

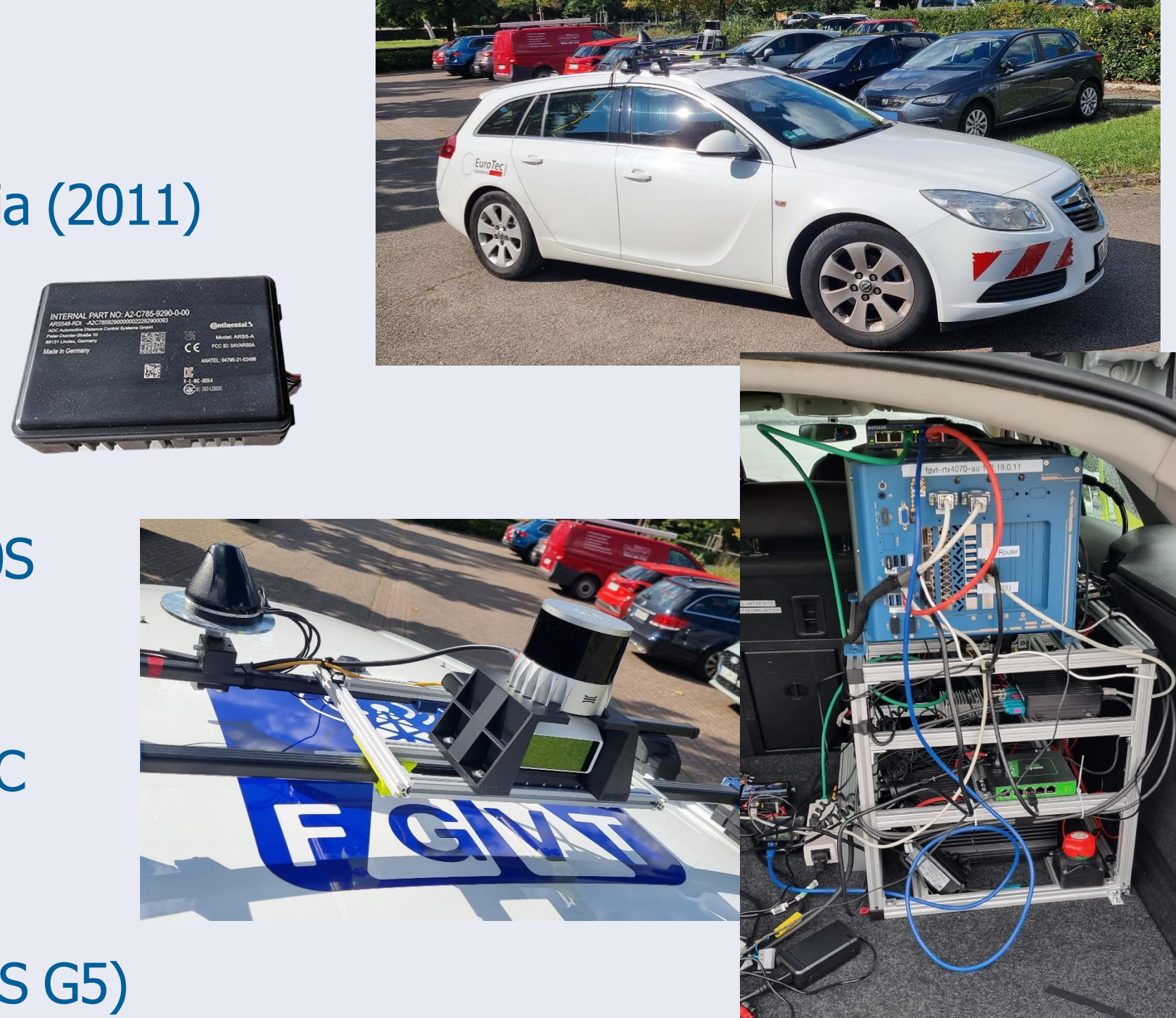


Use Case 2 – Demonstrators

Peter Gibson, Johannes Woll, Daniel Rau; Hochschule für Technik und Wirtschaft des Saarlandes – htw saar

Detecting Vehicle

- Base vehicle: Opel Insignia (2011)
- Sensors:
 - Radar:
 - Conti ARS 548
 - Lidar:
 - Cepton Vista-X90S
 - Ouster OS2
- Vehicle computers:
 - Neosys Nuvo-10208GC
 - ABOX-5200G1
- Communication
 - Commsignia OBU 4 (ITS G5)



Detecting Infrastructure

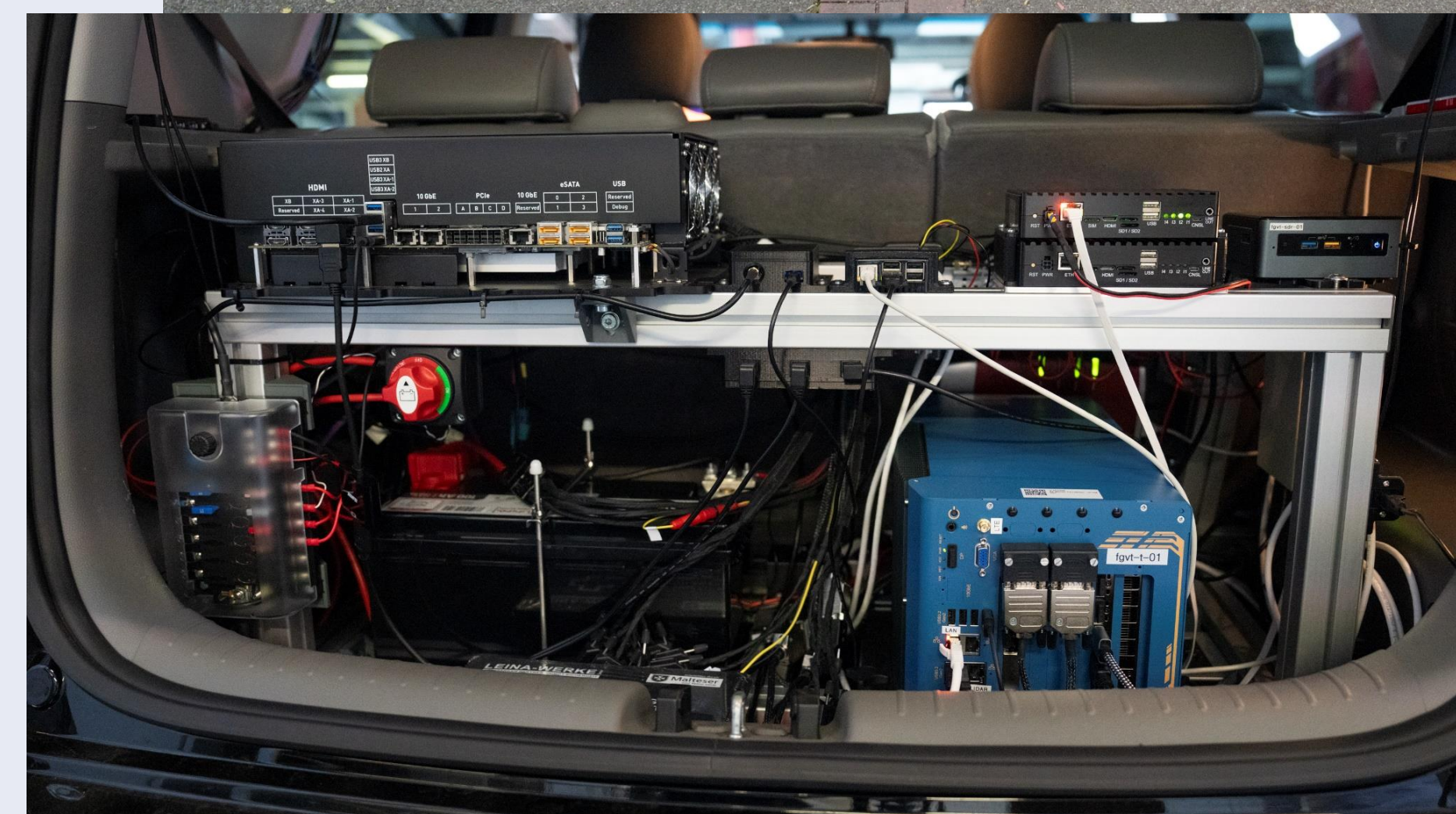
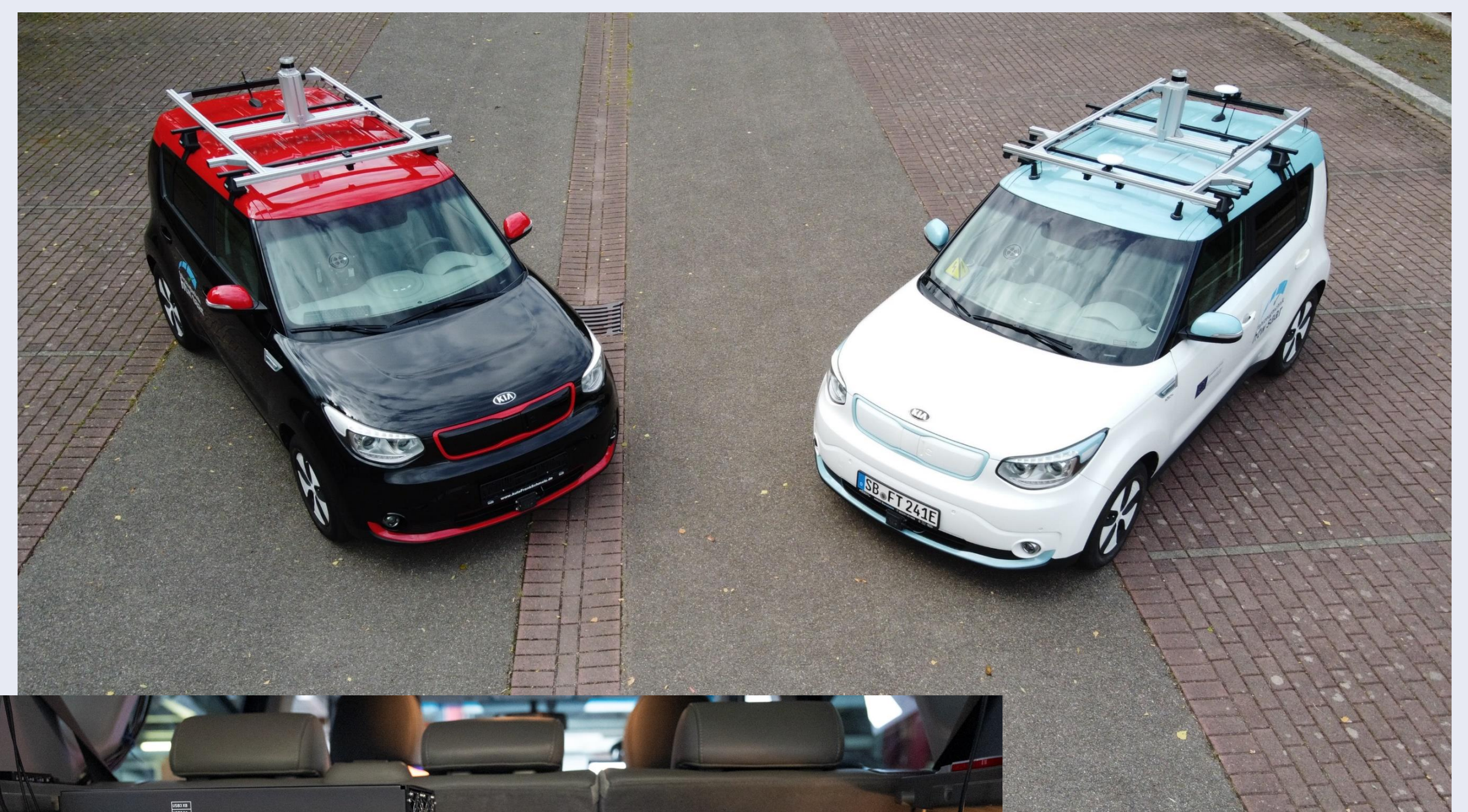
- Custom made trailer with pole
- Height: ca. 5 m
- Sensors:
 - Hikvision 4MP Bulletcamera
- Computers:
 - Neosys Nuvo-10108GC
 - Neosys Nuvo-9501
- Communication:
 - Commsignia RSU 4 (ITS G5, C-V2X)
- Power:
 - 4.6 kWh power supply for 8+ hours uninterrupted runtime



Automated Vehicle

The research platforms for automated driving at htw saar:

- Base vehicle: KIA Soul EV (year of manufacture 2016)
- Two identical models for implementing cooperative maneuvers and V2X use cases
- Computer control of accelerator, brakes, and steering via Open Source Car Control (OSCC)
- Additional sensors for environment sensing:
 - Central 360° lidar (Ouster OS1)
 - 4 cameras (Sekonix)
 - Front radar (Continental)
 - Access to the vehicle's own ultrasonic park distance control
- Sensors for detecting vehicle position and state of motion:
 - Inertial measurement unit (Microstrain)
 - GNSS with RTK (u-blox Z-F9P)
 - Access to vehicle odometry data (steering angle, wheel speeds)
- Vehicle PCs:
 - Neosys Nuvo-10108GC
 - Nvidia Drive AGX
 - Intel NUC
- V2X unit: Commsignia OBU4 (ITS-G5)
- Driving software based on Autoware

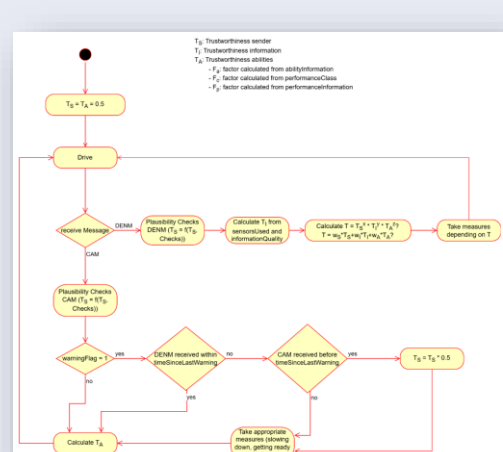
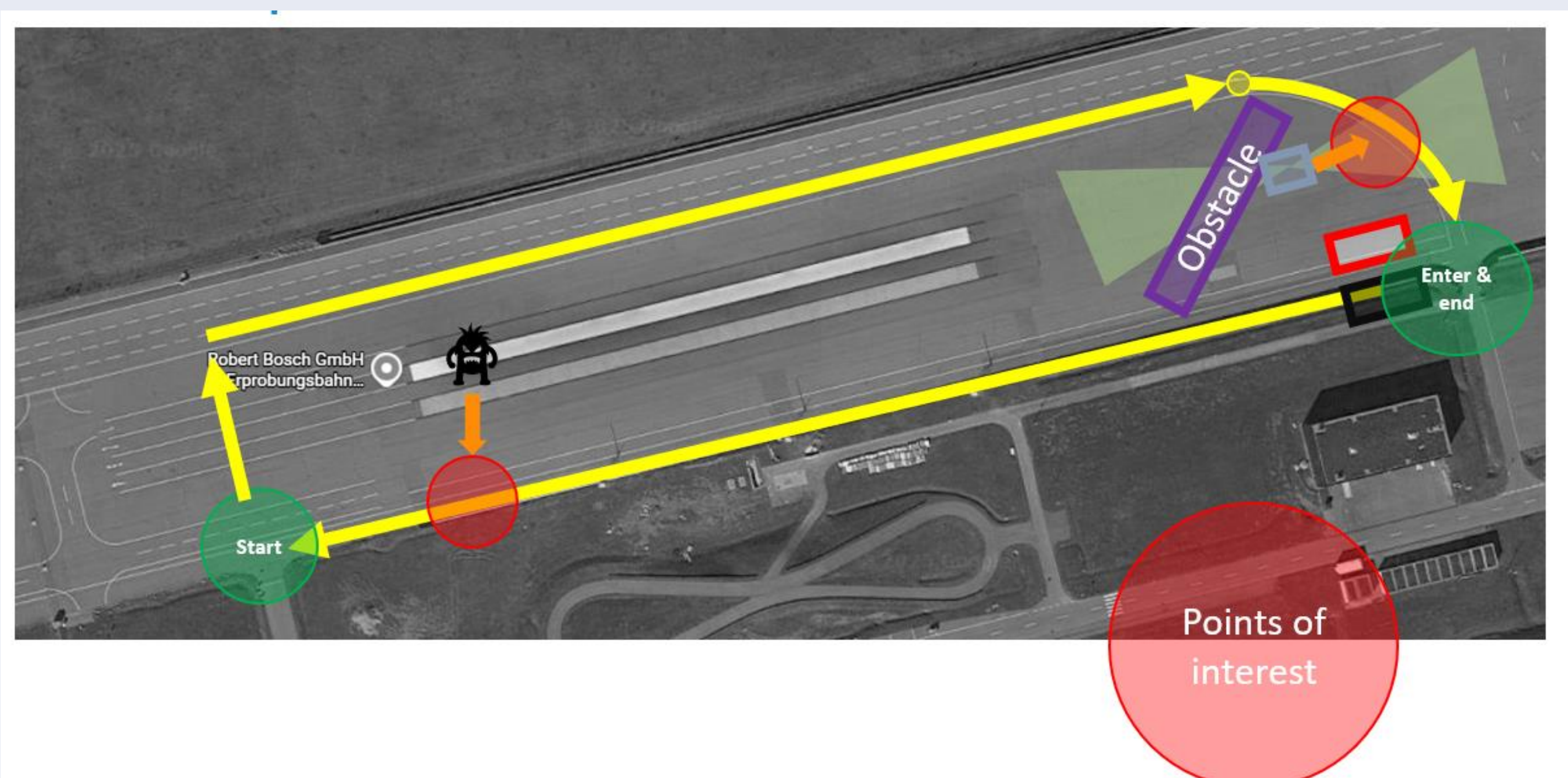


- Built up in the EC-funded research projects FAST (2019-2022) and FASTer (2022-2025)

Demonstrated scenarios

Three demonstration rounds:

- First round: without ConnRAD, two possibilities:
 - As law says: ignore information from outside your system
 - → In case of a legit warning, the CAV will brake as soon as it detects the TJ itself
 - Ignore law and accept the warning, as it is the only information available
 - → CAV will brake on open road where it assumes the traffic jam to be located
- Second round: with ConnRAD
 - First warning is trustworthy → braking earlier and smoother
 - Second warning is not trusted → an information is displayed and the speed is minimally decreased
- Third round: with ConnRAD, the TJ-recognizing entity is a car
 - The vehicle itself will be trusted, while itself provides information on malfunctioning sensors → warning for the driver and degraded reaction of CAV



- **In parallel: explanations on the Use Case, details on**
 - Sensor(fusion)
 - Message extensions
 - Calculation of trustworthiness

