ADAS HIL System

The efficient and easy coupling of the professional and proven Vector hardware and software toolchain leads to an ideal combination for the test of ADAS/AD functions: Comprehensive options for closed-loop system tests can be used with consistent workflows from early development stages through to real hardware with the Vector VT System.

Applications
Testing of ADAS functions, e.g.:
- Environment perception
  Lane detection, traffic sign recognition, object detection, simultaneous localization and mapping (SLAM) etc.
- Comfort functions
  Adaptive cruise control (ACC), traffic jam assistant, parking pilot etc.
- Safety systems
  Pre-crash, front collision warning (FCW), automated emergency braking (AEB), lane keeping assistant, blind spot monitoring etc.
- Automated driving

Overview of Advantages
- Automated test driving of thousands of kilometers – in the HIL lab
- Off-the-shelf components working smoothly together
- Fast and easy configuration of the HIL system
- Modular and flexible test set-up
- Manual testing in the same way as a real driver in the vehicle
- Automated testing: comfortable configuration and full integration of test automation
- CANoe as central tool for all development and testing tasks
- Closed-loop simulations: interaction as with a real vehicle, including virtual driver, traffic etc.
- 3D visualization of the scene and technical values in 2d widgets
- Simulation and test of ECU diagnostics
- Detection and correction of error situations early in the development process
- User-friendly graphic and text-based evaluation of results
**CANoe Test Environment**
- One tool for all development and testing tasks
- Highly automated testing execution
- Comprehensive execution of real-time simulation models (MATLAB/Simulink or other sources)
- Easy integration of third party soft- and hardware
- Numerous tool coupling options for co-simulation
- Extensive possibilities for simulating and testing ECU diagnostics
- User-friendly graphic and text-based evaluation of results
- Direct integration of test units created with vTESTstudio
- Full requirement traceability form test case to test report
- Seamless transition between simulated and real system components
- Co-operation of simulated ECUs created with vVIRTUALtarget in one common simulation setup

**Modular Test Hardware VT System**
- Modular hardware interface for all ECU connections like analog or digital I/Os, bus network, power supply
- Fully integrated in CANoe: direct and simple control of I/O for test, simulation and analysis
- High reusability through modular system design
- All basic test components included (relays, decade resistor, …)
- Automotive test requirements concerning voltage, currents, latency, through-put are fulfilled
- Simplified wiring of even complex test stands
- Minimized setup and switching times
- Highly scalable test solution from compact off-the-shelf I/O box at developer’s desk to component HIL racks in the lab

**Closed-Loop Simulation with DYNA4**
**Vehicle under Test**
- Vehicle dynamics model: different levels of detail saves effort for use-cases where simpler models are sufficient
- Realistic impact of vehicle motion on sensor field of view
- Tests use actuation of pedals and steering or definition of driving tasks for the driver model

**Traffic**
- Road users including vehicles, bicycles, motorcycles, pedestrians, animals
- Exact test definition through deterministic tasks for road users
- Interfacing to traffic simulator SUMO for highly complex traffic scenarios

**Road**
- Support of ASAM Standard OpenDRIVE road description format without conversion
- Definition of road geometry including surroundings such as traffic signs, signals, road marks, etc.

**Environment and Visualization**
- Detailed Unity-based 3D animation
- Large object catalog with buildings, road users, vegetation etc.
- Adjustable lighting and weather conditions

**Sensors**
- Use-case dependent sensor model fidelity with object lists or physics-based sensors
- Physics-based sensor models for camera, radar, lidar, ultrasonic

More information: [www.vector.com/adas-hil](http://www.vector.com/adas-hil)