TOSIM
State-of-the-art tower simulator
With its tower simulator system (TOSIM), DFS has one of the largest and most advanced simulation facilities for training, research and development and for additional purposes at its Academy in Langen. TOSIM is a real-time simulation system providing a 360° panorama in the 3-D version and a bird’s-eye view in the 2-D units.

The realistic view of the simulated airport, the accurate motions of aircraft and the reproduction of actual working positions significantly improve the quality and efficiency of all types of training. The available components allow for simulations with realistic workloads and are supported by analysis tools providing an online prognosis of how much traffic can be managed and an offline report stating relevant figures needed to document the results of a simulation. In addition to the TOSIM being a key component in training air navigation services personnel, it also offers excellent conditions for training apron controllers.

It is possible to vary the angle of view onto the respective apron.

DFS also uses the tower simulator for research and development purposes. TOSIM has proven to be a valuable tool for creating and validating operational procedures, assessing human aspects within the scope of team resource management, and introducing new systems and associated applications or conducting research concerning human-machine interfaces.

**Key performance data**

Each individual unit within the tower simulator system is designed for a capacity of 512 flight plans per exercise, an exercise duration of two hours and a maximum of 256 simultaneously moving objects. At the moment, 120+ different aircraft types are defined in the system with their performance data. By combining these with various airline liveries, more than 450 different aircraft models can be displayed graphically.
Aircraft and ground vehicles are controlled either by the inputs from the simulator pilots or by predefined parameters in the flight plan. A special supervisor function permits the simulation of failures of the tower and airport systems. TOSIM supports the simulation of a comprehensive set of aircraft emergency situations. Exercises can be recorded and replayed. Online analysis tools are available for review.

Simulated initially on the basis of a predefined weather plan, the weather conditions affect the flying characteristics and ground movement of the aircraft and also the displayed visibility conditions. These conditions can be modified at any time during simulation by inputs from the supervisor.

Initial training of tower controllers is primarily carried out on the basis of the “Virtual Airport Langen”. Additional training airports for specific purposes and real existing airports are available for pre-OJT and proficiency training. It is possible to simulate any airport once the visual and simulation databases are created.

**Infrastructure**

The tower simulator is used for several purposes at DFS. Installed at the Academy in Langen are two 3-D simulators which provide a 360° panorama front projection respectively a 250° LCD based visual system. Both simulators provide realistic tower working position environments. In addition, there are five 2-D simulators at the DFS Academy for procedures training and eleven 2-D simulators at the major tower locations as a means of preparing for proficiency training. The 3-D TOSIM is used for several research projects, such as iPORT (Innovative Airport) and SMAN (Surface Manager), together with a departure manager system, an arrival manager system and an en-route radar simulator. The aim is to assess the functionalities and to provide results to promote the further development of operational systems.
For more information, please contact:

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