DELL Technologies

Solution Brief

Mobile Data Handling for Development of Automated and Autonomous Driving

Field Operational Tests: Data Storage and Data Transfer

Automotive manufacturers worldwide are gearing up for future mobility. In order to bring advanced concepts such as Connected Car, V2X or Autonomous Driving safely onto the road, it is first necessary to record, store and analyze enormous amounts of environmental and traffic data, which will later form the basis of advanced driving functions in the form of algorithms and artificial intelligence (AI). But the ever-increasing volumes of data recorded from radar and lidar sensors, high-resolution cameras and automotive Ethernet buses in vehicle networks can only be managed by fast, uncomplicated storage, readout and transfer process. Furthermore, today´s constant cost pressure demands the efficient utilization of test vehicle fleets, if possible 24/7.

The German automotive measurement specialist ViGEM was one of the first suppliers to recognize these special needs for the automobile industry more than 10 years ago. Ever since, ViGEM has developed several successful generations of high-performance data loggers, robust removable data storages and fast copy stations for automotive applications. All ViGEM solutions are based on flexible user-friendly mobile data handling concept reducing the downtimes of test vehicles to a minimum compared to other data transfer methods.

Once the data arrives in the ViGEM copy station, it can be easily transferred to a server. Dell Technologies provides the complete physical infrastructure for further analysis of the recorded data for the automotive industry. In this way, Dell Technologies seamlessly continues the working process by providing the secure storage, management and computing of the recorded data.

Mobile Storage of Terabytes and Data Encryption

The robust removable data storage modules CCA S10xxT-x were specially designed for the CCA 9010 data logger. They can continuously record sensor raw data for approximately eight hours with data rates of up to 25 Gbit/s. The SSDs installed in the high-end CCA 9010 solution provide a storage capacity of up to 64 TB. Thus, they are currently among the most powerful mobile storage media devices on the market. Their shock- and vibration-tested metal housings can withstand even the highest mechanical stresses and allow operating temperatures from -20° to +65° Celsius. All storage variants from16 - 64 TB are characterized by reliably high write speeds (up to 32 Gbit/s) and read speeds (up to 48 Gbit/s).

ViGEM Benefits

- Comfortable mobile data handling for efficient validation of ADAS and autonomous driving: Logging, storage, transfer of huge amounts of data
- Data rates up to 25 Gbit/s per logger. Synchronization of multiple loggers possible.
- High-performance, reliable recording of raw data up to 64 TB per removable data storage
- Robust removable data storage modules
- Standard and extended temperature ranges
- Data encryption according to OPAL 2.0 standard
- Fast, secure data transfer up to 50 Gbit/s
- All CCA 9010 products CE compliant
- ViGEM is certified according to ISO 9001 and ISO 14001 standard

When the removable data storage is full or at the end of a test drive, the robust storage module can be quickly exchanged and shipped directly to the ingest station of the data center.

Due to its product design geared towards long-term durability, the removable data storage can be reused continuously.

Dell Technologies Benefits

- Automotive thought leader providing Automotive-specific products and solutions including the Dell Autonomous Drive Ecosystem
- Proven ADAS storage solutions with approximately 70% of leading Tier-1 ADAS suppliers using PowerScale Storage today
- High performance CPU and GPU-compute solutions for AI/ML/DL
- World-wide support and services tailored to meet needs ranging from start-ups to global enterprises

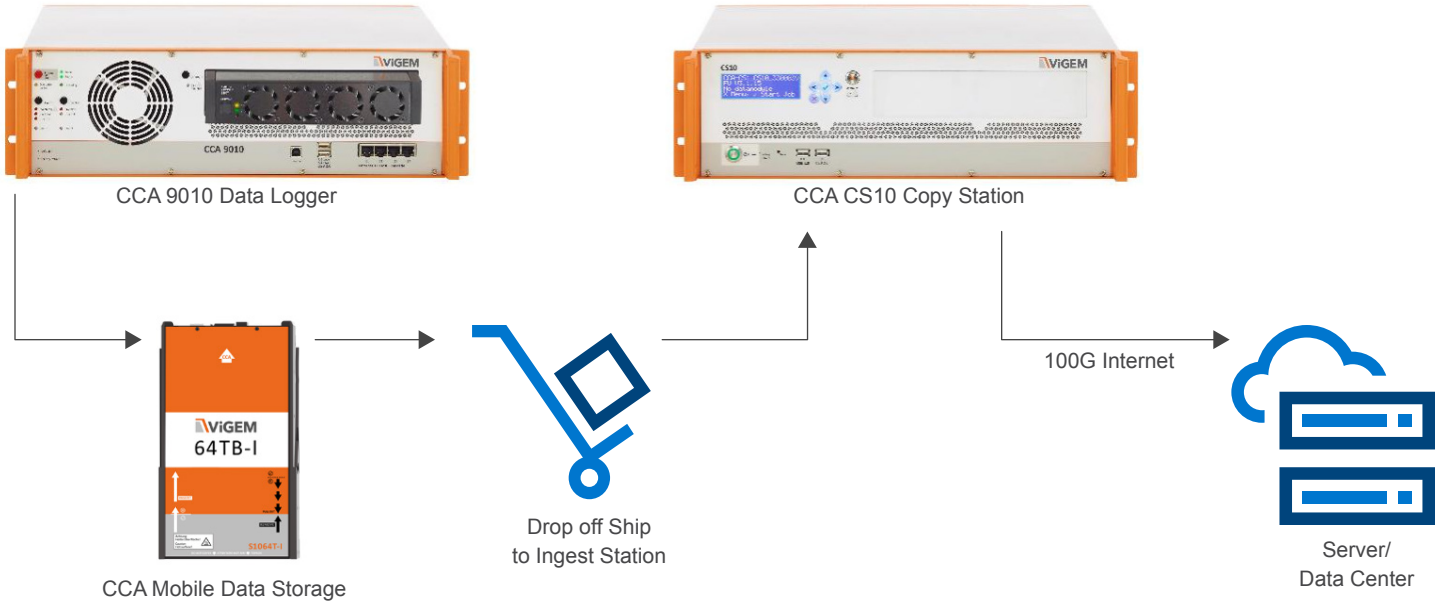

Fig. 1: Schematic of CCA system use in mobile data handling

Secure Data Encryption and Fast Data Transfer

Highest data security is guaranteed by data encryption according to OPAL 2.0 standard on all devices of the CCA 9010 solution: From the data logger to the removable data storage and the copy station. The ViGEM copy station reads the encrypted data from the removable data storage and transfers it via 100G Ethernet with a transfer rate of up to 50 Gbit/s to Dell data centers for further processing. Neither drivers, nor software, nor a PC connection are required. The efficient interaction of high-performance data loggers, robust storage media and fast copy stations, ensure maximum data reliability and security in the mobile data handling process. Without losing valuable test-drive time during data transfer, test fleets can thus be utilized almost 24/7, which holds significant potential for cost savings.

Fig. 2: Data storage variants with different capacity and temperature range

Fully Supported Data Logging

Due to the excellent ease of use, the operation of the mobile data loggers and copy stations in test vehicles or test environments can be done by the customers themselves. In case of questions, the technical support from ViGEM provides various ways to get in touch with. They range from remote services, a ticket system and personal calls. Comprehensive customized information, e.g., operating instructions, specifications and tutorial videos are available 24/7 for download.

During test drives, a comfortable user interface allows intuitive interaction with the ViGEM devices in the vehicle. The web-interface shows the amount of recorded data, allows dynamic setting of triggers and provides valuable meta data information as well as data output for smart visualization on your tablet or PC.

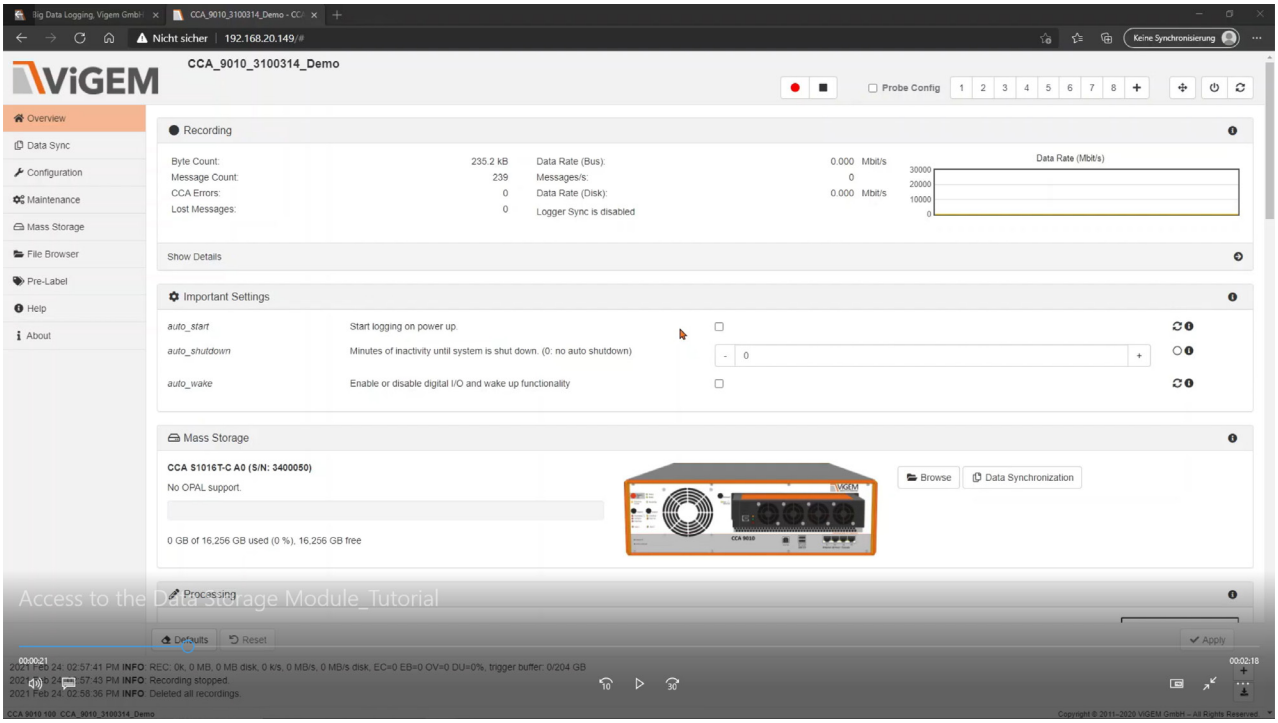

Fig. 3: Web browser based CCA configuration GUI

About Dell Technologies

Dell Technologies helps automotive companies pursue new data-driven business opportunities in the software-defined era with future-proof infrastructure built on massively scalable, high performance storage systems, intelligent servers, access to your choice of public cloud services, a streaming data platform, and a well-vetted ecosystem of software partners. We can support both traditional workflows and data-intensive, emerging AI workflows. Dell Technologies solutions offer simplified data management and predictable performance all at the massive scale required for ADAS and AD development and testing. Learn more about Dell Technologies storage solutions for Automotive Applications

About ViGEM

ViGEM GmbH is one of the leading measurement technology specialists for mobile Big Data logging solutions. The integrated hardware and software products are used in the qualification and efficient validation of automated driver assistance systems (ADAS) as well as autonomous driving. We support our customers in the development of their innovative products, e.g., in the production of individual prototypes, in the validation phase and in product adaptations. For this purpose, we develop integrated project-specific solutions. These consist of a combination of high-performance data loggers, robust removable data storage devices and high-performance copy stations. For more than 10 years, we have been setting new standards in mobile measurement and diagnostic electronics. EVERY BIT COUNTS. Learn more about ViGEM GmbH.

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