



# Autonomous Commercial Vehicles

---

Technologies for the Mobility of the Future



Compared to road traffic, specially equipped automation zones have a decisive advantage: autonomous vehicles ready for registration will be able to be used there in the near future«

**Dr. Sebastian Wagner,**  
Group Leader »Vehicle Control and Sensor Systems«

## The autonomous Future

Countless experts are currently working on projects in the field of automated driving, which has gained much importance in recent years. Before the first fully-automated production vehicles are able to drive on public roads, however, there are still many technical challenges to be met.

The automation of commercial vehicles in gated areas is an ideal migration path in this regard. There are numerous application fields, including ports, factory premises, logistics centers, (open-cast) mines as well as agriculture. The economic interest in suitable solutions is extremely high as new lucrative business models are evolving.

Key technologies are needed for these application fields. With TruckTrix® and helyOS, the Fraunhofer IVI is developing solutions to tackle these challenges. The insights gained in the process might also be used for autonomous driving on public roads in the future. The advantage of gated areas is that developments can be transferred into regular operation faster – especially with regard to legal regulations.



### Equipment

- 18-ton e-truck with integrated drive-by-wire and steer-by-wire system (AutoTruck)
- Test track for the testing of positioning and sensor systems as well as for driving tests

### »TruckTrix®« – Online Maneuver Planning

The TruckTrix® algorithm, developed at the Fraunhofer IVI, automatically determines maneuvers that enable vehicles to reach a certain destination. The basis for this are digital maps which contain trafficable areas and obstacles.

In contrast to conventional methods, TruckTrix® can also plan routes for multi-unit vehicles – including maneuver operations, if necessary. The maneuver calculation considers the following factors:

- vehicle geometry,
- vehicle kinematics,
- trafficable areas and obstacles.

Thus, the maneuvers are always collision-free and actually manageable for the vehicle.

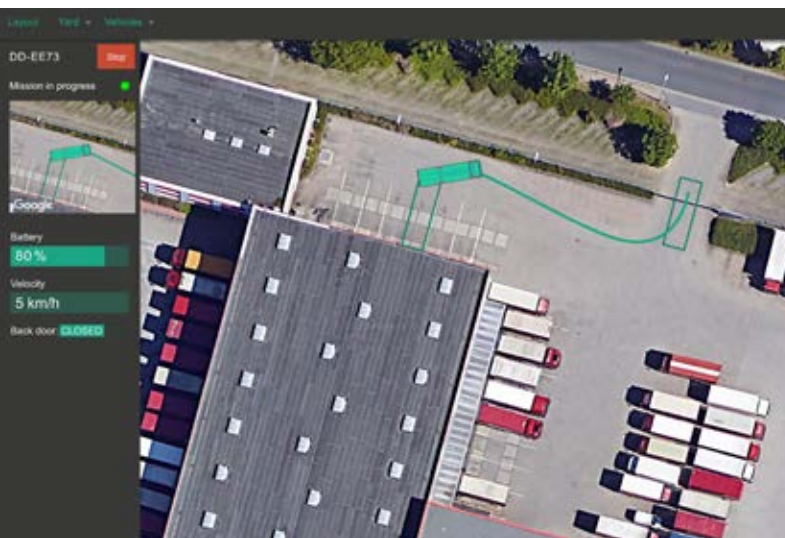
The TruckTrix® algorithm has been implemented as a web service and is available online at all times. TruckTrix® is already in active use – the online platform [www.HeavyGoods.net](http://www.HeavyGoods.net) automatically evaluates whether heavy haulages will be able to pass critical narrows.

### »helyOS« – Online Control Center

HelyOS (highly efficient online yard Operating System) is a control center for gated areas and is based on up-to-date web technologies. It connects the autonomous vehicles and uses a browser-based user interface. With this, the user can control the gated area, provide missions for vehicles and request status information from the vehicles.

The system is designed to be used both locally or via the internet. Therefore, the vehicles can also be monitored and controlled in remote logistics centers using a browser. In the connected gated areas, the vehicles communicate with each other and with external sensors.

The TruckTrix® algorithm is also a key technology for this application. HelyOS calculates suitable routes and synchronizes them. Thus, collisions are avoided and the users are able to coordinate several autonomous vehicles at the same time.



## Contact

---

**Fraunhofer Institute for  
Transportation and  
Infrastructure Systems IVI**

Zeunerstrasse 38 | 01069 Dresden

**Dr. Sebastian Wagner**

Group Leader

Vehicle Control and Sensor Systems

Phone +49 0351 4640-669

[sebastian.wagner@ivi.fraunhofer.de](mailto:sebastian.wagner@ivi.fraunhofer.de)

**Elke Sähn**

Group Leader

Science Communication  
and Design

Phone +49 0351 4640-612

[presse@ivi.fraunhofer.de](mailto:presse@ivi.fraunhofer.de)

