



FZI Forschungszentrum Informatik, Bild: mp-film | filmproduktion karlsruhe

The EVA-Shuttle offers connection to public transport - the bus is called via App

EVA: Electric, Connected, Automated

SHUTTLE

End of the line - and then? For the first and last mile beyond the public transport network, residents in Karlsruhe will be able to request the „EVA Shuttle“ via app - an electrically driven, connected and automated mini-bus. TÜV SÜD is one of the partners in the research project.

From the front door to the bus stop and vice versa: In the project „EVA-Shuttle Buses“ („Electric, connected and autonomously running electric mini-buses in public transport“) a consortium is currently developing, and testing connected and autonomously running electric shuttles. These are called via app, take passengers according to the principle of carpooling (Ridepooling) and then bring them to their destination. The aim of the project, which involves putting an automated fleet through its paces under real conditions on the „Test Field Autonomous Driving Baden-Württemberg“: Create a new public transport offer that allows more flexibility and comfort.

In addition to the FZI Forschungszentrum Informatik, Robert Bosch GmbH, Verkehrsbetriebe Karlsruhe GmbH and the

Deutsche Bahn subsidiary ioki GmbH, TÜV SÜD Auto Service GmbH is also part of the consortium of the project, which is being funded by the Federal Ministry of Transport and Digital Infrastructure (BMVI) with 2.32 million Euros as part of the research program Automated and Connected Driving.

„With our participation, we are pursuing two goals „, explains Dirk Fratzke, Project Manager EVA-Shuttle at TÜV SÜD. „On the one hand, we want to put more automated mobility solutions on the road - i.e. vehicles that move freely in public traffic areas, thereby gaining valuable experience for the future“. As a second reason, master technician of the motor vehicle business and project manager HAD (Highly Automated Driving), who joined TÜV SÜD in 2018, names the fact that the EVA Shuttle

project is intended to find answers to various research questions - such as: How does the interaction between automated vehicles and other road users work?

Target area searched and found

The consortium partners developed the necessary safety concept for the EVA shuttle approval, which was evaluated by TÜV SÜD. In advance, ioki, Deutsche Bahn's division for intelligent mobility solutions, defined a target area based on a data-driven mobility analysis to take account of every road, every traffic scenario and every accident risk. Based on the mobility analysis, the decision was made in favour of the Karlsruhe district Weiherfeld-Dammerstock.

But why exactly there? „The data from ioki not only show that the area is the best

choice for the project and the population in terms of the need and benefits of autonomous shuttles," says FZI board member and consortium leader Prof. Dr.-Ing. J. Marius Zöllner. „It also provides just the right demanding environment in which we can demonstrate the newly developed capabilities of the vehicles in mixed traffic and implement a safety concept adapted to the route.“

Case: Real passengers

„In addition, the 30 km/h zone fits in with our target speed of 20 km/h at which the shuttle buses are supposed to operate," says Fratzke. At the same time, the infrastructure was and is being prepared on site. „We want to include traffic lights, for example, but also public service vehicles such as refuse collection vehicles equipped with sensor technology," he says, concretising the challenges that the minibuses will face in real-life operation. Initial discussions on the EVA shuttle took place as early as 2017, the official starting signal for the funding project, which is scheduled to run until the end of the year, was given in 2018. Last year, EasyMile delivered the basic vehicles ordered: three minibuses with six seats each, which Bosch equipped with sensors and algorithms, while FZI took care of the software for automating the driving operation and route selection.

A technology test has been running since the end of 2018, in which the automated driving functions are being tested on test sites in Renningen and Karlsruhe - initially

without passengers. At the same time, ioki is developing the smartphone app which can later be used to order the shuttle buses „on demand“.

Test operations with passengers are scheduled to begin at the end of the year in Weiherfeld-Dammerstock. Until then, the minibus still has to get to know the streets in the firmly defined test area and collect data on its own.

With Safety Operator on board

„In 2019 there was already a first kick-off event with representatives of the residential areas," Fratzke remembers. „We have met with great interest and really looking forward to the first reactions when the three buses named Ella, Vera and Anna are actually ready to be used by the residents in a few weeks“. The Verkehrsbetriebe Karlsruhe GmbH contributes its experience in passenger transport and provides the safety operators who monitor the automation in operation on public roads and accompany the journey as "stewards".

These Safety Operator are part of the safety concept developed by the consortium under the leadership of TÜV SÜD. They are trained based on the safety concept and are always on board, also for legal reasons. „The steward will also help with boarding and disembarking if necessary, and gather his experience with the vehicle and the environment for the project," adds Fratzke.

Laurels for innovation

At the end of 2018, the EVA shuttle was already awarded the NEO2018 innovation

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prize by the Karlsruhe Technology Region. „For the first time, we are linking an on-demand transport service in public transport with automation, which is additionally electrically operated - this is new in Germany," Fratzke explains the special nature of the project. „Another new feature is that the minibus can move freely on the road, take evasive action and choose its own route“.

But this success is no reason for TÜV SÜD to rest on its laurels: Benjamin Koller, Head of Technical Regulations for Automated Driving at TÜV SÜD Auto Service GmbH, is sure that EVA will not be the last project on automated driving to accompany the testing organization: We are experiencing a strong interest in automated mobility solutions, not only in the passenger transport sector but also in the cargo transport sector. At least, rural areas can be better developed, and urban traffic flows can be optimised“.

Ready for the future

Through its commitment to automation, TÜV SÜD is also establishing itself as a reliable partner for the future, ensuring that new technologies can be used safely and without negative effects on people, the environment and society. If safety is guaranteed, tomorrow's users are much more likely to accept and trust new services and offers“, Koller underlines once again the goal that TÜV SÜD is pursuing. For the EVA Shuttle - and for all automation projects that will follow the EVA Shuttle.



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Ready for the first test operation with passengers in Karlsruhe: The shuttle buses from the EVA project