

## TEMPUS

### Bus Platooning Demonstrator for the City of Munich

Under ecological and economic aspects, highly automated driving is especially attractive in public passenger transit. This is even more true, as professionally trained drivers are lacking.

Moreover, numbers of passengers fluctuate strongly during peak hours in particular. To cope with high numbers of passengers, the city of Munich operates passenger trailers with a mechanical drawbar. However, this is associated with several drawbacks due to construction.

To eliminate these drawbacks, researchers have launched the TEMPUS project. Buses are operated in a platoon and the mechanical drawbar is replaced by an electronic one (Figures 1 and 2). Platoon means that several buses on the same route are connected to each other.

### Tomorrow's Bus Platoon

TEMPUS stands for Test Field Munich – Pilot Test of Urban Autonomous Road Traffic. The project partners are KIT, SWM, and EBUSCO. TEMPUS started in early 2021, is scheduled for a duration of two



Figure 1  
(Photo: KIT, Institute for Information Processing Technology)



Figure 2  
(Photo: KIT, Institute for Information Processing Technology)

and a half years, and is funded with about EUR 12 million by the Federal Ministry for Digital and Transport (BMDV).

KIT's tasks cover a wide range from the development of urban bus platooning concepts to the selection of suitable sensors to the design of automation algorithmics.

## Data for Backing Perception

Among the problems solved is the backing of multi-level perception by camera and lidar data. These data are collected independently of each other to ensure real redundancy. Moreover, sensors are combined to enhance performance. The FZI Research Center for Information Technology uses the data collected to develop the corresponding control systems. Test drives were made in November 2022 and February 2023.

The model displayed at Hannover Messe illustrates the complex problems of bus platooning in realistic urban settings (Figures 3 and 4).



Figure 3  
(Photo: KIT, Institute for Information Processing Technology)



Figure 4  
(Photo: KIT, Institute for Information Processing Technology)

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