

HAVEit

Highly Automated Vehicles for Intelligent Transport

HAVEit aims at the significant improvement of traffic safety and efficiency by reducing the driving burden in developing next generation ADAS with a higher level of automation compared to the current state of the art. Longitudinal and lateral control is automated depending on the driving situation, the quality of the environmental model and the driver's alertness. The automation shall lower the burden during monotonous but mentally exhausting driving or driving in complex sceneries like roadworks.

To pave the way for an introduction of the new functionalities we demonstrate how to enhance existing EE-architectures for highly automated driving and develop failure tolerant architectures for by-wire-actuators. Innovative HAVEit applications will be demonstrated in 7 vehicles: passenger cars, trucks and one bus.

At a Glance

Project:

HAVEit supports the necessity of higher integration and more reliable and driver sensitive support and intervening safety functions by driver centric automation. It will achieve a significant step towards higher levels of automation by selecting the most appropriate automation level depending on driver and vehicle state as well as traffic situation. The intelligent joint system driver / co-system (automation system) is the key.

Programme:

7th Framework Programme

Project coordinator:

Dr. Reiner Hoeger
Continental Automotive GmbH, Dept. S&T A
Siemensstrasse 12
D-93055 Regensburg, Germany
Reiner.hoeger@continental-corporation.com

Partners:

Volvo Technology (S), Volkswagen (D), EFKON (A), Knowllence (F), Continental Automotive (F), DLR (D), Ecole Polytechnique Fédérale de Lausanne (CH), Institute of Communication and Computer Systems (GR), University of Applied Sciences Amberg-Weiden (D), Budapest University of Technology and Economics (H), Universitaet Stuttgart (D), Wuerzburg Institute of Traffic Sciences (D), Institut National de Recherche en Informatique et en Automatique (F), Laboratoire Central des Ponts et Chaussées (F), Explinovo (D), Haldex Brake Products (S), Sick (D).

Start date: 1 February 2008

Duration: 42 months

Total cost: 27,5 M€

EC funding: 17,0 M€

Project website:

www.haveit-eu.org

The vision behind: highly automated driving to improve overall safety

The key actor for safe driving must be the driver. Everything has to be done to optimize her/his performance. An automation centered on the driver is an important tool to achieve this goal. Taking into account that the need for assistance strongly depends on the varying performance level of the driver, the need for a variable task partition between driver and automation becomes obvious. Higher degree of automation in this context means to support the driver in monotonous driving tasks (e.g. queuing on crowded motorways, continuous lane keeping) as well as in highly demanding tasks like driving in the narrow lanes of a roadwork area. Automation must be designed in a way that different degrees or stages of support can be flexibly produced (ranging from mere warning up to a temporary auto-pilot).

HAVEit key objectives

JOINT SYSTEM DRIVER – CO-SYSTEM

Current ADAS are switched either “on” or “off”, a severe disadvantage in case of systems integrating different functions like in HAVEit. If one part of the integrated system shows malfunction or reaches its system limits, the remaining parts of the integrated system may still work correctly or must only be degraded in part. The same holds true for the driver. There may be an intention for maximum automation in some situations, whereas part assistance may better fit to other driving situations.

Also, different alertness states of the driver (e.g. sleepiness) may prohibit switching in a highly automated mode. Therefore, one basic idea of HAVEit is to define different degrees of automated driving which can be selected according to the needs of the driving task. HAVEit vehicles will contain a sophisticated co-driving system that can, in limited driving situations, perform a higher percentage of the driving task automated (i.e. highly automated). The co-system is usually dependent on the driver to allow, supervise and/or participate in the automated behavior. If well designed, driver and co-system form an ideal symbiosis - a joint system - that drives better and safer than any of the two partners would be capable alone. One essential key to such a successful combination of human (driver) and automation (co-system) lies in the proper design of the transitions between lower and higher degrees of automation (Figure 1).

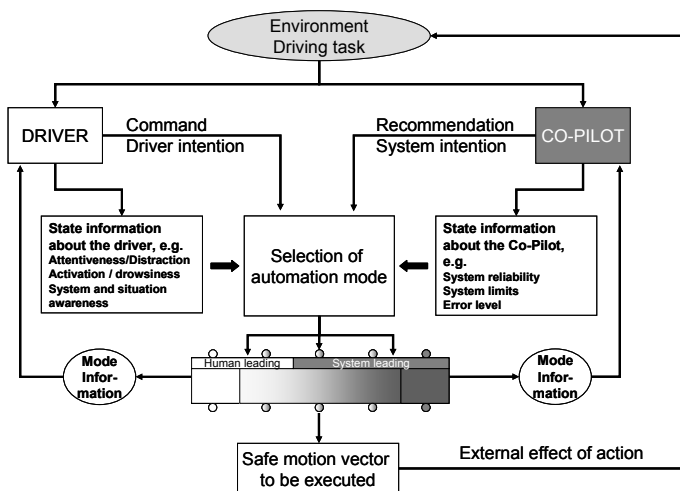


Figure 1: Optimizing task repartition in the joint system driver - co-system

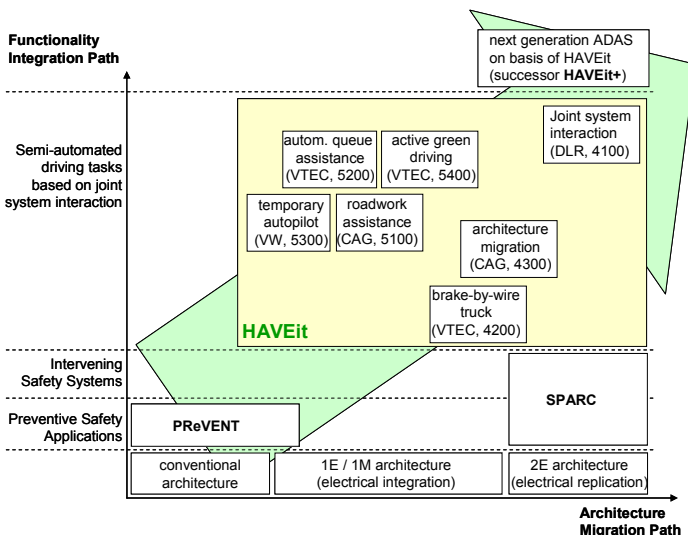


Figure 2: HAVEit's highly automated vehicle applications - architecture migration and functionality integration path

HIGHLY AUTOMATED VEHICLES

HAVEit will develop 7 next generation highly automated ADAS systems aiming at improved comfort, safety and efficiency. To achieve the overall goal, HAVEit is organized by 3 horizontal and 2 vertical clusters (Figure 2):

- Horizontal clusters at first cover the integrating tasks within the IP. A second horizontal cluster is represented by the implementation of the failure tolerant, redundant, flexible and scalable safety architecture aiming at improved traffic safety and suiting the needs of future highly automated functions (e.g. steer-by-wire, brake-by-wire). The joint system is assigned to the third horizontal cluster.
- Vertical clusters are dedicated to the application development making use of the horizontal cluster achievements. A first vertical cluster deals with the joint system (rapid prototyping car with SbW functionality) and safety architecture validation by means of BbW truck and architecture migration demonstrator. The second application cluster covers the development and realization of highly automated driving applications to be demonstrated on public roads. These aim at continuous driver support and improved road traffic safety (automated assistance in roadworks, automated queue assistance, temporary auto-pilot) as well as improved energy efficiency (active green driving bus).

The five clusters mark migration paths in two directions: Migration in the safety vehicle architecture direction (horizontal axis) and migration towards higher levels of functionality (vertical axis). Both migration directions are linked.

HAVEit will show several steps in the Figure 2 roadmap, aiming at short term (3-4 years), medium term (5-7 years) and longer term (8-10 years) industrialization after HAVEit.

For further information:

Information Desk
 European Commission -
 Information Society and Media DG
 Office: BU31 01/18 B-1049 Brussels
 Email: info-desk@ec.europa.eu
 Tel: +32 2 299 93 99
 Fax: +32 2 299 94 99
http://europa.eu/information_society