

Sensors4Rail project tests sensor-based rail traffic in Germany for the first time

## **Digital railways: Ibeo Automotive Systems equips Deutsche Bahn pilot project with LiDAR technology**

**Hamburg, 12/14/2020 – To respond to a shift in transportation patterns and meet the German federal government’s climate targets, the Deutsche Bahn plans to increase its capacity and service frequency in the future. To do so, the Deutsche Bahn plans to use new technologies. One such is Ibeo’s newest Real-Solid-State LiDAR sensor ibeoNEXT. The Sensors4Rail cooperation project with the DB is testing sensor-based environmental sensing and train localization in Germany for the first time. In addition to Ibeo, other project partners like Bosch and Siemens are equipping an S-Bahn train in Hamburg with the latest technology. The first trial runs are planned for early 2021.**

A Hamburg S-Bahn train (series 472) will be equipped with the latest LiDAR sensors from Ibeo and other features as a test vehicle. This equipment will allow it to sense its environment for precise, continuous location determination in real time. The ibeoNEXT sensor is based on a completely new type of photon laser measurement technology and contains no moving parts (real solid-state). It generates an additional black-and-white image, like that a camera. Developed in-house by Ibeo, the compact design has been constructed to nearly series production in accordance with high automotive standards. Ibeo’s LiDAR technology facilitates so-called landmark-based localization by the S-Bahn as part of a sensor system. In the future, this will allow trains to run in closer proximity to one another. Customers of the Deutsche Bahn will benefit from a significant increase in capacity. Additional installation in the track

infrastructure is not required, and the system also improves reliability and efficiency.

### **Digitizing the railway system**

The project to retrofit vehicles has begun, and test runs are scheduled to start in early 2021. Ibeo Automotive Systems is a leader in developing environmental perception and localization sensors and software in the automotive sector.

Raymond Schulz, Solution Manager for Perception in Multi-Sensor Systems at Ibeo Automotive Systems, notes: “With this project, we are clearly showing that our Real-Solid-State LiDAR sensor as a series production product manufactured according to high automotive standards is also the perfect technology for the rails. Our sensor system facilitates high-precision environmental detection in all three dimensions, as well as localization during travel.”

### **Doubling passenger numbers to protect the climate**

In light of a shift in transportation, and to promote climate protection, the German federal government aims to double the number of railway passengers. To achieve this goal, railway capacity must be increased significantly. In addition to physical expansion, technological innovations and digitizing the system are the biggest avenues for that capacity increase. The project partners in Sensors4Rail took on this challenge together, to achieve the goal of Digital Railways for Germany.

The partners will be presenting their results at the ITS World Conference (Intelligent Transport Systems) in Hamburg from October 11th through the 15th, 2021. They are planning to give live demonstrations in and on a converted train during special trips, broadcasting the trips on terminals in train stations or other central ITS exhibition locations. Exhibition attendees

will be able to experience how the sensors work together live and in person.

### **Background information for the Sensors4Rail project**

The DB is responsible in the cooperation project for project management, vehicle engineering, licensing and safety. Siemens is providing support for vehicle integration and is responsible for system tests and train front position localization using a modern odometry unit with integrated GNSS satellite location. The partners Bosch (radar, infrared long-range, mid-range and Stereo camera) and Ibeo (LiDAR sensors) are responsible for handling environmental perception. One unique challenge in railway vehicles, compared to road vehicles, are their very long braking distances. The sensor technologies used in the project therefore have a long range. Bosch merges the sensor data to provide a reliable map of the area around the train even at night or in foggy conditions. The track route is also detected and referenced to the driving situation and surrounding objects, to determine the best reaction. Bosch and Ibeo are also responsible for localizing the train front positions: They compare the landmarks detected by the environmental sensors with the landmarks saved in the HD map. HERE delivers the HD maps in 3D, allowing the train's location on the track to be fixed down to the centimeter. The map contains objects along the track, such as buildings, bridges or the edges of station platforms. These serve as a reference for continuously comparing actual and target states. This makes the map a digital twin of the railway and its adjacent areas.

## About Ibeo

Ibeo Automotive Systems GmbH has established itself as a global technology leader for LiDAR sensors (English acronym for Light Detection And Ranging) and the associated products and software tools. This technology is used as an assistance system in cars and in the field of autonomous driving. It is Ibeo's goal to reinvent mobility by enabling cars to become cooperative partners in the driving process, so making transportation safer. Ibeo employs over 400 people at its Hamburg, Eindhoven (Netherlands), and Detroit (USA) sites. Since 2016, the automotive supplier ZF Friedrichshafen AG has held a 40 percent share in Ibeo: initially via Zukunft Ventures GmbH, and since 2019 via ZF Automotive Germany GmbH, a wholly owned subsidiary of ZF. Ibeo celebrated its 20th anniversary in 2018.

For further information, visit [www.ibeo-as.com](http://www.ibeo-as.com).

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