
Siemens Mobility and partners launch “Autonomous Tram in Depot” research project

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Siemens Mobility, ViP Verkehrsbetrieb Potsdam GmbH (ViP), the Karlsruhe Institute of Technology (KIT), the Institute for Climate Protection, Energy and Mobility (IKEM), Codewerk GmbH, and Mapillary are planning to undertake joint research on a fully automated tram depot.

The project, called “AStriD” (Autonomous Tram in Depot), is being funded by the Federal Ministry for Transportation and Digital Infrastructure (BMVI) as part of its “Modernity Fund” (mFUND) research initiative.

“AStriD is the next big milestone on the way to autonomous trams. By automating time-consuming shunting operations in the depot, we want to better support our customers in ensuring sustainable value creation over the entire lifecycle as well as guaranteeing availability,” said Sabrina Soussan, CEO of Siemens Mobility.

The research and development project will be carried out at the depot operated by Verkehrsbetrieb Potsdam and aims at developing a digital depot based on the operation of autonomous trams. The project’s technical feasibility will be demonstrated with autonomous service operations in the depot, such as running trams through a washing bay onto a siding.

Depot automation is to be made commercially viable over the medium term as the first stage of autonomous tram driving. From its onset, the development project will consider the legal framework conditions necessary for the approval and operation of autonomous trams and the economic framework needed for operations. The AStriD project will be initiated in October 2019 and run for three years.

The partners have divided the project into various work packages. Siemens Mobility GmbH will develop the autonomous tram in the depot, and the tram will be integrated into the data and system landscape via the data hub provided by partner Codewerk and localized and tracked using a Mapillary digital map.

ViP will provide the tram and depot infrastructure as well as access to required data, systems and facilities, and evaluate the results from the point of view of a depot operator. “We are pleased that Potsdam has once again been selected for a project. A

practical demonstration of the measures that could be promptly implemented will be helpful for us and the whole industry. We will be checking to see whether and how time-consuming shunting operations in a depot can be fully automated. This is an interesting option for our present depot as well as for a possible further base of operations located in the north of Potsdam,” said Monty Balisch, Managing Director of ViP.

The **Institute for Information Processing Technology (ITIV)** at KIT is contributing its expertise in the specification and digitalization of depots, the automation of processes, and the identification of necessary data. “Automated systems will evolve out of the niche, especially in the field of mobility. I see an ideal field of application in the largely closed environment of a depot,” said Professor Eric Sax of KIT. “We look forward to contributing our latest research results to AStriD and implementing them in a tram depot.”

IKEM will analyze and assess legal and economic issues in the project. “The fact that the driver is absent as a reference point for behavioral requirements, responsibility and liability presents major legal challenges and, specifically, challenges to operation approval. For commercial use scenarios, calculating costs and planning deployment, on the other hand, you can’t simply assume that only the driver is eliminated as a cost position. Other functions in the system will have greater importance, and the new technology must also be considered as a factor in operations and costs. There will in fact be a completely new operator model for the depot, and the project will develop this model and, as far as possible, support it with cost estimates. IKEM will answer such questions that come up in the project working with the project partners and relevant external parties,” said Matthias Hartwig, Team Leader, Mobility, IKEM.

Codewerk specializes in industrial systems and develops, among other things, software for data communication in rolling stock. In this project, Codewerk will handle the cloud and edge components for integrating the data of all systems. “Automated driving has the potential to make rail a more attractive transportation option. With AStriD, we at Codewerk want to invest in a climate-friendly technology and strengthen our competitive position,” said Christian Grund, Managing Director of Codewerk.

Mapillary will provide the project with a cloud-based online platform for the collaborative collection and provision of street images and relevant information. The data will be analyzed with artificial intelligence and processed to provide digital maps. “The face of mobility is changing, and we will see both autonomous cars and trams rolling out over the coming years, which puts an entirely new kind of pressure on maps. Maps are no longer just needed for humans to get from A to B, but for autonomous vehicles across the board. That’s where Mapillary and our expertise in street-level imagery understanding come in. Through computer vision and street-

imagery, we will teach the tram to recognize and understand its surroundings,"said Peter Kontschieder, Director of Research of Mapillary.

(Siemens)