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AutomatedTrain: autonomous rail transit gaining pace
UAS: German rail to use drones for track inspection from 2025

Modern railway tracks equipped with ETCS, the European Train Control System, will form the basis for automated rail transit. At present, Siemens Mobility, Bosch Engineering, DB, TU Dresden, and six partners are testing fully automatic rail operation in the research and development project “AutomatedTrain”. To inspect its infrastructure German railways DB will also rely on the use of drones from 2025. Autonomous technologies are at the focus of XPONENTIAL Europe, which will be held at Düsseldorf Exhibition Centre from 18 to 20 February 2025.

The old railway station at Wegberg-Wildrath has not seen a train stopping in a long time. Nevertheless, there is no avoiding this town near the Dutch border in rail transit because this is where Siemens Mobility operates one of the world’s biggest test centres for rolling stock.

Spanning more than 28 km, the track network at the Test and Validation Centre Wegberg-Wildenrath (PCW) is used for everything that moves on tracks – locomotives, entire trains, trams and even underground trains. Two test loops and three test tracks are available for this – running on a normal gauge and the small test loop also on a metre gauge. The infrastructure boasts connectivity with little latency and plenty of bandwidth – and is fitted with ETCS and PZB. Even Galileo, the EU’s GNSS navigation system, is used for specific projects. For those interested in the future of rail traffic the site of this former Royal Air Force airbase is the first port of call.

Siemens Mobility was only awarded the contract for upgrading Copenhagen’s complete 170 km light-rail network to the highest automation level (GoA4) in April. This means driverless train operations will start from the first project phase in 2030. The German research project “AutomatedTrain” funded with around EUR 42.6 million from the Federal Ministry of Economy and Climate Protection



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is also a project to be proud of: “For the first time, we are testing fully automatic, driverless ETCS-based operation for regional transport in Germany. This is why we are proud to be part of the research and development project ‘AutomatedTrain’. We are equipping one of our Mireo Smart regional trains with the latest GoA4 technology to prepare the train and make it operational,” says Andre Rodenbeck, CEO Rail Infrastructure at Siemens Mobility.

By 2026 two prototypes will run completely automatically: the Mireo Smart train from Siemens Mobility – which is built at the Siemens site in Krefeld 45 km away and which received approval for Germany in February 2024 – along with a train for Stuttgart light-rail. If everything goes to plan, Mireo will cover the distance from the sidings to the first station fully autonomously and without an engine driver. In the event of obstacles, the vehicle brakes autonomously. Fully automatic systems for start-up and powering down of trains are also developed and tested here. Furthermore, the second of these two vehicles collects data from the operational environment for obstacle recognition. Both trains are fitted with almost identical hardware but different software solutions for obstacle recognition. This means the recorded sensor data and the software responses to specific incidents can be compared with each other.



A total of ten partners from industry and research are involved in the AutomatedTrain project, including Bosch Engineering: “Fully automatic operation holds great potential for rail traffic. We contribute our expertise in the fields of sensors and environment recognition. The aim is to safely and precisely locate train positions on the track and allow automatic arrival and departure. To this end, it is important to monitor the track in real time and detect potential obstacles located in front of the vehicle,” says Dr. Ing. Frank Schmidt, Managing Director at Bosch Engineering GmbH. The development builds on concepts for the autonomous operation and sensor technology of road vehicles and other sectors of industry. The project is divided into a total of eight technical subprojects: localisation, environment recognition, incidence prevention, vehicle automation, digital charts, Data Factory, processor platform and diagnosis.

“In the process, proven technologies from automotive engineering are adapted to the requirements of rail operation. By using automotive

diagnosis standards such as UDS, ODX and SOVD the developers want to contribute to the modularisation of software and hardware components of future rail architectures in terms of diagnostics. The aim is to automatically detect and faster process interruptions using a holistic system in future,” says Dipl.-Ing. Marc David Rabe who is subproject manager of AutomatedTrain for TU Dresden.

UAS: DB to use drones for track inspection from 2025

Set to undergo a series of track tests by autumn 2026, Mireo will also be given “support from the air” – separately from the AutomatedTrain project. From 2025 German national railways DB will trial the long-distance drone Aerial GHX25 to monitor its track network of some 60,000 kilometres. With the help of these drones – with a wingspan of 2.70 metres and a top speed of 126 Km/h – infrastructure will be monitored, vegetation checked, and aerial surveys carried out with a view to reducing external influences and disruptions. Using drones, tracks no longer have to be blocked for preventive maintenance such as trackside vegetation inspection. A total of 100 drones will be deployed across Germany according to the current plans of DB Sky Operations.

Aerial GHX25 is manufactured by Aerial UAS and equipped with the autopilot and mission computer Skynode by Auterion. This core element of the UAS is what plans, controls, monitors and communicates during all drone flight missions. The Hamburg-based firm Aerial will be exhibiting at XPONENTIAL Europe.

Autonomous technologies at XPONENTIAL Europe

“AutomatedTrain is an example underlining the need to crosslink technologies and experiences from different modes of transport. Likewise, the integration of UAS systems into an overarching concept for monitoring and securing critical infrastructures shows what XPONENTIAL Europe is all about – besides the technology it is the crosslinking of projects that widen the vision,” says Malte Seifert, Director Metals & Autonomous Technologies at Messe Düsseldorf. Seifert is in charge of XPONENTIAL Europe, which will debut in Düsseldorf in 2025.

(Expert author: Dr. Mike Seidensticker)



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