



## Highway Driving Assist Totally relaxed at 75 mph

ZF's Highway Driving Assist system supports semi-automated driving. A novel driving experience on the autobahn near Düsseldorf in Germany.



Black paintwork gleams in the sunlight: a sporty-looking station wagon is parked in the yard of ZF's Düsseldorf plant. From the outside, the car looks identical to a standard production model. But hidden beneath the skin are sophisticated systems representing an extra 2,500 hours of work. Only when you flip open the tailgate and lift the floor of the trunk does the car reveal its secret. It's an experimental vehicle. The space normally reserved for the spare tire holds a neatly wired computer network with enough processing power to teach a computer on wheels how to recognize its surroundings.

In the open-plan office above the ZF TRW workshops in Düsseldorf, robotics experts rub shoulders with physicists and IT wizards. All of these team members were recruited with the aim of gathering together the broadest possible range of IT expertise – supplemented by an ability to think outside the box. The car in front of me is among the most complex pieces of equipment that customers can buy. However, you need to build up some experience with this system before you can safely relinquish control and allow it to brake and steer on its own. "Our development team in Düsseldorf can draw on ZF resources from across the entire company," enthuses Dr. Marco Wegener. We've left Düsseldorf's city center far behind us and now we're cruising along the A3 autobahn, heading toward Cologne. That's when the 30-year-old Wegener tells me to press two buttons – and let go of the steering wheel.



“Highway Driving Assist represents an important milestone on the way to highly automated driving.”

*Source: Dr. Carsten Hass, Engineering Manager Automated Driving*

## Centering automatically

There’s no computer display to tell me what the experimental vehicle is about to do. But I can clearly feel the action of the electric motor on the steering gear, automatically keeping the car in the center of our lane. It works like a lane-keeping assistant, using cameras to monitor the lane ahead. A radar-assisted Adaptive Cruise Control (ACC) system is responsible for keeping us at the correct safe distance from the vehicle in front. ZF TRW has been producing driver-assist systems like this for a long time – increasingly, they’re becoming standard equipment in the automotive industry. Starting in 2017, for example, all Peugeot, Citroën and DS models will be equipped with the latest camera and radar technology from ZF TRW.



The systems supplier will also be responsible for function development and systems integration – for both the individual sensors, and for data fusion across the sensor network as a whole. What does the camera behind the windshield see? What’s the radar system picking up? I keep asking myself these questions

safe distance, the incident must be just as stressful as the absence of lane markings on a freshly asphalted section of road. The system must respond to events within fractions of a second, and then return the car to the middle of the lane. By flicking a directional indicator, I can also make the car change lanes automatically. That means it not only has to monitor its own lane, but the neighboring lane as well. The computer can only be sure the maneuver is safe to execute once all the different types of sensors have reached a consensual “world view”.

“Teaching a car what it’s supposed to do is an absolutely fascinating job.”

*Source: Dr. Marco Wegener, Development Engineer*

## Cruisin’ down the freeway in a semi-automated ride



(#)

### Detect – anticipate – act

At present, driver assistance – or as they are known in the industry, “driver assist” – systems are only capable of perceiving a very limited segment of the vehicle’s surroundings. In particular, they lack the experience required to classify objects and judge their movements. For example, emergency braking assistants attempt to recognize pedestrians crossing the road. So far, however, this only really works in cities. By contrast, seasoned drivers develop a sixth sense. If the vehicle in front of us starts to move toward the median strip, we can tell it’s about to move out and overtake – whether or not it is signaling. A self-driving vehicle must constantly observe, analyze, anticipate and plan for everything around it.



In actual fact, I’m able to take my hands off the steering wheel for long stretches of the A3 freeway. But I’m not allowed to pick up my notepad and take notes while driving at high speed. The ZF experts are specially trained as test drivers. They keep a close eye on the traffic at all times and can override the system whenever they want to. Let’s be clear: fully automated – i.e. driverless – cars are still a media-titillating myth. Reporters love to tell us about self-driving research vehicles fitted out with laser scanners that cost as much as a luxury sedan. But such research vehicles are only tangentially relevant to production cars. If clever onboard assistants are to become truly affordable, they’ll have to do without all the expensive extras and use advanced versions of

The ZF TRW team in Düsseldorf always keeps this democratization of innovations firmly in mind. “We’re working on automated driving functions based on our next-gen camera and radar systems,” explains project head Dr. Carsten Hass. The high priority ZF is giving to this key area of future activity is reflected by the company’s latest acquisition: this summer, ZF purchased HDLE GmbH. The German company’s 50-strong development team specializes in driver-assist systems and “surround view” technology. The cameras they use are capable of monitoring cross-traffic movements superbly, even at highway on-ramps, whereas conventional cameras and radar systems only patchily detect pedestrians and cyclists, even when they’re directly alongside the car.

After my test drive, it has become clear to me just how crucial this 360° surround-view technology is for automated driving. Admittedly, even if the car had been fitted with this technology, I still wouldn’t have been able to take notes during the drive – but it would have been another big step in that direction.

Photos: Mareike Foecking

## TAGS

- [Trends \(magazine\\_homepage.html#tag=Trends\)](#)
- [Driver assistance \(magazine\\_homepage.html#tag=Driver assistance\)](#)
- [Automated driving \(magazine\\_homepage.html#tag=Automated driving\)](#)
- [IAA \(magazine\\_homepage.html#tag=IAA\)](#)

Published on Sep 4, 2015 [Print Page \(#print\)](#)

[Next Article \(magazin\\_artikel\\_viewpage\\_22127016.html\)](#) [Previous Article \(magazin\\_artikel\\_viewpage\\_22123624.html\)](#)

## Further related articles

### Safely off on vacation

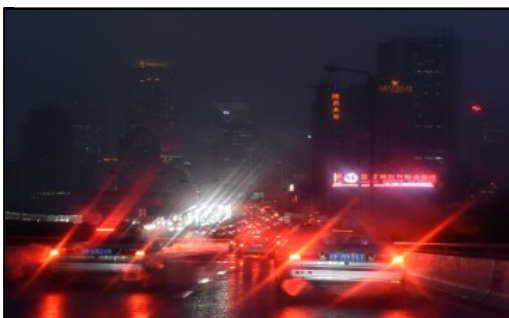


Maintenance shortcomings may result in the vacation trip being curtailed early, with the vehicle stranded in the breakdown lane.

[More](#)

[\(magazin\\_artikel\\_viewpage\\_22100008.html\)](#)

### Not without my wheels!



Shanghai is choking in traffic. The Chinese megacity needs a smart transport mix and a better infrastructure – and in the near future, so will many other metropolitan areas.

[More](#)

[\(magazin\\_artikel\\_viewpage\\_22117096.html\)](#)

### Chauffeured safely while you relax



The car drives, the driver relaxes – this was long considered something out of science fiction, but thanks to the newest electronic assistance systems in the car, it is close to becoming a reality.

[More](#)

[\(magazin\\_artikel\\_viewpage\\_22123624.html\)](#)

© ZF Friedrichshafen AG