

CDD Train Simulator

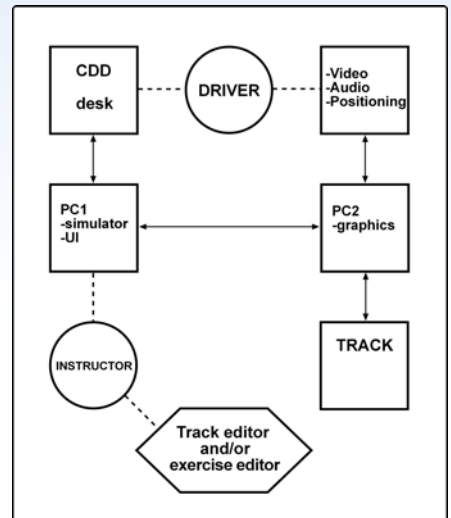
The train simulator is a European Train Control System (ETCS) – based driving desk with a three-dimensional view of a simulated railway. In the project, a high-speed train operating desk with three-dimensional driving simulator for both a driving demonstration and training programs has been developed. The simulator gives an authentic driving experience of operating a train with a Complete Driver's Desk (CDD).

The simulator's visuals are projected on a large screen in front of the desk with two projectors. The driver wears polarized glasses to experience the view in 3D. The glasses have position sensors so the view changes with the driver's head movement. Apart from the railway tracks and the environment the view also shows cockpit details and the train hull to complete a realistic visual immersion without constructing a full locomotive front. The visualization includes an amount of 3D-objects, from which a realistic track environment can be composed. The 3D feel is enhanced with a multi-channel audio projection recorded in a real train cockpit. The visualizations are developed at the TUT Institute of Electronics.

The simulator comes programmed with the most common types and builds of trains, which all react correspondingly in the simulations. One of the programmed trains is the Italian-built Pendolino, in use in Finland. The programs simulate situations and events both inside and outside the train, to which the driver must react. For training purposes different emergencies and abnormalities are tested, as well as different levels of traffic control details. The traffic control details meet the European Train Control System (ETCS) standard, about to be introduced on European railways. A supervisor follows the simulation and gives feedback to the driver after an exercise. This means a new train type can have fully trained drivers ready even before it has been completely built. A simulation environment naturally offers possibilities to train for emergency and accident scenarios. Consulted experts estimated the cost of a simulator be well covered by the cut costs in reduced on-track exercises.

The desk equipment consists of two PC:s, of which one runs the 3D visualization and the other the train cockpit visualization and the user interface. The simulation software runs the system through a Multi-Function Vehicle Bus (MVB) and builds a full array of train functions around the CDD, including opening the train doors, setting the air-conditioning, etc. The Complete Driver's Desk (CDD) is a KMT Group Oy –built, European Driver's Desk (EUDD) standard high-speed train operating workstation.

The project was initiated by KMT Group Oy:s train simulator desk prototype, which had no driving visuals and which was still limited to desk functions. A demonstration of the simulator was presented at the Berlin Innotrans '06 fair in September. The CDD and the simulator gathered a lot of interest and was the most versatile driving-simulator desk presented. The project is completed in early 2008 with a finished simulation software, modeled train types, a railway track editor and an audiovisual package.



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