The Swedish National Road and Transport Research Institute (VTI) has an opening for one or two master thesis students at the Vehicle Technology and Simulation unit (FTS). The objective of the master thesis is to improve the brake pedal performance in a unique distributed co-simulation platform.

VTI and FTS
VTI is an independent and internationally prominent research institute in the transport sector. Its principal task is to conduct research and development relating to infrastructure, traffic and transport and its operations include all modes of transport. VTI has about 200 employees and is located in Linköping (head office), Gothenburg, Stockholm, Borlänge and Lund.

FTS conducts research in the area of driving simulation, vehicle dynamics, tire characteristics, driver assistance and active safety systems. FTS has several unique equipment including three driving simulators and a test rig to measure the tire-road friction.

Background
One proven way of testing and evaluating various systems is simulation. In a collaboration between VTI and Linköping University (LiU), a unique platform for distributed co-simulation has been developed. In this setup a driving simulator located at VTI is connected to a car on a chassis dynamometer at LiU. In this way, the driveline model in the simulator is replaced with the actual driveline of the test car; thus, the platform can be used as a tool to test and evaluate current and future powertrain concepts.

To connect the simulator and the chassis dynamometers a pedal robot is used. The pedal robot receives the driver brake/acceleration input in the simulator and applies it in the car in the chassis dynamometer lab. The platform evaluation showed that while vehicle acceleration and general driving feel was perceived as realistic by the test subjects, the brake performance need improvements.

Work outline
The objective of the thesis is to specify the required responsiveness and performance of the pedal robot in various driving tasks, and improve the control algorithm (and hardware if necessary) to achieve it. The following tasks are included:

- Quantify required pedal performance by analyzing conducted simulator studies and the longitudinal driving patterns.
- Specify requirements for actuators.
- Improve the current control algorithm of the pedal robot.
- Validate control strategies in the chassis dynamometer lab.

The thesis work is planned to start in January 2015. Note that this thesis work is performed in cooperation with the University and is only open to students from LiU.

Qualification
- Engineering background within the areas of control and signal processing, vehicle dynamics or a similar area
- Experience of programming and simulation in Matlab/Simulink and C++
- Ability to work independently and to take initiatives
- Enthusiasm for problem-solving
- Adequate driving experience
- Language proficiency: fluent English is a must and Swedish is meritorious

Application instruction
Deadline: Dec 31, 2014
Send your application with CV to: anders.andersson@vti.se

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