HAVEit

Highly automated vehicles for intelligent transport

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The future of driving.

Deliverable D52.2
Automated Queue Assistance: Components installed, working and tested

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Executive summary

The overall objective of the HAVEit project is to develop technical systems and solutions that improve automotive safety and efficiency. Volvo Technology contributes to the overall objective by developing the safety and comfort focused Automated Queue Assistance (AQuA) application.

The Automated Queue Assistance (WP5200 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 or she can experience work underload which can lead to a lack of focus and increased accident risk.

The AQuA is a heavy truck application which will support the driver on motorways with different levels of automation in longitudinal and lateral control of the vehicle at speeds between 0 and 30 km/h.

This document summarizes the components installed into the WP5200 demonstrator vehicle and presents basic tests to ensure that all components are properly working.

The main objective of WP5200 during project periods M16 – M24 was to activate, interlink and test all installed components in the Volvo FH12 demonstrator truck. These components are e.g. sensors for environment perception and driver monitoring, Sensor Data Fusion module, Mode Selection and Arbitration Unit, Co-Pilot module, longitudinal and lateral controller and Human Machine Interface components like steering wheel, displays, switches, etc.

Based on the common HAVEit architecture the components of the AQuA demonstrator vehicle in the perception layer, command layer, execution layer and the driver interface components which are necessary to successfully demonstrate the AQuA function are described (a summary below):

- **Perception layer components**
  - Environment sensors (which were described in deliverable D52.1 **[1]**)
  - Vehicle sensors
  - Sensor Data Fusion
- **Command layer components**
  - Co-Pilot module (see also deliverables D31.1 **[2]** and D31.2 **[3]**)
  - Driver state assessment (see also deliverables D32.1 **[4]** and D32.2 **[5]**)
  - Mode Selection Unit (see also deliverable D33.2 **[6]**, D33.3 **[7]** and D33.4 **[8]**)
  - Command generation and validation
- **Execution layer components**
  - Drivetrain control
  - Host vehicle model
  - Steering actuator
  - Braking actuator
  - Engine actuator
- **Driver interface components**

- Primary driver interface (steering wheel sensors, direction indicator, acceleration and brake pedal position)
- Driver interface switching components (buttons)
- Driver interface display components (primary and secondary information displays)
- Driver interface audio device
- Driver monitoring system (which is described in deliverable D52.1 **[1]**)

In summary, the integration and installation work for all required components has been completed[1]. All initial tests have been successfully passed. The next steps will focus on the development, implementation and integration of the Automated Queue Assistance application functionalities, in particular the different automation levels including transitions.

[1] The IR-component in the V2V system has not been installed and completely tested (only the electrical interfaces to these modules have been successfully tested)

References

[1] D52.1 “Sensors installed in the vehicle (1st SW version)“, HAVEit deliverable, 2009

[2] D31.1 “Co-driver command vector available (1st version)”, HAVEit deliverable, 2009

[3] D31.2 “Co-driver command vector available (2nd version)”, HAVEit deliverable, 2009

[4] D32.1 “Report on driver assessment methodology”, HAVEit deliverable, 2009

[5] D32.2 “Model of driver behavior w.r.t. the need for automation“, HAVEit deliverable, 2009

[6] D33.2 “Preliminary concept task repartition”, HAVEit deliverable, 2009

[7] D33.3 „Validation by simulation“, HAVEit deliverable, 2009

[8] D33.4 “Algorithm (C-code, 1st version) available for partners“, HAVEit deliverable, 2009

[9] D12.1 ”Architecture“, HAVEit deliverable, 2009

[10] D11.1 “Functional description and Requirements”, HAVEit deliverable, 2009

[11] D21.1 “CSC & XCC HW-development“, HAVEit deliverable, 2009

[12] MATLAB and Simulink, The Mathworks, Inc. – http://www.mathworks.com

[13] dSPACE Company, http://www.dspace.de