Solutions for ADAS
Get Your ADAS Projects on Track - Quickly and Reliably

What is ADAS?
ADAS or Advanced Driver Assistance Systems support the driver, increase safety and improve comfort and economy. These facts are important increments towards autonomous driving. The decisive success factor for supporting and relieving the driver is the complete perception of the environment with all relevant objects. This also includes the reliable estimation of the future development of a traffic situation. For this purpose, various sensors record the vehicle environment. The sensor data is then fused and analyzed in the ECUs.

Whether you develop, verify or test your ADAS applications in a real or virtual environment: Vector offers you comprehensive solutions in the form of software and hardware tools as well as embedded components.

Vector Solution Areas for ADAS
> Logging
> Data analysis and function validation
> Implementation of embedded ADAS functions
> Test and simulation

Overview of Advantages
> Consistent ADAS tool chain consisting of tools, software components, algorithm framework and hardware
> Fast development and debugging of multi-sensor applications
> Testing of applications in a MIL, SIL or HIL environment with the same test definitions throughout the entire process
> Logging of high-bandwidth multi-sensor data in the vehicle
> Efficient sensor and ECU connection for data acquisition
> Rapid prototyping of driving functions with real measured data
> Object overlay in video images and 3D scenes to support easy visual checking of sensor objects
> Accelerated development of sensor manufacturer-independent data fusion or as a redundancy path for own environment models
Logging
The method of operation of every ADAS function must be tested. To prevent test drives, ADAS data is logged in the vehicle and reused for different functions and evaluations later. Different sensor types from multiple vendors and terabytes of data is recorded synchronously and stored in the rough automotive environment.

- **VX1000** - Scalable ECU measurement hardware for ADAS sensors and ECUs internals. The VX1000 base modules transmit debug or raw data to the logger (e.g. CANape log) in the form of Ethernet or XCP-on-Ethernet.
- **CANape log** - Stand-alone logger for all ADAS and vehicle data. It combines the possibilities of CANape with the strength of an automotive-grade computer.
- **CANape & CANape Option Driver Assistance** - Measurement and visualization of ADAS data. With CANape various sensor data is recorded synchronously. The CANape Option Driver Assistance visualizes the data to verify correct positioning and functions of your sensors.

Data Analysis and Function Validation
Effective data analysis plays an important role in understanding your system’s true performance from the vast amounts of driving data. Relevant data for validation is identified and measurements are annotated with metadata and labels for easy resimulation. Data protection laws must be considered and the data itself must be stored, transmitted and evaluated.

- **vSignalyzer & CANape** - Both are available with the option Driver Assistance to visualize and analyze measurement files. The sensor data is superimposed on the video window to verify them or add further metadata.
- **vMDM** - Powerful database solution as a cloud application for storing and managing measurement files. Metadata can be added automatically in the cloud. Evaluations by vSignalyzer or CANape allow you to analyze your data directly in the cloud.
- **MDFlib** - Easy-to-use function library for validating, sorting, reading and writing MDF files in your own software environment and for post processing of ADAS data in MDF format.

Implementation of Embedded ADAS Functions
The software standard AUTOSAR Adaptive plays an important role for ADAS functions. Applying this standard, you are able to keep on track with high-performance ECUs and the dynamic handling of executed software. Multiple input sources (radar, camera, lidar) must be processed in an object fusion to provide an uniform object list of the vehicle environment for path planning and decision algorithms. And the testing has to take place before you receive the final hardware.

- **Adaptive MICROsAR** - Vector solution for vehicles based in the AUTOSAR Adaptive Platform. It includes the AUTOSAR Runtime for Adaptive Applications (ARA) and comprises an efficient development environment integrated in Eclipse. There are specific ADAS functions and properties available in the MICROsAR stack.
- **BASELABS Create Embedded** - Data fusion in prototype and series ECUs. It contains fusion algorithms that combine object data from radar, camera and lidar sensors and provides a uniform object list of the vehicle environment.
- **DYNA4** - Function development with virtual test driving in closed-loop system tests. Test your system in relevant scenarios on a single desktop computer, in a continuous integration pipeline or on a HIL system as soon as ECUs are available in hardware.
- **vVIRTUALtarget** - Virtual development and testing of AUTOSAR ECUs.

Test and Simulation
Simulation-based testing has become an integral part of the development of ADAS/AD functions. The sheer number of necessary test runs can’t be handled with real test drives alone. Simulations ensure exact reproducibility, high potential for automation and safety even in critical driving maneuvers.

- **CANoe** - The ADAS Feature Set as part of the CANoe base product enables the handling of ADAS objects like surrounding vehicles. Algorithms can be stimulated and tested with simple and complex scenarios or ECUs can be stimulated via network communication. CANoe remains to be the versatile tool for developing, testing and analyzing entire ECU networks as well as individual ECUs.
- **DYNA4** - Virtual test drives with its models for cars, trucks, environment sensors, road infrastructure and traffic. Seamless exchange of signals and objects between CANoe and DYNA4 allows to move easily from stimulation to closed-loop simulation.
- **vTESTstudio** - Comfortable design of automated test sequences for embedded systems with many approaches: language-based programming, tabular and graphical test notations as well as different test design methods.
- **VT System** - Ideal combination of the Vector software and hardware toolchain for HIL testing of ADAS/AD functions. The fast and easy configuration as well as the modular and flexible test set-up are tailored to test common applications.

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