

Safety to the power of three: Bosch completes sensor portfolio for automated driving

Long-range lidar complements radar and camera

January 2, 2020
PI 11055 BBM ts/BT

- ▶ Harald Kroeger: “By filling the sensor gap, Bosch is making automated driving a viable possibility in the first place.”
- ▶ Bosch technology covers all use cases of automated driving.
- ▶ Bosch’s long-range lidar sensor will be first solution suitable for automotive use.

Stuttgart, Germany /Las Vegas, NV, USA – Good things come in threes – and automated driving is no exception. Before safe automated driving can become a reality, a third sensor principle is needed in addition to camera and radar. Consequently, Bosch is making long-range lidar sensors production-ready – the first lidar (light detection and ranging) system that is suitable for automotive use. This laser-based distance measurement technology is indispensable for driving functions at SAE Levels 3 to 5. The new Bosch sensor will cover both long and close ranges – on highways and in the city. By exploiting economies of scale, Bosch wants to reduce the price for the sophisticated technology and render it suitable for the mass market. “By filling the sensor gap, Bosch is making automated driving a viable possibility in the first place,” says Bosch management board member Harald Kroeger.

Bosch technology is alert to all automated driving situations

Only the parallel deployment of three sensor principles ensures that automated driving will offer maximum safety when it is rolled out. This has been confirmed by Bosch analyses, where developers investigated all use cases of automated driving functions – from highway assist to fully automated driving in cities. For example, if a motorcycle approaches an automated vehicle at high speed at a junction, lidar is needed in addition to camera and radar to ensure the reliable sensing of the two-wheeler. In this instance, radar can struggle to detect the bike’s narrow silhouette and plastic fairings. Moreover, a camera can always be dazzled by harsh light falling on it. As such, there is a need for radar, camera,

and lidar, with the three technologies complementing each other perfectly and delivering reliable information in every driving situation.

Lidar is an essential element in automated driving

We can think of laser as a third eye: in lidar systems, the sensor emits laser pulses and captures the laser light that is scattered back. The system then calculates distances based on the measured time it takes for the light to bounce back. Lidar offers very high resolution with a long range and a wide field of vision. As a result, the laser-based distance measurement tool can reliably detect even non-metallic objects at a great distance, such as rocks on the road. This means there is plenty of time to initiate driving maneuvers such as braking or swerving. At the same time, using lidar in vehicles exposes the lidar system's components, such as the detector and the laser, to many stresses – above all, with regard to temperature resistance and reliability over the vehicle's entire lifetime. Because Bosch can draw on its sensor expertise and systems know-how in the fields of radar and camera technology when developing the lidar, the company can ensure that all three sensor technologies dovetail with each other. "We want to make automated driving safe, convenient, and fascinating. In this way, we will be making a decisive contribution to the mobility of the future," says Kroeger. Bosch's long-range lidar will not only fulfill all safety requirements for automated driving, it will also enable automakers to efficiently integrate the technology into a very wide range of vehicle types in the future.

Artificial intelligence is making assistance systems even safer

Bosch is an innovation leader in sensor technology for driver assistance systems and automated driving. The company has been developing and manufacturing millions of ultrasound, radar, and camera sensors in-house for many years now. In 2019, Bosch sales of driver assistance systems rose by 12 percent to around 2 billion euros. These assistance systems are paving the way for automated driving. Recently, Bosch engineers succeeded in taking the camera technology used in cars to a new level by enhancing it with artificial intelligence. The camera technology detects objects, categorizes them into classes such as vehicles, pedestrians, or bicycles, and measures their movement. In congested urban traffic, the camera can also recognize and classify partially obscured or crossing vehicles, pedestrians, and cyclists quickly and reliably. This allows the vehicle to trigger a warning or an emergency braking maneuver as required. Bosch engineers are also continuously refining radar technology. The latest generation of Bosch radar sensors is even better at capturing the vehicle's surroundings – including in bad weather or poor light conditions. Their greater detection range, wide aperture, and high angular separability are the basis for this improved performance.

Press photos: #2913265, #2719199

Contact person for press inquiries

Jörn Ebberg,

Phone: +49 711 811-26223

Twitter: @joernebberg

Bosch at CES 2020:

- **PRESS CONFERENCE:** In Ballrooms B, C, and D, Mandalay Bay Hotel, Las Vegas, **South Convention Center, Level 2**, from **9:00 to 10:30 a.m. local time on Monday, January 6, 2020.**
- **BOOTH:** Tuesday to Friday, January 7–10, 2020, in the Central Hall, booth #12401
- **FOLLOW** the Bosch CES 2020 highlights on Twitter: **#BoschCES**
- **PANELS WITH BOSCH EXPERTS:**
Wednesday, January 8, 2020, 10:15 to 11:15 a.m. (local time)
Event entitled “Growth of Apprenticeships for ‘New Collar’ Jobs” with Charlie Ackerman, Senior Vice President of Human Resources, Las Vegas, South Convention Center

Mobility Solutions is the largest Bosch Group business sector. In 2018, its sales came to 47.6 billion euros, or 61 percent of total group sales. This makes the Bosch Group one of the leading automotive suppliers. The Mobility Solutions business sector pursues a vision of mobility that is accident-free, emissions-free, and fascinating, and combines the group's expertise in the domains of personalization, automation, electrification, and connectivity. For its customers, the outcome is integrated mobility solutions. The business sector's main areas of activity are injection technology and powertrain peripherals for internal-combustion engines, diverse solutions for powertrain electrification, vehicle safety systems, driver-assistance and automated functions, technology for user-friendly infotainment as well as vehicle-to-vehicle and vehicle-to-infrastructure communication, repair-shop concepts, and technology and services for the automotive aftermarket. Bosch is synonymous with important automotive innovations, such as electronic engine management, the ESP anti-skid system, and common-rail diesel technology.

The Bosch Group is a leading global supplier of technology and services. It employs roughly 410,000 associates worldwide (as of December 31, 2018). The company generated sales of 78.5 billion euros in 2018. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected manufacturing. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is to deliver innovations for a connected life. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is “Invented for life.” The Bosch Group comprises Robert Bosch GmbH and its roughly 460 subsidiary and regional companies in over 60 countries. Including sales and service partners, Bosch's global manufacturing, engineering, and sales network covers nearly every country in the world. The basis for the company's future growth is its innovative strength. At nearly 130 locations across the globe, Bosch employs some 68,700 associates in research and development.

Additional information is available online at www.bosch.com, iot.bosch.com, www.bosch-press.com, twitter.com/BoschPress