Logical testing

An all-in-one modular and customizable datalogger adapts to testing needs

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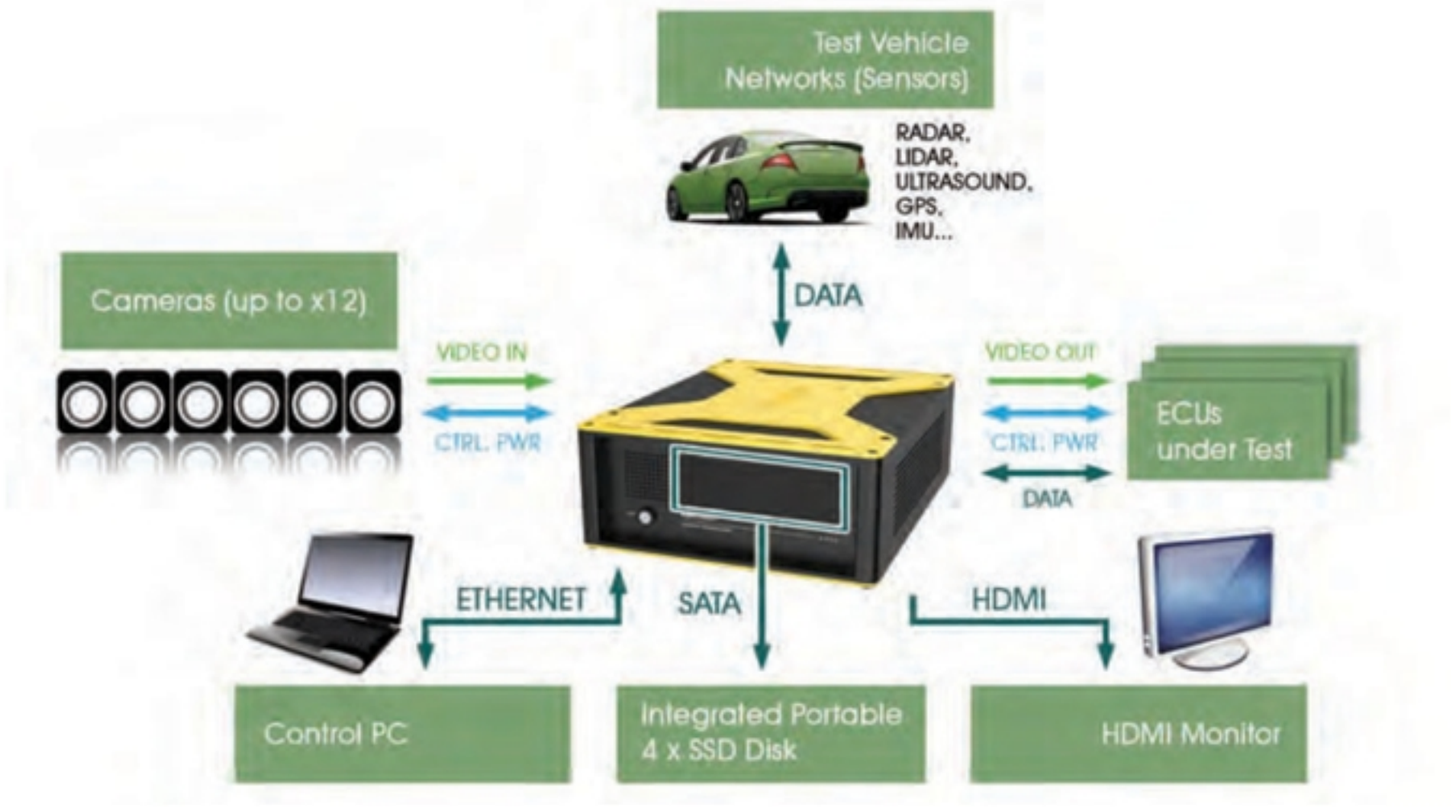
Development and validation of autonomous vehicles and ADAS are extremely demanding processes that include real-life road testing and exhaustive laboratory conducted simulations. While real-world road testing is the ultimate step before releasing an automotive product, many companies tend to replace it as much as possible with realistic software- and hardware-in-the-loop (HIL) simulations, which are less costly, offer greater controllability, and generally improve the test quality and validation coverage.

For a typical AV to see and understand its surroundings, it combines high-bandwidth sensors such as radar, lidar and video cameras with the low-bandwidth sensors and actuators interfaced through legacy automotive networks. The heterogeneous sensors generate a large amount of data, depend on various real-world parameters and become interconnected in complex patterns that cannot be artificially generated for fully realistic simulations.

Simulations based on this artificially generated sensory data are usable, but are not the ultimate test and validation solution. An example of this can be illustrated by the forward-looking camera. While the camera may recognize objects with an extremely high accuracy in HIL simulations with artificially generated and display projected road scenarios, it will present unexpected deficiencies when applied in road tests with real traffic situations and weather conditions such as rain, direct sunlight or fog. This simple example demonstrates the importance of high-quality data collected by datalogging from real test car installations and for use in simulation and testing rigs. The rise of sensor resolutions and high-speed communications cause reliable multichannel sensory data capturing to be very challenging. It requires test equipment that inserts between the vehicle's sensors and the ECUs to non-invasively record the data, with a very low latency and transparent to other electronic systems in the test car. All data must preserve synchronicity and be accurately time stamped, which is essential for the further use of the recorded data. Ideally the logger should be able to play back the logged data to fully exchange the physical car's sensors in HIL simulations.



Xylon's logiRECORDER automotive video datalogger supports logging and playback of up to 12 video cameras using an arbitrary video interface. In addition to the video channels, it logs more than 20 low-speed networks, including CAN, LIN, GPS and FlexRay, in synchronicity using a central hardware generated timestamp. It also supports fast Ethernet and BroadR-Reach logging, smart Ethernet logging with local processing of proprietary smart camera data, and has two 10GbE channels for use in HIL simulations. Radar and lidar data can be logged through Ethernet or multichannel LVDS-based interfaces.

The logiRECORDER stores the log files on exchangeable solid-state drives and uses formats, such as MDF4, ROS, PCAP or ASC, to enable easy use and interfacing with third-party software tools and HIL systems. Its smart control dashboard application provides full system hardware controls, video previews, remote test controls through 4G mobile networks, smart recognition and triggering on specified events, data marking and other mechanisms for data preprocessing during the test drive or off-line data analysis.

The logiRECORDER is modular and flexible to adapt to different development and test/validation programs and enables various configurations to meet the majority of today's testing needs. ‹