

# Apron and Tower Simulator – ATS

The DLR Institute of Flight Guidance uses its Apron and Tower Simulator (ATS) for research and development purposes for vision based air traffic control, i.e. for tower, apron and ground control. Experienced controllers from throughout the world participate in simulations to test and evaluate new air traffic management (ATM) concepts and controller assistance systems. Its flexibility and scalability makes the ATS an appropriate testbed for a variety of ATM related research purposes.

Basically, ATS consists of two dynamic modules that generate aircraft movements according to aircraft dynamic models and two visual systems that generate and display the synthetic vision. The simulated aircrafts are controlled by pseudo pilots in an adjacent control room who communicate with the controllers via a simulated radio transmission line. The supervisor uses a master station to control the simulation. A variety of editing tools is available for the modelling and generating of scenarios for the preparation of simulations. The simulation software is based on an approved and commercially available product, which is in use for training and licensing also at several major international air navigation service providers and airports.

The visual system consists of a six channel and a four channel image generator based on two independent Linux PC clusters and two projection systems in separate halls where the images are projected on spherical screens of seven meters diameter. The projection systems are identical with the exception of the visual angle of 200° and 300° horizontally, displaying four and six channels respectively. Using 10° overlap and specific image transition hardware, no image boundaries are visible. The vertical angle of vision is 48°.



The 200° visual system of ATS

Up to four controller working positions can be integrated in each of the simulation halls equipped with approach radar, airport surface detection equipment (ASDE), flight strips and a lighting panel. Additional consoles permit the installation of airport specific systems and the systems to be tested. Both simulation halls are connected by telephone lines to permit the coordination between the controller teams.

Furthermore, both simulation halls are connected to the pseudo pilot stations via a six channel intercom facility in order to simulate radio transmissions.

While air traffic control agencies are responsible for approaching and departing aircrafts as well as aircrafts on the taxiway system, the airport authority is usually responsible for all aircrafts and vehicles maneuvering on the apron. The introduction of new procedures and systems at an airport often affects both authorities. Therefore, simulations with controllers of both authorities are often required. With two separate simulation halls and a sufficient number of pseudo pilots, distributed simulations can easily be performed involving both, apron and tower controllers. As the ATS uses two independent synthetic visions in the both halls, the apron and tower control centers can be located at two totally different positions on the airport.

In addition to developing and testing new controller assistance – and air traffic systems, the ATS can be used to visualise and test the effects of planned modifications of the airport infrastructure. This permits an optimisation of the planned measure and helps to avoid expensive and possibly dangerous mistakes.



Simulation run on the 300° visual system of ATS

## AT-One combines the strength of NLR and DLR in ATM Research

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