



**EDDI**  
**Electronic Drawbar - Digital Innovation**  
Platooning pilot operation fact sheet

## Project description

- Scientifically monitored project for the development of digitally connected truck convoys
- Project partners: DB Schenker (logistics), MAN (technology) and Fresenius University (research)
- Federal government funding of 1.86 million euros

## The principle

- Two MAN articulated trucks are digitally linked and together form a convoy known as a "platoon"
- The follower vehicle emulates the acceleration, braking and steering of the lead vehicle.
- The rear truck reacts directly and synchronously without active intervention by the driver. However, the driver always keeps his hands on the wheel.
- When another road user cuts in, the platoon automatically separates and the distance increases again to 50 meters.
- At the same time, the rear driver takes back full control of his vehicle.
- Ahead of freeway roadworks, the platoon separates at the request of the lead driver
- Distance between both trucks around 15 meters (varied during the trials to a length of up to 21 meters)

## The vehicles

- Standard MAN TGX class vehicles for less than container load shipping.
- Chassis for mounting of swap bodies.
- Tandem axle carriages serve as trailers.
- Total weight of the three-axle tractor unit: 26 metric tons.
- Total weight of train combination designed for 40 metric tons.
- Total length of the two road trains: 18.75 meters for articulated trucks (required by law).
- Swap body (two per articulated truck) 7.82 meters in length, box construction with a smooth surface and rounded edges.

## Technology

- Second-generation platooning technology (based on the existing technologies already developed by MAN)
- Connection of the vehicles: WiFi11p connection (specially developed for vehicle-to-vehicle communication)
- Multiply redundant sensors: (standard-equipment) camera/radar sensors as well as Lidar sensor (Light Detection and Range) with large opening angle for early detection of vehicles cutting in
- Electrically controllable steering system for lateral control in the follower vehicle
- ACC (adaptive cruise control), LGS (lane guard system) and EBA (legally required emergency brake assist)
- Full TFT display with permanent indication of the platooning operation data
- Modified steering wheels with activation buttons for platooning
- System availability in practical operation: 98 percent
- Overriding of the system by the driver: 0.5 times per 1,000 kilometers

## Practical operation

- Operation between DB Schenker terminals between Munich and Nuremberg (around 145 kilometers) on the digital test section of the A9 autobahn
- Time period: August until December 2018 (initially dummy cargo, followed by real cargo from the European cargo network of DB Schenker)
- Departure from Munich each time 9.30 pm, departure from Nuremberg each time 1.30 am
- Driving in platoon: average of around 73 kilometers per trip
- Total kilometers driven during practical operation: 35,000
- Longest permitted platoon phase: 30 minutes
- Permitted maximum speed: 80 km/h
- Compulsory separation of platoon at freeway junctions, ahead of roadworks, on up/downgrades of over four percent as well as in especially heavy traffic; platooning not permitted on wet roads
- Fuel saving: three to four percent in the follower vehicle, 1.3 percent in the lead vehicle

## Research setting

- Scientific monitoring over 13 months by six scientists from Fresenius University
- Use of electroencephalogram (EEG) and mobile eye-tracking glasses while driving
- EEG: Derivation of voltage fluctuations at the surface of the head caused by constant electrical changes of state of brain cells; analysis of degrees of alertness and activation of each driver
- Eye-tracking: Analysis of eye movements (distribution of glances, duration of focusing, areas of interest)
- As part of the social-science investigations, open interviews with the drivers; prior to the test phases, 23 drivers in groups and the ten test drivers in individual interviews (contents: career choice, job characteristics, job rating, assumptions with regard to practicability, safety and consequences of platooning technology); after the test phase, participating drivers in individual interviews (contents: experiences, rating and possibilities for improvement of the technology); also standardized questionnaires on technology acceptance, trust in technology, subjective alertness and safety-relevant rating of specific driving situations

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