



advanced driver assistance systems solving the challenges

simplify the integration of in-vehicle high-performance computing and AI capabilities for the development of fully autonomous vehicles

setting the scene

Advanced driver-assistance system (ADAS) development is facing unprecedented challenges and is drawing larger investments than initially expected.

It is now widely accepted that the path to self-driving vehicles will be evolutionary rather than disruptive, and it relies on the capability to **continuously improve deep learning algorithms on real-time sensor data and capture extreme real-life cases.**

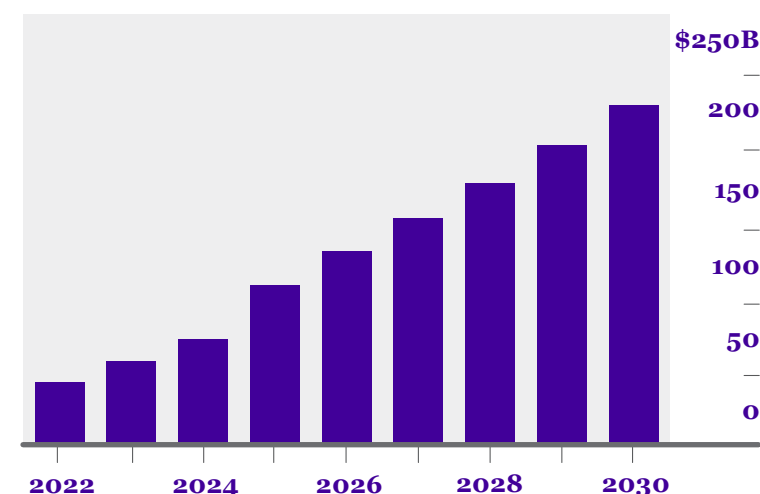
OEMs and solution providers need to overcome **significant mechanical and software engineering challenges:** equipping test vehicles requires **sophisticated, ruggedized hardware with extreme computational and data logging performance**, coupled with a growing number of cameras and sensors and edge AI software for training and inference.

To tackle this complexity, Eurotech has been selected by top automotive players as a **technology partner throughout their complete ADAS development cycle.**

Our complete portfolio of **scalable, reliable, compact High Performance Computers (HPCs)** is designed to accommodate the **most demanding requirements** and **reduce development time.**

This whitepaper guides you through the development challenges that we have overcome to achieve maximum computational density, highest logging speed and automotive-grade ruggedization.

ADAS market will reach \$220 billion in 2030



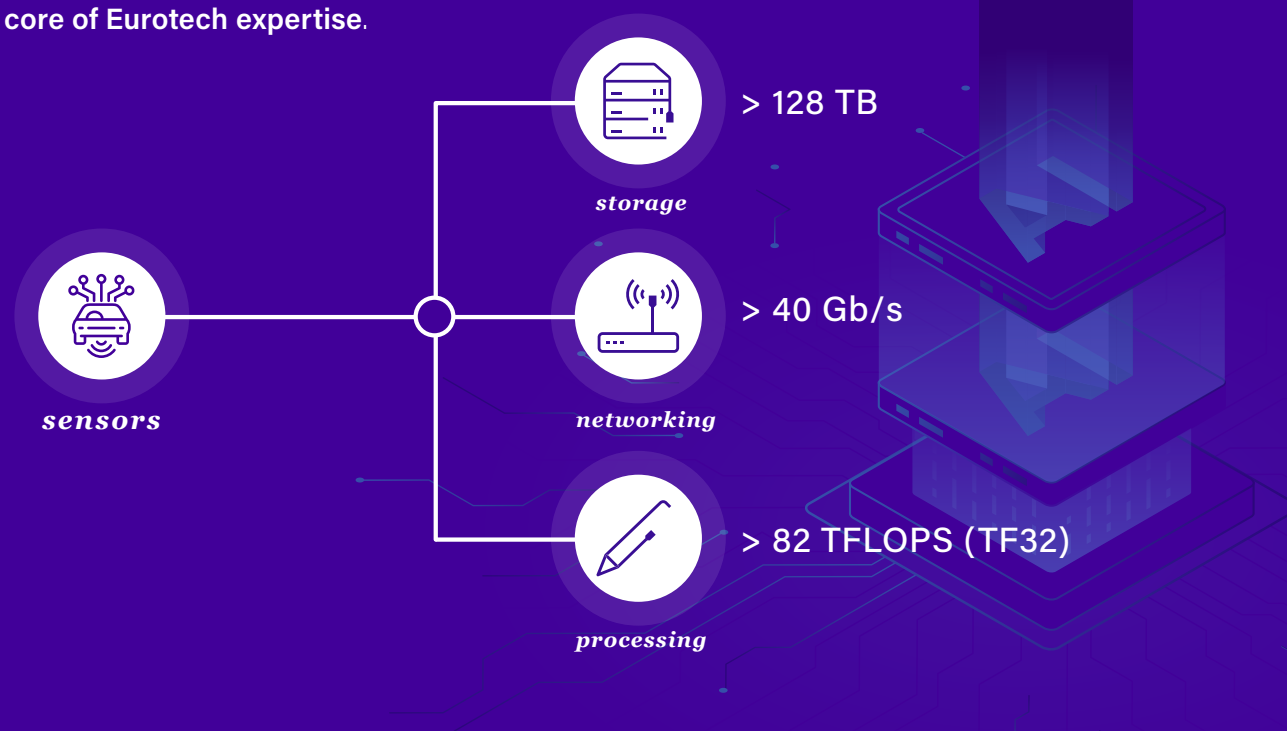
Source: BloombergNEF

AI means high-performance data acquisition, processing, and storage

Autonomous driving is classified according to the amount of human driver intervention and ranges from Level 0 (no automation) to Level 5 (full automation).

Enabling Level 5 autonomy requires collecting, storing, and processing data at an unprecedented level. The total bandwidth used by ADAS sensors (cameras, LIDARs, radars, ultrasonic, motion) can reach 40Gbit/s. In less than 8 hours, when stored in raw format, this data would require over 127TB storage. When processed in real time, it would require a GPU with at least 80 TFLOPS (TF32), such as NVIDIA A30 or superior, for inference or reinforcement training.

Meeting these demanding requirements in HPCs, whilst fitting them into a **reduced space like the trunk of a vehicle, cooling them to reach top performance, and ruggedizing them to survive automotive use is at the core of Eurotech expertise.**



#ruggedness

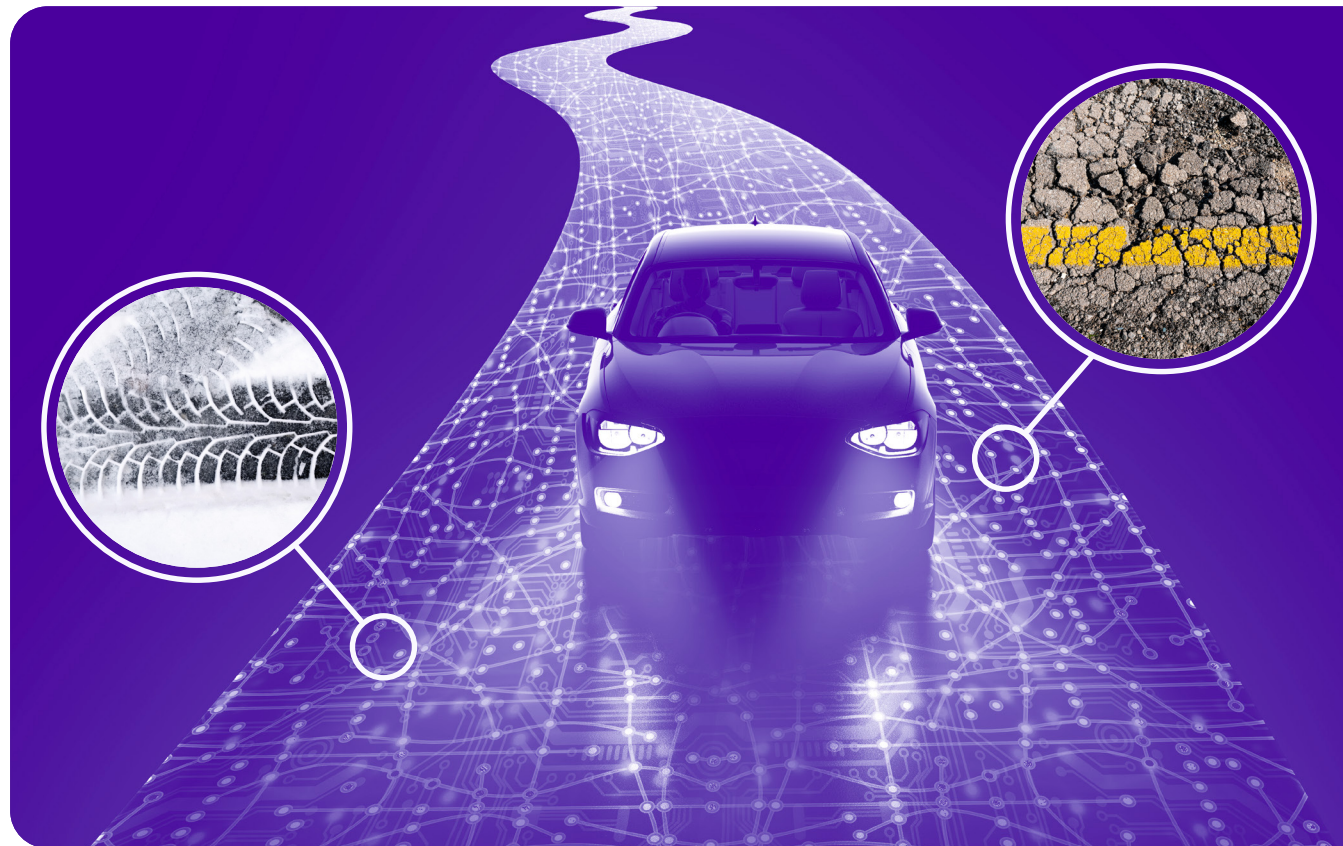


High performance computers are traditionally designed for controlled and benign conditions. When they operate in harsh environments, with dust, shocks, and vibrations, ruggedization is required. **Not all ruggedizations are made equal, though.**

Fans and vents are potential failure points and may become ineffective when sufficient air circulation and exchange cannot be guaranteed (as in a vehicle trunk). Shock absorbers require tuning to specific frequency ranges and tend to be bulky.

At Eurotech, we have **multi-decade expertise** in **innovative ruggedized designs**, making our HPCs fit to function in automotive environments.

Our data loggers and AI servers come with E-Mark, ECE ONU R10, ISO 16750, and IEC 60068-2-6 / 60068-2-27 certifications, giving you peace of mind when heading out for test drives.



#liquid cooling



Processing large amounts of data in a vehicle requires packing as much computational power as possible in a small recess, often without sufficient air circulation.

For the most demanding use cases, **Eurotech has pioneered unique liquid cooling solutions** able to guarantee the **highest computational density at zero noise**.

Liquid cooling not only minimizes the HPC dimensions but also improves reliability, by removing the need for fans and air vents.

Eurotech high-end data loggers and AI servers come with liquid cooling or air / liquid hybrid cooling, giving you the opportunity of maximizing computational power in a vehicle trunk.



#data bandwidth

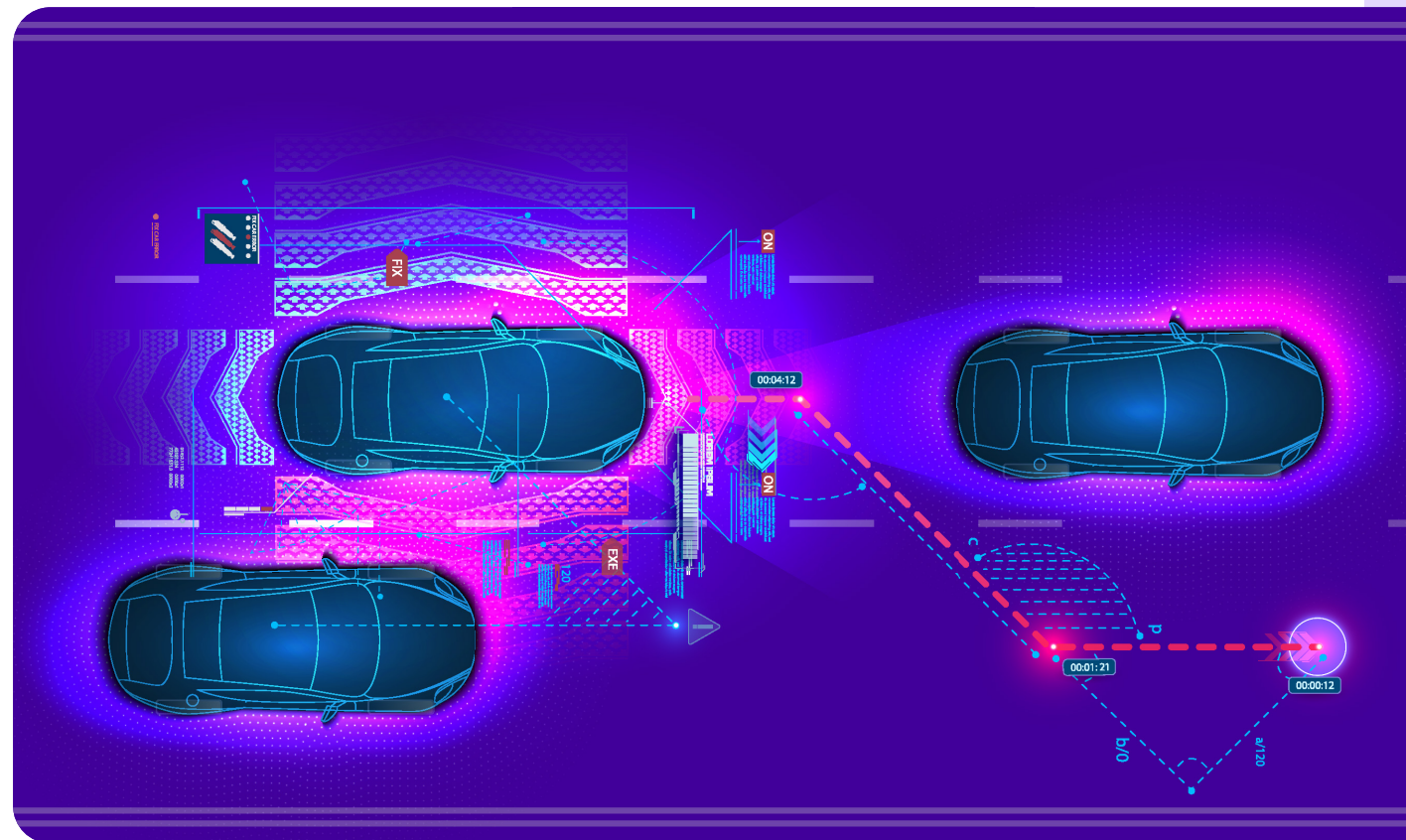


An increasing mix of cameras, LIDARs, radars, and motion sensors are used to test and implement complex driver assistance capabilities.

This data is often stored at full resolution to perform in-vehicle, real-time operations (AI inference or reinforcement training) or offline AI training or simulations in large lab workstations. In-vehicle data loggers need to meet a number of requirements.

- **high speed** to keep up with sensor feeds
- **large capacity** to log full-day test drives
- **robust carriers** for fast and flexible data exchange

Eurotech data loggers mount latest generation U.2 drives in RAID configuration to achieve the highest sustained writing speed in the market, in rugged, swappable carriers.



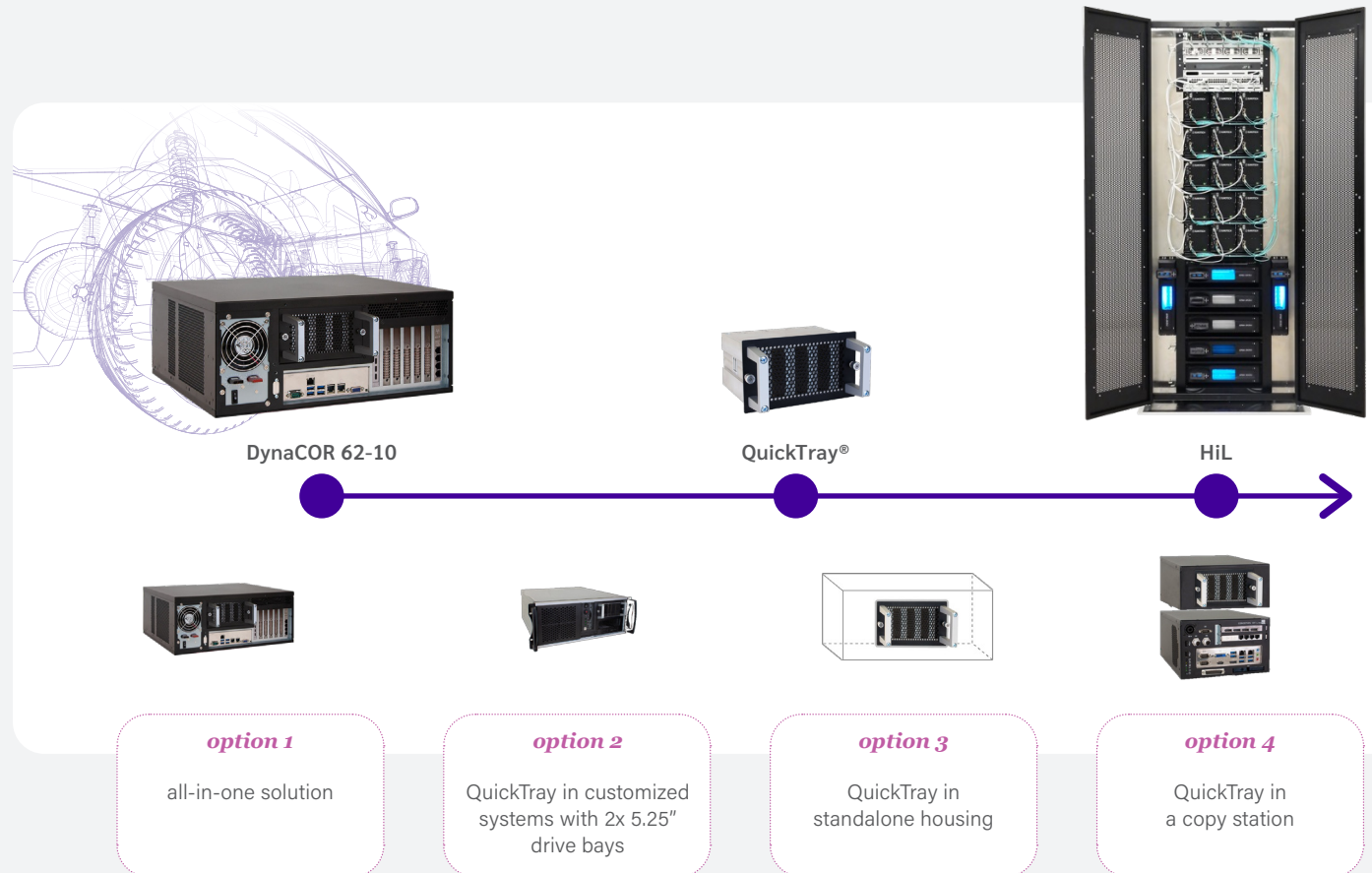
case study #1 high performance data logger

In this application example, the goal is to collect large amount of sensor data during a test drive of four hours. The dataset is then transferred to the customer's data center for AI training and validation.

Logging speed, storage capacity, and ease of data transfer to lab servers are key requirements.

In this case, **DynaCOR 62-10**, with its datalogging speed reaching **224 Gb/s**, can be used in combination with removable **QuickTray®** storage units for a total capacity of up to **384TB**.

QuickTray units can also be used in customized systems with 2x 5.25" drive bays, in standalone housings, or copy stations.



high performance data logger

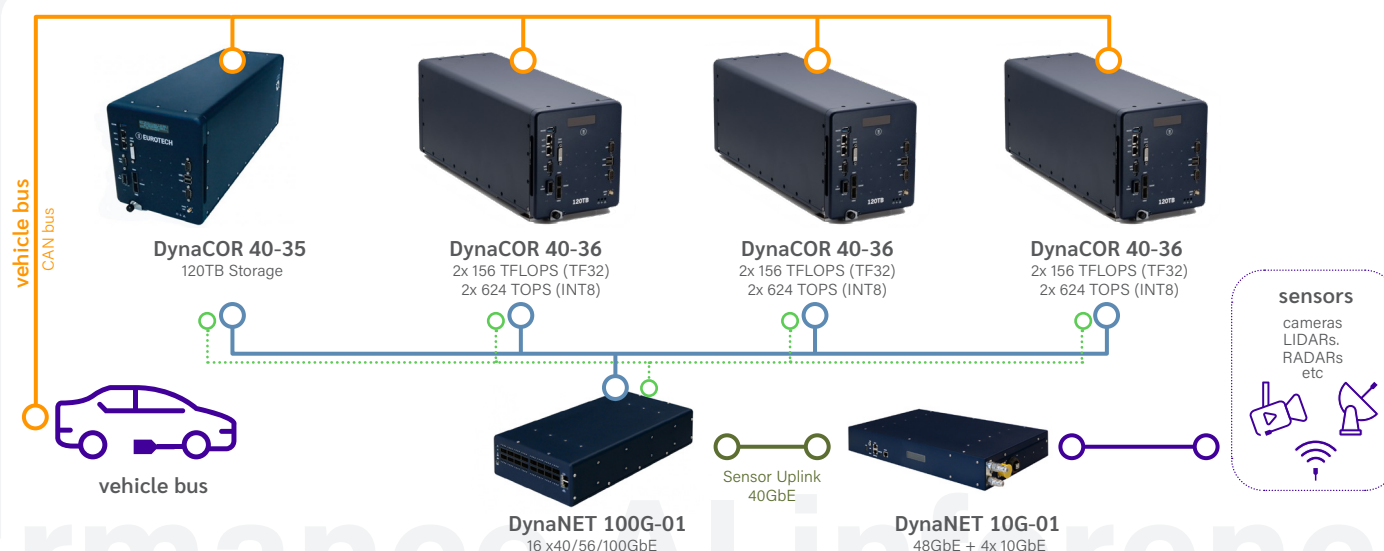
case study #2 high performance AI inference

In this application example, test drives are used to perform real-time AI inference and log data. All the equipment needs to fit into the car trunk with no space for bulky shock absorbers. **Logging speed, AI processing performance, efficient cooling, and ruggedization are key requirements.**

The **DynaGATE 40-36** is an automotive-certified rugged AI HPEC (High Performance Edge Computer). It can be configured with up to **4x NVIDIA A30 GPUs** and features **2x 100GbE** interfaces while providing a direct storage capacity of up to **4x U.2 NVMe**s.

In a real case arrangement, 3x **DynaGATE 40-36** have been combined with a **DynaGATE 40-35** acting as a storage server, **DynaNET 100G-01** and **DynaNET 10G-01** switches for Layer 3 networking to achieve minimum latency, real-time load distribution, and data processing.

Liquid cooling and top-of-the-line ruggedization allow an efficient use of limited space and power. By fully populating the 16-port switch, this virtually achieves **up to 1,920TB of NVMe storage capacity**, or **up to 4,992 TFLOPS (GPU, TF32) / 21,120 TOPS (GPU, INT8)** computational performance.



always at the *top performance*

For the past three decades, Eurotech has grown its offering of HPC (High Performance Computers) and HPEC (High Performance Edge Computers) solutions. Over time, the Eurotech brand has become synonymous with cutting edge technology and reliability.



DynaCOR 40-36

Liquid cooled, automotive qualified HPEC for top AI performance in a small form factor.



DynaCOR 40-35

Liquid cooled, automotive qualified edge server for heavy duty high data rate data logging.



DynaCOR 62-10

Hybrid cooled, edge AI server removable data storage. Highly configurable as an AI HPEC or data logger.



DynaCOR 44-11

Compact and simple to install. Ideal choice for in-vehicle AI inference.





about eurotech

Eurotech (ETH:IM) is a multinational company that designs, develops, and supplies Edge Computers and Internet of Things (IoT) solutions – complete with services, software and hardware – to system integrators and enterprises.

By adopting Eurotech solutions, customers have access to IoT building blocks and software platforms, Edge Gateways to enable asset monitoring, and High Performance Edge Computers (HPEC) created also for Artificial Intelligence (AI) applications.

To offer increasingly comprehensive solutions, Eurotech has partnered with leading companies within its field, with the view of creating "best in class" solutions for the Industrial Internet of Things.

