Press release

“Digital eyes” make trains more intelligent

Industry project tests sensors on trains of the S-Bahn Hamburg • Test drives to start early 2021 • DB Board Member Ronald Pofalla: “Deutsche Bahn is ensuring rail transportation growth together with industry partners.”

(Berlin, December 15, 2020) Digital Rail for Germany is making history in Hamburg. In the future, highly modern sensors are to identify the surroundings and locations of trains in real time. As part of the “Sensors4Rail” joint project with industry and specialist partners, DB is initially equipping a train of the S-Bahn Hamburg with the technology of the future.

DB Member of the Management Board for Infrastructure Ronald Pofalla: “Digital Rail for Germany allows us to step up the pace when it comes to increasing capacity within the network. Smart technology is making switches and trains even more intelligent and rail transportation noticeably more robust. This is truly an advantage for our customers and the entire sector. In collaboration with our industry partners, we are ensuring transportation growth on climate-friendly tracks.”

The innovative sensors automatically monitor the surroundings in front of and next to the train, thus allowing it to avoid potential disruptions. In addition, a digital map permits precise tracking of the vehicle in real time, thus enabling shorter intervals between trains. This frees up even more capacity on the routes, without having to additionally upgrade or revamp the infrastructure. The system Sensors4Rail serves as support for the train crew and the driver remains on board.

DB and Siemens Mobility are incorporating their rail expertise in Sensors4Rail. Bosch Engineering, HERE Technologies and Ibeo Automotive Systems are leaders in the automotive sector when it comes to developing sensors and software for monitoring the surroundings and localization.

Andre Rodenbeck, CEO Rail Infrastructure, Siemens Mobility: “The cooperation project Sensors4Rail is an extraordinary example of how digitalization can contribute to improving and increasing the capacity of rail operations. Siemens Mobility is proud to provide the technology for this innovative project.”

Heiko Mangold, Head of the Railway Technology business unit at Bosch Engineering GmbH: “We are benefiting from the long-term and comprehensive automotive expertise of Bosch in the field of sensor technology and will now also put this to use for rail.”

Jørgen Behrens, Senior Vice President and Chief Product Officer at HERE Technologies: “The HERE platform allows customers such as Deutsche Bahn to create their own maps using the sensor data. Thanks to technical tools that we developed for this, they can combine this data with the HERE maps and use it for many different purposes.”

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Publisher: Deutsche Bahn AG
Potsdamer Platz 2, 10785 Berlin, Germany
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2020 KHW/NK

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Raymond Schulz, Solution Manager for Perception in Multi-sensory Systems at Ibeo Automotive Systems: “This project impressively shows that as a series product, our real-solid-state LiDAR sensor complies with the high automotive standards and is also the perfect technology for rail. Throughout the process, our sensors enable high-precision sensing of the surroundings in all three dimensions and localization during the journey.”

Detailed information

Sensors4Rail is a joint project. Within the scope of the cooperation, Deutsche Bahn is responsible for project management, vehicle engineering, approval and safety.

Siemens supports vehicle integration and is in charge of the system tests and localization of the train front position using a modern odometry unit that integrates GNSS satellite positioning.

The partners Bosch (radar, infrared long-range, mid-range and stereo camera) and Ibeo (LiDAR sensors) are responsible for the realization of the surrounding sensor approach. The very long breaking distances pose a special challenge for rail vehicles in comparison to those on the road, which is why the sensor technologies used in the project have a high range.

Bosch fuses the sensor data, thus providing a reliable image of the train’s surroundings even at night or when it is foggy. In addition, the track layout is detected with respect to the driving situation and the surrounding objects in order to calculate the right reactions. Bosch and Ibeo are also in charge of the localization of the train front positions. When sensing the surroundings, they detect landmarks which are then compared with those saved on the HD map.

HERE delivers the HD map in 3D to enable the most precise tracking of the train right down to the last centimeter. The map contains objects throughout the route, such as buildings, bridges or platforms that serve as references to continuously compare the actual and the target status. Thus, the map becomes a kind of digital twin for the tracks and their immediate surroundings.

The partners plan to present the results at the Intelligent Transport Systems (ITS) World Congress in Hamburg from October 11 to 15, 2021.

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