



Apron and Tower Simulator (ATS)

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The Apron and Tower Simulator of the Institute of Flight Guidance is one of the world's leading facilities for new developments in the field of airport air traffic control.

It offers the possibility to simulate the desired controller working position at any airport around the world. By utilising these opportunities, new systems and procedures can be designed and validated in order to make air traffic safer and more efficient.

In the ATS, controllers have all of the tools and means that they would normally have at real working positions at the airport. For example, the controllers can use approach and ground radar, and they can see all aircraft and vehicles outside at the airport displayed by a projection system. They can contact the aircraft and other work units at the airport by radio and telephone. Furthermore, the controllers can receive additional assistance tools to help with the planning, controlling and monitoring of traffic. Special software is used in the simulator to enable all of these features. This software calculates the aircraft movements according to physical laws, and it generates the radar displays and outside view projection. Pseudo pilots participate in radio communication and execute the controller commands in the aircraft. They respond to the controller in keeping with prescribed procedures, and they control the aircraft using mouse and keyboard.



Working positions on two levels within the 360° panorama

Research areas

Optimised departure and ground traffic management

The major European airports in particular pose a bottleneck issue in the air transport system due to their high traffic volumes. Within the ATS, new sensor and planning systems are developed, supporting the air traffic controllers in determining the optimal sequence for taxiing and departing aircraft so that aircraft can take off again more quickly. At the same time, new procedures and systems help to save fuel and reduce noise.

Information exchange

Like society in general, air traffic controllers face an increasing demand for digital connection and information exchange. Airlines want to ensure that their most important aircraft are serviced first by air traffic control, rather than the aircraft that calls in first. Airports have a necessity to organise their services so that they best suit the traffic, whilst the network management tries to obtain the most precise picture of the traffic at the airport in order to adapt the traffic flows. Regarding all these information exchange demands, the DLR examines new ways of digital communication, augmented reality and automated assistance for the controllers. For this, the ATS can be equipped with virtual glasses, systems for guiding the aircraft with the support of the taxiway lighting or head- and eye-tracking sensors.

Future simulation components for air transport

New options for simulating air traffic are constantly explored in the ATS, such as the assessment of new ways for the software to control aircraft accurately and with timely precision. The virtual outside view is constantly improved by adding new elements, such as virtual inserts.

Technical background

The ATS gives the controller a 360° panorama, which is generated by an autocalibrated projection system, using thirteen high-resolution LED projectors.

The controller working positions are generic representations of real working environments, allowing for flexible configuration and adaptation to any kind of research purpose.

It is also possible to install external systems, ranging from simple software programs down to completely new work consoles. Further adaptations are possible in terms of hardware but also in terms of the software. For example, nearly every airport in the world can be depicted and from every perspective. Simple inputs determine which aircraft will appear and the flight path it will take. Ground vehicles can also be simulated in this way.



Pseudo pilots execute controller commands

The ATS can be connected to all other simulators of the Institute of Flight Guidance, allowing complex, distributed simulations of several areas in the air transport system.

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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