

Everything under control: Bosch Engineering presents smart surround sensors at FIRA

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More safety and precision for field robots and autonomous tractors thanks to radar and ultrasonic sensors

- ▶ New as of 2024: radar off-highway premium
- ▶ ROS2 based Radar Sensor Toolbox for simplified application of radar data
- ▶ Flexible and precise surround sensors for assistance systems and automation of agricultural machinery

Abstatt, Holzkirchen (Germany) – Automation is playing a significant part in making agriculture faster, more efficient, and also more sustainable. This is especially true for assistance functions for agricultural machinery and equipment – right up to autonomous field robots. The high-performance surround sensor systems from Bosch Engineering provide an important building block for machine automation. At FIRA, the company will present its new ultrasonic system as well as the completely redeveloped high-imaging radar featuring ultrahigh resolution for detecting objects that are very close to one another even more precisely. "Our high-performance surround sensors help us make mobile agricultural machinery safer and enable work to be done very precisely in fields that are often difficult to navigate. By combining software and sensors, we also generate assistance functions that are more sophisticated," explains Philipp Kurek, who is responsible for the off-highway area at Bosch Engineering.

Radar off-highway premium – for ultraprecise surroundings perception

Radar technology is extremely insensitive to weather and environmental influences such as rain, fog, or dust. Compared to other sensor concepts such as LiDAR, radar technology therefore offers a high level of functional reliability at comparatively low overall costs. In the summer of 2024, Bosch Engineering will launch the newly developed off-highway premium radar system (imaging radar). Based on the latest automotive technology, the system offers a point cloud with a ten times higher resolution compared to previous system generations, meaning that objects in the detection area (x, y, and z coordinates) which are very close to one another can be distinguished even more reliably. For example, this enables very precise height measurement for precise

readjustment of the device's working height from the ground during travel over uneven terrain.

Bosch Engineering is currently developing what is known as radar sensor toolbox to simplify automation functions based on 4D radar technology. The toolbox is based on ROS2 and specifically filters out information from the huge amount of sensor data only when it is relevant for the respective automation function. This includes, among other things, measuring the height of an implement and determining the machine's track center for applications in an orchard or a vineyard.

Ultrasound – powerful sensors for more safety up close

For greater safety in the automation of agricultural machinery, it is becoming increasingly important to use high-performance surround sensors for safety-relevant functions. The ultrasonic systems for agricultural applications from Bosch Engineering cover a wide detection range (up to 360° panoramic view) with up to twelve ultrasonic sensors. Depending on the configuration, the sensors simply measure the distance or also offer object localization. For this purpose, an algorithm determines the position of the object within the detection area by using triangulation.

The safety certification according to ISO 25119 enables the ultrasonic system to be easily integrated into the sensor cluster of a surround sensing system which has to meet functional safety requirements. For example, this includes move-off control or emergency braking functions for slow-moving machines.

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