



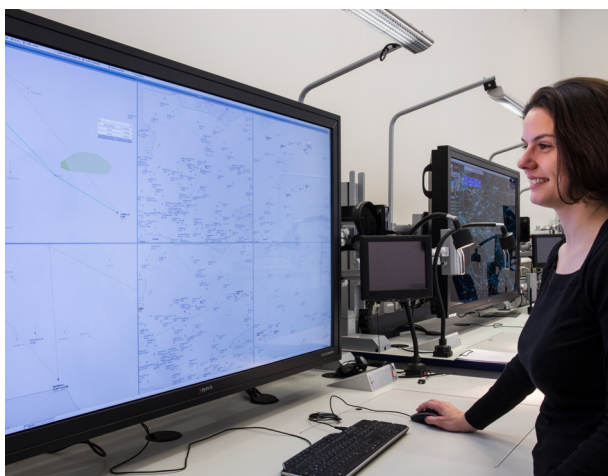
Air Traffic Management and Operations Simulator (ATMOS)

Air Traffic Management and Operations Simulator (ATMOS)

The Air Traffic Management and Operations Simulator is an experimental facility for simulating air traffic in real time.

In a simulated airspace, the ATMOS can be used to test new approach and landing procedures in terms of flight safety, pollution reduction and traffic capacity. Furthermore, this facility allows researchers and air traffic controllers to jointly evaluate new working methods for controlling and influencing air traffic. One area of research is determining the strain on controllers, including in critical situations.

The ATMOS also allows the simulation of fully automated scenarios. Planning and coordination processes can be tested in this way. The benefit of these types of simulation is that, apart from being a safe way to conduct experiments, certain traffic situations can be repeated. In addition, traffic volumes can be simulated as they are expected in the future. In ATMOS, the entire flight from departure to landing at the destination aerodrome can be simulated for a large number of aircraft. It is also possible to more closely examine only one aspect of flight, such as intercepting segmented approaches.



Sectorless ATM controller working position

Research areas

Validation of controller assistance tools

Innovative assistance and display functions for controlling aircraft are being examined. In addition effects of security related issues on this communication can be addressed.

Communication between controllers and pilots

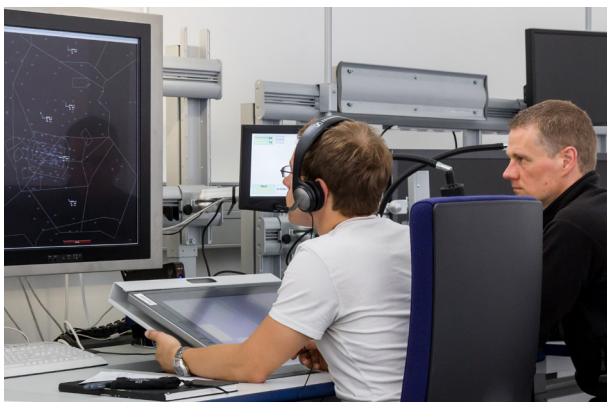
Novel digital data connections for controller-pilot communication are being researched.

Validation of new approach procedures

Innovative approach procedures are being assessed in terms of noise abatement, fuel savings and shortening of flight routes.

Situational awareness and workload of controllers

When introducing new procedures, it has to be ensured that the situational awareness of controllers is not compromised and the workload does not exceed the safety boundary.



TMA controller working position

The simulator is primarily designed for performing assessments with interacting participants, which is why the traffic situations have to be simulated in real time. The assessments relate to technical air navigation services issues from the perspective of ground controllers. It is generally possible to use any airspace in the world, including one or more airports as desired. If necessary, the selected airport can be adjusted in line with different air traffic control sectors.

Technical background

The ATMOS is divided into an airborne component and a ground component, and their simulation computers are connected via a local network.

The airborne component can be the different testing facilities of the Institute of Flight Guidance or experimental aircraft. However, the airborne component is usually pseudo pilot stations that are physically located away from the controller working positions. Since each pseudo pilot deals with several "aircraft", the controller can make contact with several "aircraft" and issue them instructions.

The ground component takes the form of the air traffic management simulator, which is the central experimental facility in the total simulation of "aircraft in air transport". It calculates a physical model for each aircraft. Using both today's and experimental radar working positions, the controllers interact with the simulation system and the pseudo pilots.

The ATMOS can be connected to all other simulators of the Institute of Flight Guidance, such as the cockpit simulator and the tower simulator, allowing complex, distributed simulations to be performed in the air transport system.



Supervisor position

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.

Imprint

Publisher:

German Aerospace Center (DLR)

Institute of Flight Guidance

Address:

Lilienthalplatz 7, 38108 Braunschweig

Phone + 49 531 295-2500

e-mail flugfuehrung@dlr.de

DLR.de/fl

Images DLR, unless otherwise stated.

Member of



**Deutsches Zentrum
für Luft- und Raumfahrt**
German Aerospace Center

Institute of Flight Guidance

Supported by:



Federal Ministry
for Economic Affairs
and Energy

on the basis of a decision
by the German Bundestag