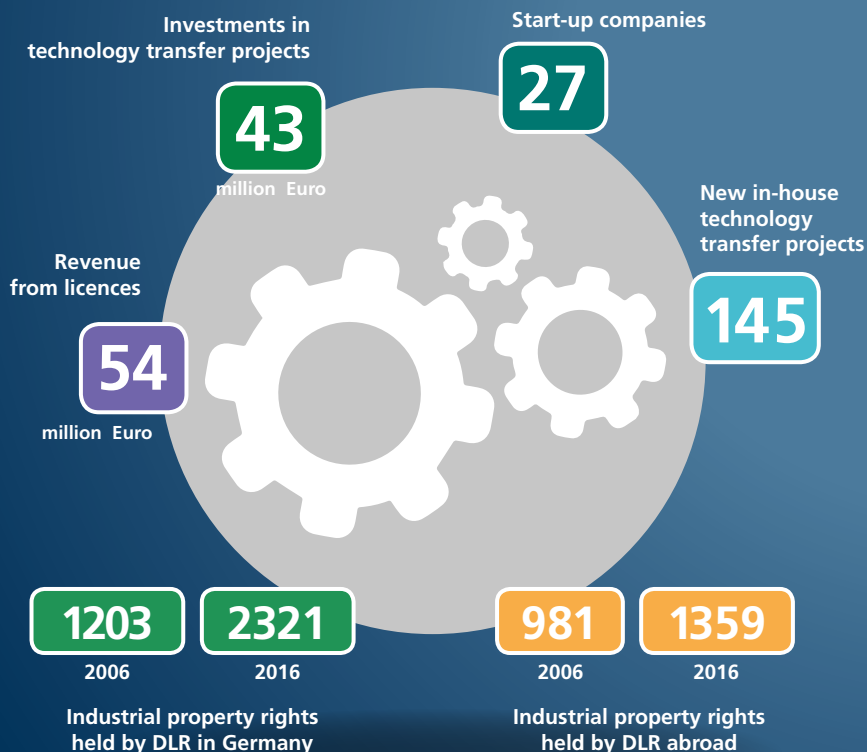


# Innovation and technology transfer



DLR supports cross-industry and demand-oriented knowledge and technology transfer in order to promote the exploitation of research and development results in industrial applications. DLR Technology Marketing represents the interface between research and industry, between product ideas and the market. DLR is a point of contact for innovation-oriented companies and creates an uninterrupted chain of innovation from ideas through to final products. Innovation ecosystems – in terms of successful innovation networks – foster the development of new products, services or processes for the market.

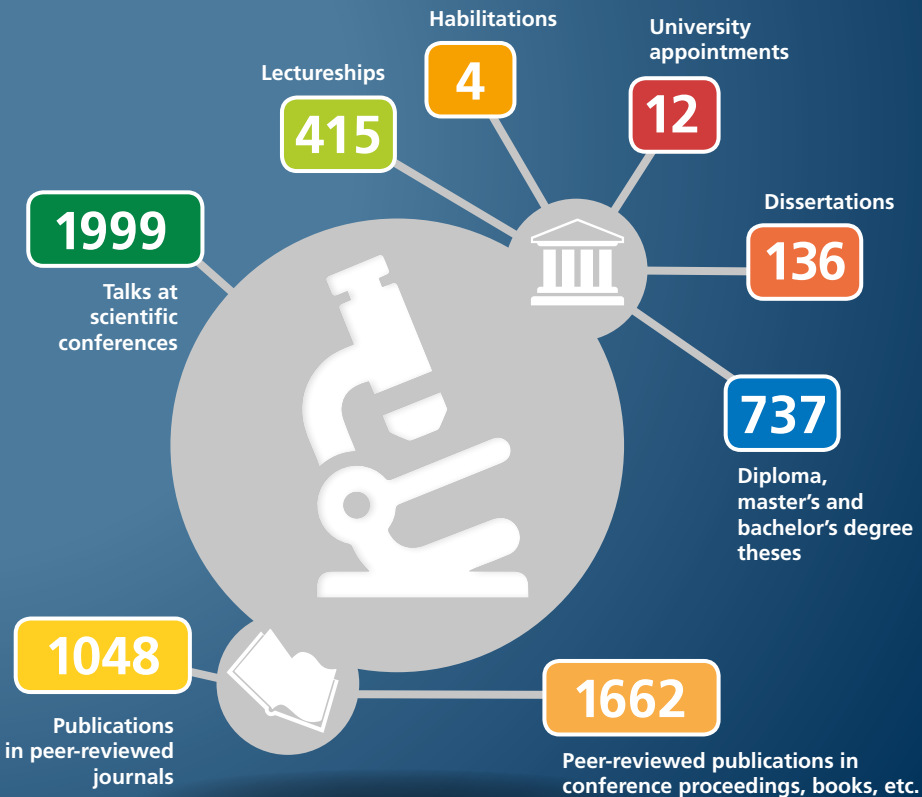
## 2006 – 2016



# Scientific Indicators



The number of scientific results reported in publications, talks or lectures is an indicator of research performance. Over the last five years, DLR scientists have more than tripled their number of peer-reviewed publications. The number of university teaching positions also rose to a new record level in 2016.





**Research vehicles  
and platforms**



**Test facilities for  
energy storage**



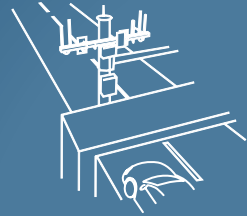
**Aircraft**



**High-performance  
computing infrastructure**



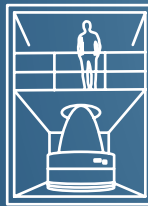
**Wind tunnels**



**Test tracks**



**Facilities for materials science  
and design research**



**Test rigs**



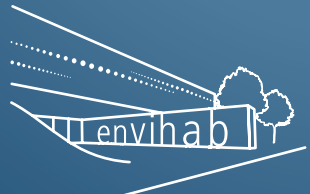
**Research power plants**



**Receiving stations  
and control centres**



**Simulators and  
systems analysis laboratories**

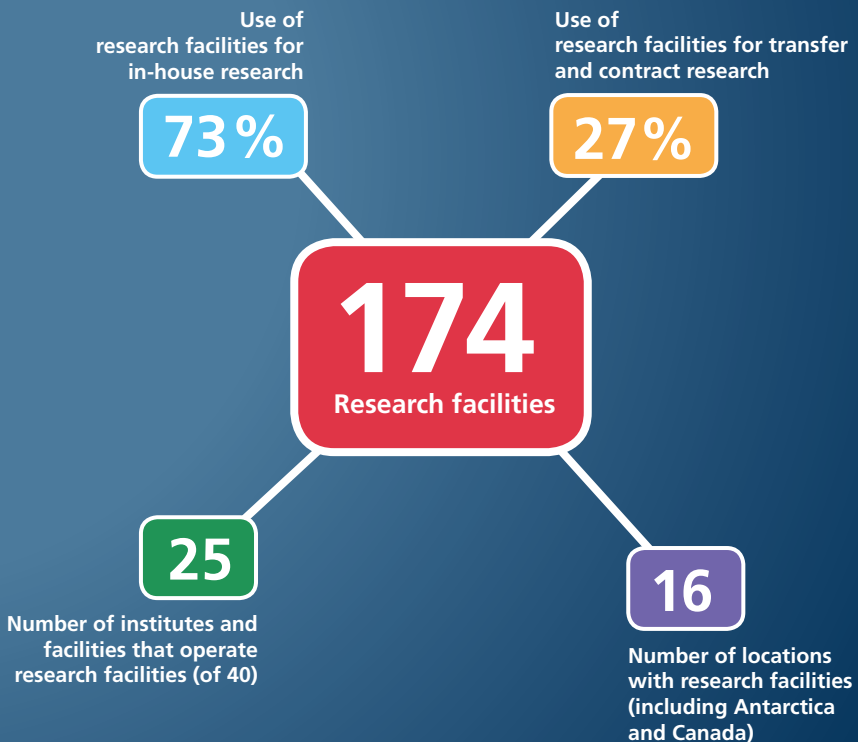


**Medical  
infrastructure**

# Large-scale research facilities



DLR operates a large number of major research facilities in order to tackle the challenges faced by aeronautics, space, energy and transport, as well as the cross-sectoral fields of security and digitalisation. With this research infrastructure, DLR is able to address overlapping topics such as mobility, energy efficiency and storage, as well as materials science and noise reduction in a unique way, which can also be applied to industry. With its processing and data storage systems – soon to be expanded by the facilities of seven new institutes – DLR meets the demands of the continuous trend towards digitalisation, Big Data, and simulation.



# Locations

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**As of: September 2017**

The designations used in the texts for groups of people apply to all genders.

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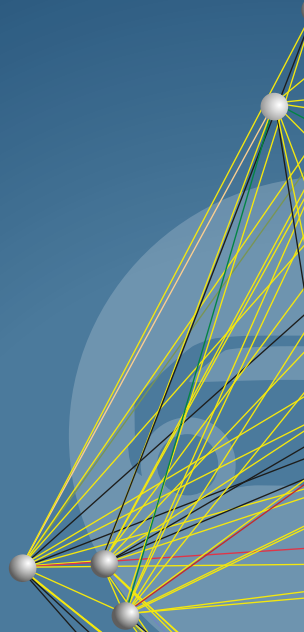
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SUSTAINABILITY  
CLIMATE PROTECTION