

### **New Bosch tram assist suite – the next step toward automation**

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**New driver assistance systems boost safety in city traffic and prevent operational disruptions**

- ▶ The Bosch tram assist suite: newly developed forward, near range, flank, and focus assist enhance safety and minimize operational disruptions
- ▶ OEM-independent solution as original equipment or retrofit solution for existing fleets
- ▶ System complies with all international standards for urban trains and trams and was engineered specifically for rail operations
- ▶ Robust, state-of-the-art Bosch sensor system adapted specifically to the demanding requirements of rail applications

Abstatt – Modern public transport is becoming increasingly important in our cities, thus making the high availability and, above all, safety of these services more essential than ever. Things can get very hectic on inner-city roads, and this makes life very difficult for tram drivers. Accidents involving other road users result in high repair costs for tram operators, while disruptions cause dissatisfaction among passengers. At InnoTrans, Bosch Engineering is presenting its new tram assist suite for seamless all-round protection and greater reliability in urban traffic. To this end, a completely new head-on collision warning system was developed. This is supplemented with near-range, flank, and focus assist functions, which will help to minimize or even prevent accidents in the future. “With the tram assist suite, we are taking the next logical step. The individual assistance systems greatly increase operational reliability while also reducing the risk of accidents. They provide crucial support and welcome relief for personnel in numerous critical situations, be it at tram stops or on busy roads and blind junctions with left-turning traffic. Accident damage and consequential breakdowns or diversions can thus be significantly reduced,” explains Heiko Mangold, head of rail technology at Bosch Engineering GmbH. Since 2017, the existing collision warning system from Bosch Engineering

has been effectively supporting tram driver's across the globe in carrying out their demanding job.

### **Bosch tram assist suite**

With its new tram assist suite, Bosch Engineering is extending its range of assistance systems for trams. The modular assistance package allows operators of urban train and tram services as well as vehicle manufacturers to select the exact functions for their individual requirements.

The suite includes the **tram forward assist** system, which warns of impending head-on collisions and detects both signs and signals. The system is also available in two advanced versions: "plus" and "extended range". **Tram near range assist** additionally monitors the near range. It issues warnings at tram stops, for example, if children are crossing directly in front of the tram or if there are persons in the coupling area between two tram cars (e.g., "coupling surfers"). The system also prevents the doors opening on the incorrect side and supports rail personnel by providing distance measurements when coupling tram sections in the depot.

The aim of **tram flank assist** is to prevent collisions caused by vehicles cutting into the path of the tram. Cross traffic, lane changes, and left-turning vehicles are the main causes of tram accidents in mixed traffic. "Our tram flank assist warns the tram driver of an imminent danger at an early stage, allowing them to adapt their driving accordingly and, in many cases, prevent an accident from occurring," explains Mangold. The system extends the detection range of tram forward assist. Another cause of accidents is tiredness and distraction of the tram driver, and this is where **tram focus assist** comes in. This system monitors the driver's gaze direction, facial expressions, and posture, allowing it to detect any signs of tiredness or distraction. It then warns the driver accordingly.

The tram assist suite is based on cutting-edge Bosch sensor technology of the latest generation. A sensor cluster comprising camera, radar, LiDAR, and ultrasound technology allows the entire external surroundings of the tram to be monitored along with the driver's cab inside the vehicle. The recorded data is processed by high-performance control units optimized for use in rail vehicles. Modern connectivity solutions support over-the-air (OTA) updates of the system software via a wireless interface as well as the integration of predictive maintenance concepts.

### **Quick and safe integration into new or existing fleets**

As an OEM-independent solution, tram manufacturers or third-party providers can integrate the Bosch tram assist suite into new trams as ready-to-install original equipment or can retrofit the system in existing fleets of any age. "Particularly in

the case of mixed fleets, the use of a uniform technology platform across all trams offers significant benefits to operators. On the one hand, the costs for spare parts logistics and maintenance are reduced due to the use of shared parts while, on the other hand, the training and adjustment effort is minimized since the drivers only have to learn to operate one manufacturer's system and will be faced with the same controls when switching to a new tram," explains Mangold. At the customer's request, Bosch Engineering can also act as the system integrator for the retrofit. The software and hardware components of the Bosch tram assist suite comply with all international standards for trams and urban trains. They were engineered specifically for the harsh operating conditions encountered in rail operations and are designed to be extremely robust, reliable, and durable.

As the next innovative step following the launch of the tram assist suite, Bosch Engineering is already working on concepts for automated urban rail transportation of the future. One example is the automation of depot traffic. This will allow the driver to simply park the tram in the depot at the end of a shift, and the automation function will then take over control before maneuvering the tram to its final position in the depot – without any intervention on the part of the driver.

**Further information:** <https://www.bosch-engineering.com/industries/rail/railway/>

**Press photos are available on the Bosch Media Service at [www.bosch-press.com](http://www.bosch-press.com).**

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