

Press Release

Modern Measurement and Testing Technology is Revolutionizing Our Mobility

Technical Article on Measurement and Testing Technology in the Context of ADAS & Autonomous Driving | dataTec at the International Suppliers Fair (IZB) for the First Time from October 22 to 24

Reutlingen, September 26, 2024 – The vision of cars navigating through cities and highways fully autonomously remains a future concept for now. However, research and development on this front are being pursued intensively worldwide. Today, driver assistance systems are increasingly taking over many driving tasks. For them to function reliably and safely, and for autonomous driving to become a standard practice, modern measurement and testing technology is crucial.

The potential of self-driving cars is immense. They could enhance traffic safety, improve traffic flow, ensure more relaxed journeys, reduce CO2 emissions, and revolutionize the entire transportation system. However, this paradigm shift in mobility can only succeed if all electronic components and vehicle functions are flawlessly coordinated and work together seamlessly. For the management of increasingly complex electronic systems and to meet industry standards in the field of e-mobility, innovative testing solutions are essential to ensure that vehicles meet the high safety and efficiency requirements.

Autonomous Driving

Modern driver assistance systems like Advanced Driver Assistance Systems (ADAS) already play a significant role in vehicle safety and comfort. Even minor errors can lead to incorrect assessments of a situation, potentially resulting in serious consequences. The complexity of the technologies used necessitates precise automotive testing. Automated and autonomous driving imposes even greater demands on measurement and testing technology. The development of these vehicles requires a multifaceted approach that involves various process steps.

Simulation is the foundation for testing autonomous vehicles. It creates virtual environments where algorithms, sensors, and control systems can be tested and validated. Once the first prototypes of an autonomous vehicle are built, design concepts, functionality, and safety must be evaluated. During dynamic driving tests, the prototype's behavior under various driving

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conditions is examined. Sensors and data recording systems are employed to measure parameters such as speed, acceleration, and forces. In this phase, the electronics are also extensively tested since all components must function perfectly and meet required standards. The critical tests for autonomous vehicles take place under real driving conditions. Using data acquisition systems, sensors, and telemetry solutions, data from test vehicles is captured and analyzed in real-time. These data are invaluable for identifying potential problems, optimizing algorithms, and improving overall system performance. Precise measurements are also crucial for safety, including the thorough characterization and validation of radar, lidar, and other vehicle electronics. All systems must operate safely and effectively under varying conditions.

The Connected Car

Autonomous vehicles must communicate with one another to ensure smooth traffic flow. For these connected cars, it is essential that radio standards and GNSS systems function properly and deliver full performance. Test applications include testing C-V2X components and C-V2X radio simulation. Compliance tests according to global standards and extreme scenario testing guarantee reliability. Vehicle access control is also strictly monitored. To detect errors in communication networks, control units (ECU) are tested, and bus systems are triggered and decoded. Compliance testing, EMI troubleshooting, and checks for signal quality and power integrity are crucial. Additionally, communication between the communication bus and battery management is tested, and power disruptions and voltage drops are simulated.

Electromagnetic Compatibility (EMC)

Modern vehicle functions rely on a multitude of radio and radar technologies. An essential aspect, therefore, is the robustness of electronic components against emissions and external electromagnetic sources. EMC compliance testing according to all major standards such as CISPR, IEC, ISO, or MIL ensures that the vehicle is immune to emissions. This includes EMI analyses, EMI precompliance testing, and coexistence performance tests of radio systems.

Battery Management

The battery management system (BMS) aims to ensure maximum performance, range, and safety. The development and testing of a BMS involve emulating individual battery cells and real-time monitoring of parameters such as voltage, current, and charge state. Power consumption of electronic components is monitored, inverter efficiency is qualified, and standby currents or power surges during startup are characterized.

Infotainment

Modern measurement and testing technology also ensures high-quality infotainment. Mobile internet, multimedia, antennas, and navigation devices – all systems must work flawlessly. Power consumption of applications and components is also monitored, and batteries undergo

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runtime tests. Testing also includes simulations of interference signals and scenarios for broadcasting and mobile standards, as well as compliance testing for WiFi or Bluetooth transceivers and the generation and simulation of GNSS signals.

Conclusion: State-of-the-art measurement and testing technology is already a crucial requirement to ensure that driver assistance systems operate reliably, and that cars are produced and operated efficiently and safely. For autonomous driving, measurement and testing applications will continue to gain importance and make a decisive contribution to advancing the technology.

For more information on measurement and testing systems for automotive applications, visit: <https://www.datatec.eu/de/en/automotive>.

This year, dataTec is participating as an exhibitor for the first time at the International Suppliers Fair (IZB) in Wolfsburg. From October 22 to 24, dataTec engineers and technicians will be available in Hall 3, Booth 3319, to answer questions about measurement and testing technology.

About dataTec

dataTec AG is the leading specialised distributor for test and measurement technology in Europe. Since 2018, dataTec has been pursuing the European expansion of its sales activities and is currently active in Spain, Switzerland and Austria as well as in Sweden, Estonia and Finland. The broad product portfolio with more than 50 manufacturers includes power supply units, oscilloscopes, modular measurement technology, test systems, test equipment and thermal imaging cameras. With over 150 employees, the Swabian family-owned company advises customers from a wide range of industries and sectors – from industrial companies to public authorities and educational institutions – from its headquarters in Reutlingen.

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