
New AutoLog research project with partners Volkswagen Group Logistics, BIBA - Bremer Institut für Produktion und Logistik at the University of Bremen, Deutsche Telekom and Unikie | Total volume: 5.8 million euros | Test field in the port of Emden

For more efficiency and climate protection: project on automated driving in car ports launched

Bremen, Wolfsburg, Munich, Emden, Berlin. Every year, Volkswagen Group Logistics ships around 2.4 million vehicles from more than 40 ports. The largest port in this network is the port of Emden. Volkswagen Group Logistics, the BIBA - Bremer Institut für Produktion und Logistik at the University of Bremen, Deutsche Telekom and software specialist Unikie will be conducting research there in the new AutoLog R&D project until the end of 2026. The project partners are convinced that automated driving technology has great potential to make the distribution process more efficient, safer and more climate-friendly across the various logistics partners.

The AutoLog project (development of automated driving processes and dynamic storage and logistics concepts at car terminals) aims to research and realise the potential for optimisation using automated driving processes at car terminals. To this end, the partners are investigating which prerequisites must be created for the processes and infrastructure at the car terminals and how the technical infrastructure must be designed to ensure robust and safe vehicle control. They are also focussing on human-technology interactions – for intuitive, safe interaction on the terminal in automated and non-automated processes. In addition, they are investigating the potential for optimising warehouse and logistics processes.

From concept to practical tests and user acceptance

The project is divided into two main parts: on the one hand, simulation studies will be used to test concepts and see what effects can be expected. On the other hand, a test field in a real environment will be set up to study the implementation of an entire automated terminal. There will also be user studies with operational employees on user-friendliness, user acceptance and cognitive workload. In the context of the test evaluation, an assessment will be made regarding occupational safety and human-technology interactions.

Overall, this project is characterised by the fact that it will implement the systems consisting of the vehicle, the system for automated driving, the network supply via a public 5G network and the necessary logistics systems for the first time in a logistics and port environment. This will allow the extent to which the interaction can be implemented in the highly complex environment of a port or logistics service provider, thereby ensuring and improving the operational capability of the port.

Test field in the port of Emden

In order to be able to test and optimise the overall system, a test field is being set up on the terminal site at the port of Emden. The Volkswagen plant Emden has a direct connection to the harbour. It has nine piers, two transfer tables and various sidings as well as four low-loader lorry bays, providing the best possible test conditions for the project. Incoming and outgoing vehicle flows across all modes of transport can be mapped there. The test area with car parking spaces includes several lanes and a busy roundabout. In addition to the technology and system design itself, one of the major challenges is to safely manage automated and manually controlled vehicles and pedestrian movements at the same time.

LiDAR sensors, marshalling system and public 5G network

A digital twin with LiDAR sensors will be created for the test field and installed in the port of Emden. They capture even the smallest details in real time with maximum accuracy and include all moving and stationary objects such as people, vehicles and objects. The sensors can be used to record data day and night, even in poor weather conditions. The digital twin is a key component of the vehicle marshalling system provided by

Unikie. The marshalling system can be used to control vehicles that are approved for the ISO23374 automation standard in accordance with the ETSI TS 103 882 protocol standard.

Communication with the vehicles takes place via the public 5G network. Deutsche Telekom ensures consistent service quality for this application via a dedicated network interface. The vehicle marshalling system is operated in a Telekom Edge Data Center to ensure low and secure latencies for communication between the marshalling system and the vehicle. The real-time-capable digital twin and the communication optimised in this way enable a high level of security in the test field. To avoid complex network cabling, the connection of the sensors to the marshalling server is tested via mobile radio.

Safer, more climate-friendly, more economical

According to studies carried out by the AutoLog partners in preparation for the project, automated driving on terminals can make handling processes more efficient and increase occupational safety. The need for sealed surfaces could also be reduced by around 20 per cent through storage compaction, among other things. Moreover, the number of kilometres driven on the terminal by shuttle traffic could be reduced by up to around 25 per cent in some cases. The establishment of this new technology therefore not only has positive labour safety aspects and a high economic relevance in the ports, but also contributes to climate protection. Another increasingly important aspect for terminal operators is the current shortage of personnel. The integration of automated driving can alleviate this problem, which is likely to become even more acute.

Manufacturer-independent and transferable

For car terminals, the integration of automated driving movements into terminal operations offers opportunities for significant resource and cost savings as well as quality improvements. The research and developments are carried out across manufacturers and brands. The scientific results will also be used for future research. It should be possible to transfer the developments from the project to a large number of terminals. A transfer to the entire distribution chain, i.e. from the car manufacturer's premises to the dealer's yard, is also conceivable.

Key data on the AutoLog project

The joint project AutoLog (development of automated driving processes and dynamic storage and logistics concepts on automotive terminals) will run for 3 years and has a total volume of 5.8 million euros. It is being funded with 3.2 million euros in the Innovative Port Technologies Programme (IHATEC II) of the Federal Ministry for Digital and Transport Affairs (BMDV) and supported by the project sponsor TÜV Rheinland. With this funding, the federal government aims to promote innovative technologies in German sea and inland ports and thus strengthen their competitiveness. Partners in the project are Volkswagen Group Logistics (network coordinator, Wolfsburg), the BIBA - Bremen Institut für Produktion und Logistik at the University of Bremen and, as associated partners, Telekom Deutschland (Bonn) and Unikie (Munich).

(Sabine Nollmann)

Attention editorial offices:

Images accompanying the press release can be found at www.biba.uni-bremen.de/presse/pressemitteilungen/2024

Further information:

www.volkswagen-konzernlogistik.de | www.biba.uni-bremen.de | www.telekom.de | www.unikie.com

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