

**PhD student in Computer Science and Engineering, with orientation towards methods for software function development and test of Cooperative Vehicular ICT for safe cooperative system assisted vehicle driving**

**Last day to apply: September 10, 2013**

Application shall be e-mailed to: [vti@vti.se](mailto:vti@vti.se)

Subject: Ph.d. Cooperative Vehicular ICT

Reference: 2013/0375-3.1

Company: Swedish National Road and Transport Research Institute (VTI), SE-581 95 Linköping

*Previous collaboration between the company and the university*

Both HH and VTI are active in the area of Cooperative Systems research with applications in cooperative vehicle and traffic systems for increased traffic safety and environment friendly transports. HH and VTI are partners in Vehicular ICT Arena (VIA) aiming at a more open and distributed innovation, modeling, development and test of software functions aimed for increased traffic safety and efficiency in future vehicles and transports.

*Description of the company and its aims for the project, including exploitation of the results*

VTI is an independent and internationally prominent research institute in the transport sector. The Institute is a government agency under the Swedish Government. VTI's principal task is to conduct research and development related to infrastructure, traffic and transport. The knowledge that the institute provides gives a basis for decisions for players in the transport sector and in many cases finds direct application in both national and international transport policies. VTI conducts commissioned research in an interdisciplinary organization that works with investigations, provides consultancy services, and performs different kinds of measurement and testing services. The institute has a great deal of technically advanced equipment and world-class driving simulators, a laboratory for road materials and a crash test laboratory. VTI's researchers participate continuously in international research projects, principally in Europe, and in international networks and alliances. VTI collaborates with universities and higher education institutions that conduct related research and education. VTI has about 200 employees and is located in Linköping (head office), Stockholm, Gothenburg and Borlänge. Results from this project are expected to be used as part of a technical platform for future studies on cooperative systems, concerning both energy efficient driving and safety of vehicles.

VTI aims to find better methods for test and development of software intense ICT functions enabling modern active and cooperative safety functions for automated and assisted vehicles. It is expected that the project will develop methods and integrate different tools to address the complex task at hand when developing interacting cooperative vehicle functions. VTI has a particular focus on human centred design and HMI issues for these functions.

## *Research questions, approach, and the company's role and function in the project*

VTI's overall objective is to conduct research that help Sweden reach its transport political goals. This project targets the use of cooperative functions in the transport systems. These type of systems are one of the large enablers to reach higher efficiency, less environmental impact as well as increased safety in the transport system. The systems are complex and require new methods both for development and for evaluation. The main research question is how to develop and evaluate cooperative systems in an efficient way.

Important research questions are:

1. How build software components and interfaces that fulfill the requirements on safety critical vehicular software that rely on cooperative behaviors among several vehicles.
2. How perform testing and get sufficient test coverage by simulation of cooperative driving situations (e.g., involving several vehicles or road side units).
3. How model, develop, test and evaluate new cooperative traffic safety functions in an organized and efficient fashion.

The solution space includes, among other things:

- Component oriented development frameworks for embedded systems such as Autosar.
- Development processes aiming at open collaborative innovation, development and test with possibility to learn and adapt to new requirements in a flexible way.
- Modeling, development and test using hardware in the loop (HIL) and software in the loop (SIL).
- Test methods using HIL driver simulators with both new software functions and human drivers in the loop.

VTI will take an active role in the project with industrial supervision/coaching. VTI will also provide equipment when needed. The student is expected to spend a considerable amount of time at VTI's office, and to conduct experiment in VTI's driving simulator together with other VTI researchers.

### **Your profile**

You shall have a degree as Master of Engineering ("civilingenjör" or equal) with an orientation relevant for the description above. We expect that you are used to do independent work and that you have a documented and good knowledge of English. The employment implies that you will be registered at the doctoral education at Halmstad University.

### **Time of employment**

The employment as doctoral student is expected to last for four years, full-time, but according to regulations the employment will be time limited one year at a time. After the first year, if the research and research studies are carried out according to plan, the employment will be prolonged for another year if all parts agree on that. The goal is that after four years' full-time work/studies the employee will graduate as a doctor.

### **Doctoral studies**

More information about the Embedded and Intelligent Systems Industrial Graduate School (EISIGS) at Halmstad University can be found on [www.hh.se/eisigs](http://www.hh.se/eisigs) On this page you can

also find links to the doctoral education in Information Technology. If you want to know more, in general, about being a doctoral student and how to apply, please, look at [www.hh.se/forskning/utbildningpaforskarniva](http://www.hh.se/forskning/utbildningpaforskarniva)

The employment and the registration are mutually dependent on each other and will therefore be coordinated.

**Contact person at VTI:**

Jonas Jansson

Tel: +46 13 20 40 37, +46 702 195 156,

E-mail: [jonas.jansson@vti.se](mailto:jonas.jansson@vti.se)

Research leader and contact person at Halmstad university:

Professor Tony Larsson

Tel: +46 35 167168, +46 70 54 30 296,

E-mail: [tony.larsson@hh.se](mailto:tony.larsson@hh.se)

Director of the Embedded and Intelligent Systems Industrial Graduate School (EISIGS) at Halmstad University:

Professor Magnus Jonsson

Tel: +46 35 167177,

E-mail: [magnus.jonsson@hh.se](mailto:magnus.jonsson@hh.se)