

# Applications

RailDrIVE® is a testing and measurement vehicle that provides a flexible, adaptable platform for the development of positioning and safety systems for road and rail. It can be used in a wide range of scenarios for applications where highly accurate, reliable and continuous positioning or the logging of status information is required. Here are some possible applications:

### Testing and Evaluation of Combinations of Sensors with different Positioning Data

The measurement data can be analysed online at the computer workstation in the RailDrIVE®. At the preprocessing level, the user can monitor the individual sensor data and their signal quality. The result of the subsequent fusion of the sensor data gives an indication of a sensor combination's positioning quality.

### Testing of Positioning Components in real Rail Operations

New positioning components, such as the Eurobalise of the European Train Control System (ETCS), can be tested for validation and as part of the approval procedure.

### Recording and Validation of Digital Route Maps

Using the existing positioning sensors, RailDrIVE® can create digital route maps for road and rail.

### Status Information Logging

Using suitable sensors, it is possible to log the status both of the vehicle and the tracks it runs on (such as rail breakage or track displacement). By combining this information with positioning data, additional applications are possible, such as in maintenance, logistics or dispatch.

### Use of RailDrIVE® as a mobile DGNSS Reference Station or as a DGNSS Rover Location

RailDrIVE® can be used on road or rail both as a mobile unit that has its own reference station and as a reference station for DGNSS.

### Testing Platform for the European Satellite Navigation System Galileo

Galileo applications for road and rail transport can be tested and developed using the RailDrIVE®. This includes evaluating the advantages of Galileo over other satellite-based positioning methods.

### Testing of Communications Systems

GSM-R (Global System for Mobile Communications – Rail) and other communications systems can be tested under real conditions. By combining positioning and communications systems, collision avoidance systems can also be tested and validated.



# Equipment

The road-rail vehicle is equipped with a range of positioning and communications components, permitting the testing and evaluation of combination of sensors with a range of positioning data.

Thanks to its modular architecture, the basic configuration of RailDrIVE® can be expanded at short notice if required, depending on the intended use:



GNSS (Global Navigation Satellite System): To determine the absolute position, speed and time



Doppler radar: To determine speed and distance



Optical sensor: To determine speed, distance and direction



Odometer: To measure the wheel rotation rate in order to determine distance and direction

The basic configuration also includes an inertial measurement unit, a laser scanner, a balise antenna and a RFID antenna system. A GSM modem, an independent power supply and a computer workstation for monitoring tests and carrying out preliminary online analyses also form part of this mobile laboratory.



Fig: Operator working place inside the RailDrIVE® cabin

# RailDrIVE® – Road-Rail Vehicle for Positioning Tests

Modern operating systems that have to meet high standards in terms of efficiency and safety require continuous and exact positioning, as do systems that provide up-to-date information on the timetable and vehicle.

To demonstrate that the sensors and systems deliver the quality required under various standards and regulations, the sensors must undergo field testing. For this purpose, the Institute of Transportation Systems has developed the testing and measurement vehicle RailDrIVE®.

This road-rail vehicle operates on the road for the preparation of tests and is then deployed directly to the required test track as a railcar.



TS-RailDrIVE®-E-09/12 Photos: DLR

## DLR at a glance

DLR is Germany's national research centre for aeronautics and space. Its extensive research and development work in Aeronautics, Space, Energy, Transport and Security is integrated into national and international cooperative ventures. As Germany's space agency, DLR has been given responsibility for the forward planning and the implementation of the German space programme by the German federal government as well as for the international representation of German interests. Furthermore, Germany's largest project management agency is also part of DLR.

Approximately 7000 people are employed at 16 locations in Germany: Cologne (headquarters), Augsburg, Berlin, Bonn, Braunschweig, Bremen, Goettingen, Hamburg, Juelich, Lampoldshausen, Neustrelitz, Oberpfaffenhofen, Stade, Stuttgart, Trauen and Weilheim. DLR also operates offices in Brussels, Paris, and Washington D.C.



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RailDrIVE®



## RailDrIVE®

Rail Driving Validation Environment



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