Acquiring and recording data is one of the main tasks in road testing or development. If different sources are recorded with individual tools, the result is a hodgepodge of different data loggers in the vehicle. CANape log is the solution for ADAS logging tasks in the vehicle. All requirements can now be implemented using just one data logger.

The development of complex systems, such as driver assistance systems, is a major challenge for all involved. Many different ADAS sensors and control units come together in the vehicle. For the analysis system behavior and for re-simulation, as well as for many other reasons, it is important to record data in the vehicle. Suppliers are completely free to choose their tool chains. But when the products of several suppliers now come together in a vehicle, it is no longer a question of the individual but the overall solution: a tool chain that records and stores all data sources synchronously in time. What do the challenges and their solutions look like in detail?

Status Quo in the Vehicle
Acquiring and recording data is a major task in road testing or development. If the different sources are collected with individual tools, the result is an accumulation of different data loggers in the vehicle. Such a solution has a number of challenges:

- The common starting, stopping and triggering of several data loggers and the temporal synchronicity of the measurement data.
- The increased space requirements and Power supply of many data loggers.
- The drivers need knowledge of all systems, for example, to reading out the measurement data from the different data loggers.

Requirements for Data Loggers
ADAS applications mainly involve data from radar, video and LiDAR sensors. Depending on the manufacturer and sensor type, these deliver their data via classic bus, Ethernet and video interfaces. Ground truth data such as positions from RTK (Real Time Kinematic) systems or videos from context cameras are needed for a better assessment of the vehicle situation. In addition to XCP, other protocols such as SOME/IP and DoIP are used to record ECU data. To be prepared for future situations, solutions with open in-
Interfaces are required. Currently, a few hundred megabytes of data are generated per second per vehicle. Future sensors, however, will deliver much larger amounts of data. Here, only a well-scalable solution will help to protect the investment in measurement technology. Very different types of data are also recorded. Data loggers with removable storage units, with sizes of several 10 terabytes, have the advantage of fast installation and removal times. This significantly minimizes vehicle downtime for data transfer compared to transfer via WiFi/Ethernet. How can the problems with multiple data loggers in the vehicle be overcome? The answer is simple: Implement all requirements via just one logger. Vector has developed the “Smart Logger” family precisely for this purpose. Two software solutions are available on three industrial computer platforms.

Record Everything

CANape log can be used to acquire all bus, sensor and ECU data (Figure 1). The network interfaces from Vector enable access to CAN / CAN FD, Automotive Ethernet and FlexRay. The acquisition of all raw and debug data from sensors and, of course, all ECU-internal values is done with the Vector VX1000 product family. CANape log is scalable in many ways. If there is a need for more memory or ports, the existing setup can be expanded to include additional industrial computers in the vehicle. Data is recorded using the ASAM standard MDF. In addition to signals and bus messages, videos, raw sensor data, description files and other meta data can also be integrated. An MDF file thus contains everything necessary for analysis or re-simulation. If the written storage medium is full, it can be replaced with an empty one in just a few steps (Fig. 2). The vehicle is quickly back on the road, while the data from the storage medium is transferred to the network by means of a copy station.

Process Reliability and Adaptability

After CANape log has been installed in the vehicle and all components have been wired, the connection to CANape is made via Ethernet. While the application engineer is working in CANape, all data converge in CANape log. After successful setup, CANape is disconnected from CANape log, and the logger continues to work autonomously with the configuration. There is no room for transmission errors between the tool and the logger. While driving, the driver uses an application on his smartphone or tablet to see all the necessary information or to trigger actions such as starting and stopping. If changes to the configuration are necessary, CANape is reconnected to CANape log at any time. If parameters in the ECU or the measurement configuration need to be adjusted, no changes to the wiring in the vehicle are required. Efficient and process-safe work is thus guaranteed.

Figure 1: The solution for ADAS logging tasks in the vehicle: a data logger instead of many devices.

Figure 2: Easy replacement of the storage cartridge on the Vector VP7400

Translation of a German publication in Hanser automotive, issue 2/2021

Image rights: Vector Informatik GmbH

Dipl.-Ing. Andreas Patzer

studied electrical engineering at the Technical University of Karlsruhe. His main focus was on measurement and control technology as well as information and automation technology. In 2003, he moved to Vector Informatik GmbH in Stuttgart, where he is responsible for “Customer Relations and Services” as a team leader in the Measurement & Calibration product line.

Translation of a German publication in Hanser automotive, issue 2/2021

Image rights: Vector Informatik GmbH