



Airport Research Facility  
Braunschweig (ARF)



# Airport Research Facility Braunschweig (ARF)

The research airport Braunschweig-Wolfsburg provides a unique set of sensor systems that enables research on advanced communication, navigation and surveillance technologies. This environment allows new procedures and technology to be tested under realistic conditions.

Required adaptations to technical equipment in the aircraft and on the ground can be tested in a highly flexible field testing environment. All installations can be adapted to the requirements of the systems under test and all kinds of sensors can be added into the network system, which connects the nine shelter locations distributed over the whole airport area.



Data link tower for the air-ground communication

## Research areas and technical background

### **Taxi guidance**

The research work of the DLR has largely shaped the development and standardisation of taxi guidance at airports. At the research airport, a multilateration sensor system can be used to gain a traffic overview of the entire airport and to monitor taxi clearances. This also involves work on a “safety network” on the ground that is being researched given the ever-rising volume of ground traffic. The sensor system of the facility comprises nine multilateration stations (MLAT). They determine an object’s position by measuring the time difference in the arrival of transmitted signals. The system has a position accuracy of 7.5m on the ground. Two of the sensor stations are located outside the terminal area and are used for the surveillance of approaches and departures up to 40km around the airport. The position accuracy in this case is up to 50m.

### **Air-ground communication**

New air-ground communication procedures as well as data link applications for the guidance and control of remotely piloted vehicles are being developed and technically implemented. Particular emphasis is placed on their acceptance by controllers and pilots. The core element is an experimental S-band data link that can send both audio signals and data in parallel in both directions on broadband via a full-duplex transmission. Alternatively, a serial, bi-directional connection can be set up for data transmission via a 170 MHz link. These existing capabilities are complemented by a VDL mode 2 standard data link system. Moreover, a VHF system is in place for radio-telephony communication (air-ground communication and experimental radio). Advanced data link technologies based on LTE and satellite links are complementing capabilities. The position data calculated and transmitted by the aircraft (ADS-B) can also be received and evaluated at the airport.

### **Remote monitoring and controlling of airports**

The remote monitoring of airports is being assessed and tested in order to evaluate how one or multiple smaller airports could be controlled remotely from one centre. Braunschweig airport was the first test site in Germany for a multi-camera system, which enables all operational areas of the airport to be remotely monitored by video.

## Operational procedures

New technologies and operational procedures are being developed that have the potential to enhance punctuality without impacting safety. The key to achieving this is the better support of controllers and pilots.



◀ GBAS and MLAT equipment

## Technical background

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A multicamera system enables all operational areas of the airport to be remotely monitored by video.

Digital air-ground communication is possible via the standard VDL2.

The test site is equipped with the state-of-the-art satellite-based precision landing system GBAS (Ground Based Augmentation System) for high-precision variable arrival routes.

# Air Traffic Validation Center

Simulators, sensor systems and flight testing equipment together form the Air Traffic Validation Center of the DLR Institute of Flight Guidance. The entire center offers researchers the right tools for testing and evaluating new ideas, concepts and technologies for all areas of air traffic management. It allows each development step to be continuously reviewed, from the initial idea down to the testing of prototypes and their implementation under realistic conditions.

The Institute of Flight Guidance performs long-term engineering research preceding industrial developments in the field of flight control and air traffic management. Its main areas of research are operational procedures, technology development and human-centered automation. The goal is to ensure a safe, efficient, environmentally friendly and reliable air transport system.

## DLR at a glance

DLR is the national aeronautics and space research centre of the Federal Republic of Germany. Its extensive research and development work in aeronautics, space, energy, transport and security is integrated into national and international cooperative ventures. In addition to its own research, as Germany's space agency, DLR has been given responsibility by the federal government for the planning and implementation of the German space programme. DLR is also the umbrella organisation for the nation's largest project management agency.

DLR has approximately 8000 employees at 20 locations in Germany: Cologne (headquarters), Augsburg, Berlin, Bonn, Braunschweig, Bremen, Bremerhaven, Dresden, Goettingen, Hamburg, Jena, Juelich, Lampoldshausen, Neustrelitz, Oberpfaffenhofen, Oldenburg, Stade, Stuttgart, Trauen, and Weilheim. DLR also has offices in Brussels, Paris, Tokyo and Washington D.C.

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