HAVEit

Highly automated vehicles for intelligent transport

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The future of driving.

Deliverable D53.1 Temporary Auto-Pilot: Sensors installed in vehicle (1st SW version)

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Authors

Dr. To, Thanh Binh Volkswagen AG

Dr. Bartels, Arne Volkswagen AG

Project Manager

Prof. Alfred Hoess

Project Co-ordinator

Dr. Reiner Hoeger

Continental Automotive GmbH, STA EG

Siemensstrasse 12

93055 Regensburg

Germany

Phone +49 941 790 3673

Fax +49 941 790 13 3673

E-mail reiner.hoeger@continental-corporation.com

Executive summary

The overall objective of the HAVEit project is to develop technical systems and solutions that improve automotive safety and efficiency. Volkswagen Group Research contributes to the overall objective by developing the safety and comfort focused Temporary Auto Pilot application.

The Temporary Auto Pilot (TAP, WP5300 in the HAVEit project structure) is fundamentally intended to support the driver in monotonous traffic situations like traffic jams or monotonous long distance driving from A to B where he can experience work under load which can lead to a lack of focus and increased accident risk. The TAP is a passenger car application which will support the driver on motorways and motorway similar roads with different levels of automation in longitudinal and lateral control of the vehicle at speeds between 0 and 130 km/h. The automation spectrum is as follows:

- Highly-Automated: hands-off driving, automated longitudinal and lateral control (Pilot)
- Semi-Automated: hands-on driving, automated longitudinal control (ACC)
- Assisted driving: hands-on driving, assisted lateral control (LKS)
- Intervening safety functions: driver initiated emergency braking

This guarantees that the driver gets the best possible support available. This will contribute to traffic safety.

The main objective of WP5300 during project periods M4 – M15 was to specify, develop and integrate the different sensors for environment perception and driver monitoring in the Volkswagen demonstrator vehicle (see Figure 1 below). The driver monitoring camera still has to be integrated in the instrument panel. The three Ibeo laser scanners have been mounted near the front bumper. The integration of the front radar, ultrasonic sensors, the front camera and the rear view camera was rather straight forward since they are already available for serial vehicles. This was very helpful since a good position for these sensors has already been located. Initial tests of the sensor outputs show that they are working properly and that they are providing sensor data on their CAN bus and video interfaces.

Figure 1: TAP sensor system

In Figure 1 these sensors with their mounting position in the Volkswagen Passat passenger car are depicted. The field of view of the sensors for environment perception is illustrated in Figure 2.

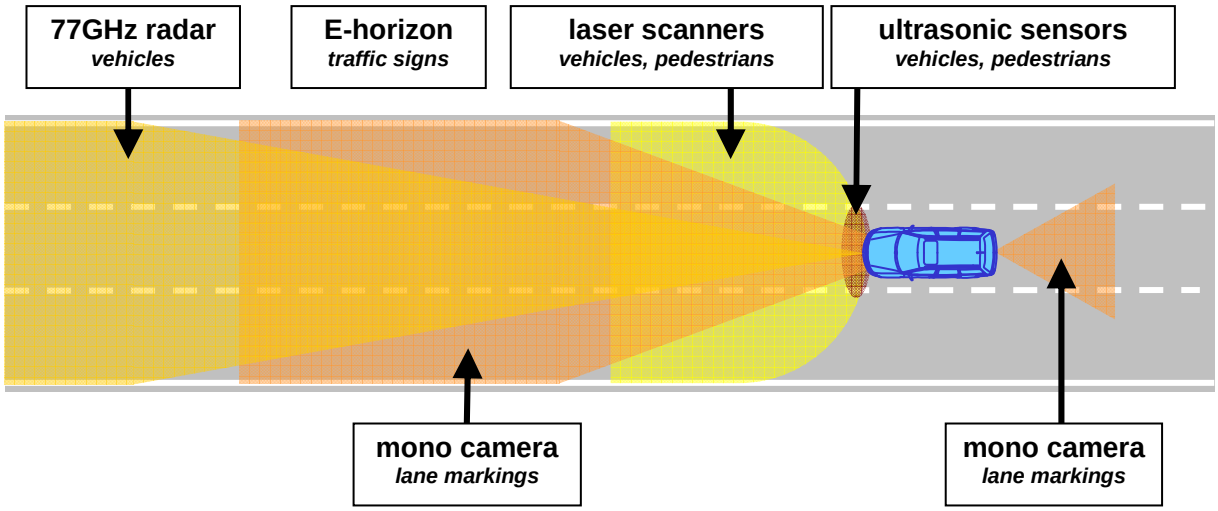

Figure 2: Environment perception sensor's field of view

Next steps are the integration of the driver monitoring camera with an appropriate design, the calibration of the sensors, the updating of the software of the cameras and laser scanners and then proceed with first sensor data recording in real traffic. Afterwards the work will concentrate on Sensor Data Fusion (SDF), the development of the Human Machine Interface (HMI) and the functional software control algorithms.

Further details of the sensor specification and architecture can be found in the corresponding development deliverables D11.2 Specification [1] and D12.1 Architecture [2].

References

[1] D11.2 Specification, HAVEit deliverable, 2009

[2] D12.1 Architecture, HAVEit deliverable, 2009