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Alstom's pilot project on autonomous driving in Germany enters the next phase

Digitalisation in regional passenger transport

- Automated driving is the prerequisite for sustainable and efficient rail transport in the future
- Cooperation between Alstom, LNVG, TU Berlin and DLR
- German Federal Ministry for Economic Affairs and Climate Action and Lower Saxony's Ministry of Economics support the future of mobility

10 June 2022 – The research project “Automated regional trains in Lower Saxony, Germany” is entering the next phase. Together with the German Aerospace Center (DLR) and the TU Berlin, Alstom is developing technical solutions to gradually digitise rail passenger transport in Germany. The project will explore the possibilities of automation in regional transport via the European Train Control System (ETCS). The Landesnahverkehrsgesellschaft Niedersachsen (LNVG) supports the project and is providing two regional trains for the tests. Automated driving is being tested on routes in Northern Germany. While the Federal Ministry of Economics and Climate Protection (BMWK) is supporting the automation research project, Lower Saxony's Ministry of Economics is funding the necessary equipment for the two test vehicles with 5.5 million euro.

For the trials, new systems for driverless operation are being developed in a first phase. This includes signal recognition, which will provide the ability to recognise and interpret the railway traffic signals set up along the track. In addition, the train must be able to recognise obstacles. In the event of a malfunction, the train is controlled remotely or guided by the train attendant. Alstom has already demonstrated with test trains in other countries that automated driving and remote control of trains can be technically implemented. The project will determine whether the existing regulatory framework for Automatic Train Operation (ATO) could be adapted. It will then examine which tests and results are needed to sufficiently prove safety standards for automated driving in passenger operation.

In a second phase, automated driving must take place as a “living lab” under real conditions. The new systems will be installed in the two LNVG multiple units pre-equipped with ETCS and tested in operation. The findings from development and operation will help to prepare for the later approval of fully automated trains and to further automate regional transport.

Lower Saxony's Transport Minister Dr. Bernd Althusmann says: “The future of rail transport is climate-neutral and digital - we know that very well, especially in Lower Saxony. After we have already been using the world's first emission-free hydrogen trains here since 2018, we are now testing how we can achieve an even higher quality in local transport through autonomously running trains. The project combines two outstanding qualities of Lower Saxony as a location: innovative mobility and a high level of digitalisation. We are thus creating the basis for more traffic on the railways.”

Michael Kellner, Parliamentary State Secretary at the Federal Ministry of Economics and Climate Protection, explains: “The automation of railways, especially regional transport, offers a variety of opportunities. Falling operating costs make it easier for regional providers to enter the market or expand their services. Routes that have become unprofitable can be automated

and operated profitably again. This also reduces commuting by road: less CO₂ emissions and a more relaxed journey for commuters.”

“Automated driving is the prerequisite for sustainable and efficient rail transport in the future. With our joint pilot project, we are creating the basis for the use of this technology in German regional transport and are significantly driving forward the implementation of corresponding technical solutions,” says **Müslüm Yakisan, President of the DACH Region at Alstom**. “In addition to our partnership with LNVG, we are also actively involved in several other ongoing automation projects for German regional transport. For example, we will be converting S-Bahn and regional trains in the greater Stuttgart area to ETCS technology as part of the Stuttgart 21 and 'Digital Node Stuttgart' lighthouse projects.”

Carmen Schwabl, Managing Director LNVG, emphasises: “The promotion of technical innovations is a core concern for us. We are pleased to be able to support this development with two of our vehicles.”

“An automated regional multiple unit running on German lines represents an exciting application for research in railway engineering,” says **Prof. Dr.-Ing Birgit Milius, Head of the Department of Railway Operations and Infrastructure at the TU Berlin**. “The scientific objectives include the optimisation of the remote-control operator's workplace for railway applications and operational studies for mobile train control by the train attendant inside and outside the driver's cab. Usability studies and technical feasibility are in the foreground. The TU Berlin is also scientifically supervising the topic of preparing for approval. Together with the partners, the TU Berlin is developing a system definition for driverless driving, variance analyses to today's operation with a driver and safety analyses of the new system. A possible path towards a generic approval of driverless driving is to be developed.”

“The automation of rail transport is an important step for a flexible and more attractive mobility offer in the region. The associated changes to operational processes, as well as the tasks and roles of staff and a user-centred design of future workplaces are research questions on which DLR is working. The exciting thing here is that this work is being done in the context of a living laboratory, and thus very close to real operations,” explains **Dr. Bärbel Jäger from the DLR Institute of Transportation Systems**.

For the introduction of automated rail operations in the regional sector, DLR will identify both the operational requirements for the technology to be used later and the necessary adaptations regarding the manually operated vehicle today. In addition, the researchers will use railway operational and economic calculations to investigate how the automation solutions can be transferred to other regional lines. The aim is to derive recommendations for action for their equipment.

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About DLR

The Institute of Transportation Systems of the German Aerospace Center (DLR) researches technologies for the intermodal networked and automated transport of the future on road and rail. Interdisciplinary teams with a total of 250 scientists are developing innovative operating concepts and methods in Braunschweig and Berlin. Their goal is to ensure climate-neutral and sustainable mobility in cities and regions. For the railway system, the researchers at the Institute are developing solutions for technological, operational and economic optimisation as well as concrete test and implementation strategies. The potentials of digital control and safety technology in combination with technologies for automated trains enable the best possible use, maintenance and expansion of the network infrastructure. Innovative vehicle concepts developed at DLR integrate the railway into attractive intermodal solutions. www.dlr.de/ts/

About TU Berlin

The Technische Universität Berlin is an active part of the international metropolis and the outstanding science location in Berlin. Using a wide-ranging spectrum of subjects, the TU Berlin establishes future fields that are embedded in cross-faculty research activities networked with external actors. With its approximately 35,000 students and 7,000 employees, the TU Berlin promotes the transfer of knowledge and technology between university and practice. The Department of Railway Operations and Infrastructure deals comprehensively with railway operations and related areas such as human factors, approval, risk and safety and incident analysis. Various projects and basic research are carried out on these topics. www.railways.tu-berlin.de

Contacts

Press:

Alstom

Jörn BISCHOFF – Tel.: +49 (0) 174 925 03 48

joern.bischoff@alstomgroup.com

TU Berlin, Department of Railway Operations and Infrastructure

Prof. Dr.-Ing. Birgit MILIUS

birgit.milius@tu-berlin.de

German Aerospace Center (DLR), Institute of Transportation Systems

Dr. Bärbel JÄGER

baerbel.jaeger@dlr.de