



Unique in Germany: the DLR railway test laboratory

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Sometimes the light goes out for a fraction of a second, and sometimes the high speed train is forced to stop at a border, making the journey time longer – anyone travelling in Europe as a rail passenger can sometimes experience the practical effects of using over 20 different train control and safety systems. The European Train Control System (ETCS) will help; it is designed to standardise European rail traffic systems and make cross-border rail travel faster and more cost-effective. RailSiTe, the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) railway test laboratory, is the only accredited German testing laboratory for ETCS components.

"ETCS is gradually being implemented on both new and existing rail lines, to establish a standardised system across borders," says Karsten Lemmer, director of the DLR Institute of Transportation Systems, which includes the DLR RailSiTe testing laboratory. "The certification received from the German accreditation authority, DAkkS (Deutsche Akkreditierungsstelle), confirms our neutrality and capability. For us, this is more than just a special quality award; it is also important for getting test results recognised to gain approval for new components from national regulatory bodies," says the Institute's head, proudly. "This is our contribution to the introduction of ETCS." By 2020, the ETCS should be implemented on about 8000 kilometres of railway lines in Germany alone; the investment will be several billion Euros.

RailSiTe

The DLR RailSiTe train laboratory enables detailed technical and operational simulations and testing of railway control and safety technology. It is modular, so that individual components can be integrated as software modules or hardware components. The type and number of modules can vary, so that almost any number of trains can run on the virtual rail networks.

Until now, railway vehicles travelling across borders have frequently had to be equipped with multiple train protection systems. Changing these at the borders is time consuming and expensive. Science and industry have been working on a single, consistent European train control system for several years now. "ETCS will enable barrier-free passage between different countries in Europe; the trains will no longer have to be fitted with up to seven different control and safety systems, and the train drivers will no longer have to trade places at the border with someone who knows how to operate the local system," explains DLR researcher Karsten Lemmer, emphasising the benefits of the system.

An on-board computer is the key

A reliable control and protection system is the basis of safe, fast rail travel. On the train, a complex on-board computer forms the heart of the system. In normal circumstances, it knows the route and speed. Its constant communication with the control centre enables the on-board computer to receive commands from the control centre in exceptional circumstances, such as severe weather or works on the railway. The train driver monitors the system and can, of course, intervene at any time.

Complete schedules can be simulated

"It is important that these devices and their components function one hundred percent in any situation," says Lemmer. This is the reason for the work carried out at RailSiTe; the railway test laboratory consists of a number of connected computers – with simulations of train journeys on real on-board computers from different manufacturers. "We test the systems primarily to see whether they meet the technical requirements for ETCS," explains Lemmer. A test can last for several weeks, and the DLR researchers investigate around a hundred sequences, each with several hundred test steps. The procedures and results are accurately recorded. This enables the manufacturers to demonstrate the ETCS-compliant operation of a new device for certification. The main question is: 'Does the new component function as it should in every conceivable situation and during emergencies?' Safe and rapid train travel is only possible if the technology functions correctly at all times. With its simulation tests, DLR is making its contribution to the future of rail travel in Europe.

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Unique German testing laboratory for ETCS tests



The DLR RailSiTe train laboratory is part of the DLR Institute of Transportation Systems in Braunschweig. It has now been accredited as the only German laboratory for testing components of the future European Train Control System (ETCS). ETCS is designed to standardise European rail traffic systems and make cross-border rail travel faster and more cost-effective. There are currently more than 20 different national train control and protection systems in Europe.

Credit: DLR.

The DLR RailSiTe train laboratory



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