Deutsches Zentrum
für Luft- und Raumfahrt e.V.
in der Helmholtz-Gemeinschaft

Handout

Institute of Flight Guidance: At a Glance

The Airport and Control Center Simulator (ACCES) for airport management improvements.

Researching the starting, landing and taxiing of aircraft inside the Apron and Tower Simulator (ATS).

Validating new concepts for controllers with the Air Traffic Management and Operations Simulator (ATMOS).

The Institute of Flight Guidance performs long-term engineering research preceding industrial developments in the fields of flight guidance and air traffic management. Operational procedures, technology development and human-centered automation are its main areas of work.

The Institute of Flight Guidance develops solutions for the demanding challenges of today's aviation: The improvement of efficiency and capacity for a steadily increasing air traffic while maintaining the highest safety level.
Answers are advanced flight guidance systems and highly automated air traffic control systems supporting operators and pilots on a high level. Researching this interaction of the airborne and ground-based air traffic management is one of the main tasks of the institute. To overcome the fragmented system of air traffic control in Europe is another main task. Required are major innovations in the fields of navigation, communications, air traffic control and management on the airborne and ground-side.

Six Research Departments

The outlined challenges are provided for by the collaborative effort of the institute's six research departments and the management support department.

New methods for the automation of flight management processes on-board are investigated by the department of **Pilot Assistance**. This includes also assistant functions for the operation of unmanned aircraft in controlled airspace.

For the ground side the department of **Controller Assistance** focuses on the design of air and ground traffic management systems for high density airports. Methods and procedures are developed to assist controllers in the monitoring, planning and management of all the airport's traffic.

On a macro level the department of **Operations Control** works on holistic approaches for overall guidance systems. Innovative concepts are created, implemented in prototypes and integrated and demonstrated on-site.

New concepts and technologies for air traffic management are reviewed and evaluated in realistic environments by the **ATM-Simulation** department. Several on board and ground simulators for human-in-the-loop validation tasks are operated.

The department of **Air Transportation** works on modelling and analysing today's and tomorrow's air traffic. Using analytical models and fast-time simulations forecasts and studies are generated in order to answer questions along the key performance areas.

The design of advanced human-machine interfaces in flight control and air traffic management systems is the concern of the department of **Human Factors**. Following the principles of human-centered automation, solutions are developed and evaluated in simulations and field trials.

Extensive Simulation Network

Across all departments an extensive network of simulation and validation facilities is available. The components are interoperable and can be connected to form a "Super-ATM Simulator". So complex scenarios with multiple actors can be tested and validated. For real field

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Institute of Flight Guidance: At a Glance

DLR's research aircraft „D-ATRA", an Airbus A320-232.

The Generic Experimental Cockpit (GECO), used for avionics and cockpit research.

tests the institute has access to DLR's aircraft fleet and the nearby Braunschweig Research Airport.

Networks and Cooperation

The Institute of Flight Guidance participates in many national and international research projects, cooperating with partners from science, business and governments like Airbus or the European Commission. A unique research alliance exists with the National Aerospace Laboratory (NLR) of the Netherlands. As AT-One both organizations have combined their strengths in the field of air traffic management on an international level. Via AT-One the institute is an official Associated Partner of the European research programme SESAR Joint Undertaking.

80 Years of Aviation Research

The special discipline of „Flight Guidance" has a rich research history. Since more than 80 years scientists work in this field in Braunschweig. While in the beginning the development of sensing devices for poor visibility conditions was predominant the institute constantly expanded its research domains parallel to the rapid growth of air traffic and management challenges. Today the institute's work covers the ground and airborne side of flight guidance. Improving the cooperation between aircraft and ground operators as well as between humans and highly developed automatic systems is a central concern of the institute's work today.

DLR at a Glance

DLR is Germany's national research centre for aeronautics and space. Its extensive research and development work in Aeronautics, Space, Energy, Transport and Security is integrated into national and international cooperative ventures. As Germany's space agency, DLR has been given responsibility for the forward planning and the implementation of the German space programme by the German federal government as well as for the international representation of German interests. Furthermore, Germany's largest project management agency is also part of DLR.

Approximately 7000 people are employed at 16 locations in Germany: Cologne (headquarters), Augsburg, Berlin, Bonn, Braunschweig, Bremen, Goettingen, Hamburg, Juelich, Lampoldshausen, Neustrelitz, Oberpfaffenhofen, Stade, Stuttgart, Trauen, and Weilheim. DLR also operates offices in Brussels, Paris, and Washington D.C.