OpenModelica Applications at VTI

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vti
The Swedish National Road and Transport Research Institute

VTI is an independent and internationally prominent research institute commissioned by the Swedish Government. Our principal task is to conduct research and development related to infrastructure, traffic and transport systems.
We have approximately 240 employees and offices in Linköping, Gothenburg, Stockholm, and Lund
Traffic and road user (TRAF), one of VTI’s 3 research departments. Focus on traffic safety, the human in the transport system, vehicle and simulation technologies, and a sustainable transport system.
Driving Simulators
Driving Simulators

- Vehicle, train, bicycle and pedestrian applications
- Vehicle and train dynamics
- Active safety and automated driving
- Road and environment
- Rail and signals
- Human-machine interface and interaction
- Driving and driver performance
Train Simulator

- Train simulator, desktop set up
- Passenger train simulator
- Freight train simulator
Bicycle Simulator

- Research on the impact of infrastructure to comfort and safety
- Study of interaction between bicycles and other vehicles
Bicycle Simulator
Sim IV

Bicycle

Volvo XC60

Volvo FHM
Modelling of vehicle dynamics

• We have our own low and medium-fidelity models for average car and truck dynamics

• We measure and calibrate the models in our own facilities
Simulator – Simulation interface

- Simulation interface
- Simulation kernel
- I/O (graphics and sensors)
- Vehicle model
Standard interfaces!

- Matlab/SIMULINK
- Modelica
- C++ model

Functional Mock-up Interface

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What do we use OpenModelica for?

- Modeling of vehicle dynamics (fmi export)
- Executing of vehicle dynamics models (fmi/ssp)
- Continuous integration and testing
  - Vehicle dynamics model
And what is next?

- Modeling of vehicle dynamics (fmi export)
- Executing of vehicle dynamics models (fmi/ssp)
- Continuous integration and testing
  - Vehicle dynamics model
    - Motion cueing
- Development process for FMI
  - Traceability
- dcp
  - Distributed Co-Simulation Protocol