HAVEit

Highly Automated Vehicles for Intelligent Transport

**Funding:** European (7th RTD Framework Programme)
**Duration:** Feb 2008 - Jul 2011
**Status:** Complete with results
**Total project cost:** €27,538,372
**EU contribution:** €16,998,662

**Call for proposal:** FP7-ICT-2007-1
**CORDIS RCN:** 85267

**Background & policy context:**

The project aimed at the improvement of road safety, energy efficiency and comfort through the development of a virtual co-system, which will support the driver.

Driver monitoring was used to estimate the driver's performance and state, including driver distraction and driver drowsiness. To minimise underload and overload situations, a layered approach of dynamic task repartition between driver and co-system was used, starting with a conservative layer and expanding to more future-oriented layers that give the co-system more authority and allow for a more fluid transition of control.

Automated driving requires an adequate safety architecture from fail safe to fail tolerant. Therefore, a scalable vehicle architecture will be mandatory for the migration from single Advanced Driver Assistance Systems (ADAS) to a powerful automated driving concept.

Comfort, safety and the efficient usage of energy were addressed by the HAVEit highly automated vehicle applications in passenger cars as well as in heavy duty trucks:

- Automated queue assistance
- Construction site assistance
- Temporary auto-pilot
- Active green driving

After implementing the aforementioned applications, their benefit and impact was assessed in relevant scenarios.

**Objectives:**

HAVEit aimed at significant improvement in terms of traffic safety and efficiency by three measures:

1. Development and validation of the next generation of ADAS with an optimised task repartition between the driver and the highly automated vehicle, with higher level of automation compared to the current state of the art.
2. Optimum system joining and interaction between the driver and the co-system, by defining different degrees of automated driving, which will be selected according to the needs of the driving task.
3. Development and validation of a scalable and safe vehicle architecture that includes advanced redundancy management, in order to suit the needs of highly automated vehicle applications.

HAVEit integrated seven advanced vehicle applications for both passenger cars and trucks aiming at enhanced safety and comfort as well as improved fuel efficiency. These applications are categorised into two groups:

1. The highly automated driving group implemented solutions for queue assistance, construction site assistance, temporary auto pilot, and active green driving.
2. The safety architecture application group presented a migration concept and a demonstrator to show possible migration paths.

Methodology:

Sensors: Various external sensors were used to achieve a wide enough perception area for all applications. Especially for safety related applications, effort will be given to achieve coverage of the area of interest from multiple sensors.

Driver monitoring: The driver was monitored directly and indirectly all the time to obtain a confidence value on her/his capacity and attention status in order to optimise the tasks repartition and the feedback strategy.

Platform: A scalable vehicle architecture, by means of smart sensors, standard fail silent ECU and smart actuators, was defined to cope with the needs for highly automated driving, based on conventional actuators up to fail tolerant integration of drive-by-wire to allow autonomous driving.

Related Projects:

See among others: ATESST2, INTERSAFE2, EVITA, ARTIC and SPARC.

Parent Programmes:

FP7-ICT - Information and Communication Technologies

Institute type: Public institution
Institute name: European Commission
Funding type: Public (EU)

Lead Organisation:

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Organisation Website: http://www.conti-online.de
EU Contribution: €4,422,353

Partner Organisations:

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EU Contribution: €443,284

Vdo Automotive Ag
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<td>Volvo Bus Corporation</td>
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**Volkswagen**

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**EU Contribution:** €1,091,895

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**EU Contribution:** €693,874

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**Technologies:**

- Advanced driver assistance systems
- ADAS learning and harm prevention platforms

**Development phase:** Validation

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**Key Results:**

At the Final Project Event, in Borås (Sweden) and at the nearby Hällered Volvo test track, the project team demonstrated an automated vehicle driving through a narrow construction site. The driver did not steer, accelerate or brake one single time. Another car passes the vehicle in front of it, after the driver pushes the appropriate button. A truck recognises a traffic jam and automatically slows down. All of these highly automated driving features have been developed through the collaboration of the European automotive industry and scientific community, with an eye toward making driving safer, more environmentally-friendly and more comfortable.

**Innovation aspects**

The realisation of highly automated driving. The project has developed, validated and demonstrated important intermediate steps towards highly automated driving.

**Technical Implications**

Although the project has been very successful, various aspects will need to be further addressed in future research. For example: the level of use with respect to information received ‘from outside’ (V2V and V2I communication). Such information would significantly increase the perception horizon of highly automated vehicles. However, it will raise also additional questions. For example:

- who is responsible for the information;
- how to ensure that this information is up to date;
- to which extent can this information be used in the highly automated vehicles;
- potential misuse.

**Policy implications**

Highly automated vehicles will characterise the future of mobility, as traffic density increases and the flood of information available to drivers is growing fast. Automation will relieve drivers of driving stress as it guides them safely through traffic, in an efficient way, using environmentally friendly technology.

**Other results**

Improvement of road safety, energy efficiency and comfort due to the development of a virtual co-system, which enables supporting the driver. In addition, driver monitoring will be used to estimate the driver's performance and state, including driver distraction or driver drowsiness.
Policy objectives

Innovating for the future (technology and behaviour): A European Transport Research and Innovation Policy

Documents:

Highly Automated Vehicles for Intelligent Transport (Final report)

STRIA Roadmaps: Cooperative, connected and automated transport
Transport mode: Road transport
Transport sectors: Passenger transport, Freight transport
Transport policies: Decarbonisation, Safety/Security, Digitalisation
Geo-spatial type: Other