b-plus

Annual 2025

Optimize Your ADAS/AD Systems with the AD Validation Toolbox

Generate Your Own Dataset and Validate Your System with live Analysis

The development of driver assistance systems and autonomous driving technologies places high demands on the acquisition, processing, and validation of data. To meet these requirements, b-plus offers the AD Validation Toolbox, a comprehensive solution that includes both powerful hardware and software components to support a seamless development process.

Comprehensive Hardware Solutions

The AD Validation Toolbox offers scalable hardware solutions for a wide range of applications. Whether it's simple recording systems, complex multi-I/O setups, or advanced platforms for deep learning and artificial intelligence, our solutions are flexibly configurable. The modular measurement technology platforms can be expanded with numerous add-ons and powerful storage solutions, allowing them to be tailored to individual requirements. This optimally supports the development and validation of even complex systems.

Powerful Software Solutions

In addition to the hardware, b-plus provides software solutions that support data recording, processing, and encryption. These software solutions offer methods for time synchronization and provide interface know-how that enables reliable and precise data acquisition.
This enables companies to carry out precise analyses and implement customer-specific solutions.

Cloud-based Data Management

The AD Validation Toolbox is complemented by cloud-based data management tools that provide deeper insights into the data collected. These tools include health monitoring and the ability to create and manage data collection campaigns, allowing real-time tracking of missing or sufficient scenarios. This increases collection efficiency. In addition, over-the-air updates enable remote system updates, and effective storage management ensures optimal use of test vehicles.

Technology Driver MAX

Experience the AD Validation Toolbox live in our MAX demo car. MAX demonstrates the next generation of measurement technology for cameras, radar systems and lidar in vehicles and provides a comprehensive overview of the toolbox's capabilities. From the initial acquisition of raw sensor data to storage in data center quality, MAX shows what efficient and reliable data processing can look like. The system is supplemented by intelligent energy management and test fleet management functions.

The AD Validation Toolbox Consists of Various Solutions Regarding:

- Trusted Data Recording
- Data Distribution
- Data Storage
- Data Encryption
- Data Analytics
- Time Synchronization
- System Health Monitoring
- Data Labeling
- Testfleet Campaign Management
- Data Quality Optimization
- Data Replay in HiL/SiL

b-plus as a strong Development Partner

We are a technology driver and engineering partner for the development, testing and validation of driver assistance systems and control units. With our high-performance technologies, our vision of a new mobility and the strength to realize it, we are a strong partner and accompany our customers on their way to new mobility.

As a leading provider and development partner in the ADAS/AD, industrial and off-highway sectors, our expertise lies in high-performance and high-precision measurement technology. Our core competencies include in-depth know-how regarding various interfaces, high-speed communication, and compliance with industry-specific standards. We offer customized services for the optimal planning and construction of customer-specific setups and are always on hand to advise our customers thanks to our team of experts.

What Sets us Apart?

- Large partner network
- Great usability and modular design
- Seamless interaction of all components
- Integration into existing systems thanks to open architecture
- Many projects from major German automotive suppliers and OEMs
- Over 25 years of experience in Hardware and Software development
- Understanding individual requirements and use cases

Carina Oody

Because „Out of the Box“ Is Not Always the Right Solution

Custom-Fit Precision with the Measurement Data Interface MDILink

With our MDI (Measurement Data Interface) technology we specialize in decentralized measurement data acquisition from sensors, the conversion and precise time stamping of data from synchronized clocks, and the subsequent transfer via Ethernet to the recorder. Our technology is used in the development process of ECUs, for automated and autonomous driving, in prototypes and tests for data acquisition.

Out-of-the-box, MDILink is equipped with industry-standard interfaces such as GMSL2, FPD-Link III, and CSI-2 to cater to a broad spectrum of applications. However, the true value of MDILink lies in its outstanding customization options. Depending on the specific use case, MDILink can be tailored to meet unique requirements, ensuring seamless integration with any ECU and sensor setup.

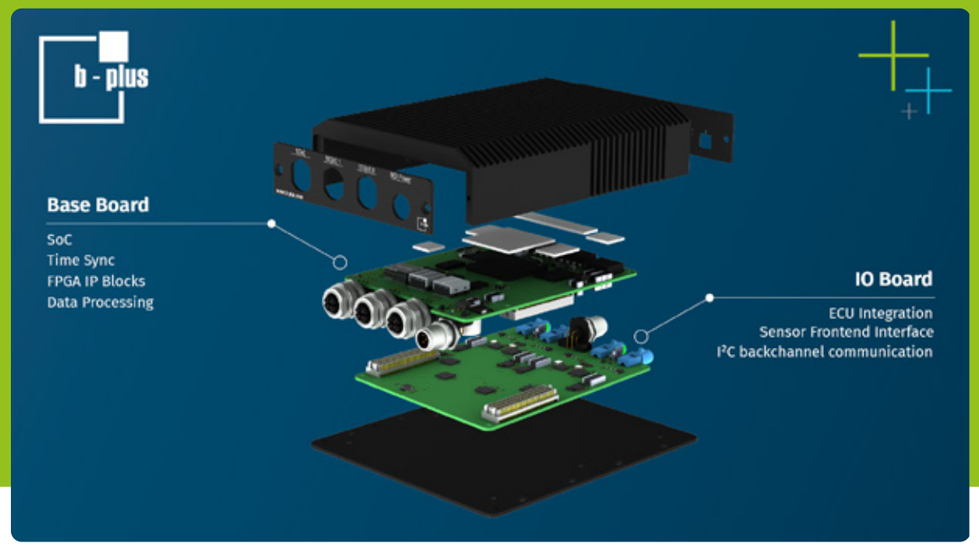
At the heart of the MDILink‘s customization capabilities is its use of advanced FPGA technology, which facilitates highly efficient and parallel processing of various interfaces at highest data rates.

Integration with existing tool chains is smooth thanks to well-defined software interfaces, making MDILink a versatile and open solution that can adapt to a wide array of software frameworks. This interoperability is key for developers looking to incorporate the MDILink into their existing systems without the need for extensive modifications.

Furthermore, our MDILink can be customized to support unique interfaces, accommodate various data formats for input and output, and apply specific data compression, conversion, and encryption techniques. This high degree of adaptability ensures that MDILink can be fine-tuned to align with the precise demands of any project, offering a personalized solution that off-the-shelf solutions simply cannot match.

Whether it is for handling complex sensor arrays or ensuring data integrity in the most challenging of automotive applications, MDILink proves our commitment to flexible, tailored solutions in state-of-the-art technology.

Carina Oody



Reliable Hardware

30.000 Hours of Continous Operation Without Failures

In today‘s automotive and technology industry, durability and reliability are decisive factors for success. Systems must function faultlessly not only under normal operating conditions, but also under extreme loads. An outstanding example of such high standards is the BRICK2 data recorder, which has achieved 30,000 hours of continuous operation without problems in endurance testing. This was made possible by a robust hardware design, advanced health management and innovative remote monitoring technology.

The robustness of a system begins with hardware development. To ensure maximum reliability, all components of a system must be carefully developed and tested. Knowledge of all common PC and vehicle interfaces plays a decisive role here. Tailor-made solutions for automotive pre-series and mobile automation make it possible to respond to challenges and technological advances at an early stage. Our extensive know-how in these areas ensures future-proof investments that remain powerful and flexible. An important aspect of hardware development is high-speed design, which enables sustainable performance as well as long-term adaptability and robustness of the products. Device manufacturers rely on EMC-compliant hardware solutions to ensure electromagnetic compatibility. Comprehensive advice on standards and EMC requirements as well as the development of EMC concepts, simulations, and pre-tests help to meet legal requirements and identify problems at an early stage.

Highest Test- and Quality Standards

Compliance with high test and quality standards is essential to ensure the robustness and durability of a system. Through internal automotive tests according to LV124 and LV148 standards as well as environmental simulations and climate tests, we ensure the durability of the products in various environments under realistic conditions. Tailor-made tests include CE certifications, automotive standards and relevant norms such as ECE R10, E1 (KBA) and E13 (SNCH). Support for approval procedures in various countries, including the USA (FCC, UL), Japan (VCCI), Australia (RCM) and Korea (KC) is absolutely relevant and ensures the global usability and reliability of new products.

Health- and System Management

An essential component of system reliability is advanced health management. This is where the Smart I/O Driver Interface (SIODI) comes into play, a comprehensive solution for monitoring and managing measurement technology systems such as BRICK, LOGIfiyer and DATALynx ATX4. SIODI acts as a central interface for all components installed in the systems and enables real-time monitoring of system performance and status. This also includes the option of adjusting individual system parameters as required. SIODI enables hardware-related failures to be detected and avoided at an early stage, which optimizes the operation of test vehicles or entire vehicle fleets. The solution is compatible with Windows and Linux and also enables the identification and control of xSTORAGE storage units.

30.000 Hours

An impressive example of the robustness, durability and sustainability of our systems is the BRICK measurement technology system, which has been in continuous use for four years. Even after 24/7 operation over several years, the system shows no signs of failure. Only one minor anomaly was detected via the SIODI-based health management system: a low fan speed. This will now be taken as an opportunity to carry out a detailed examination of all components in order to ensure the continued optimal functioning and longevity of the system.

Conclusion

The successful continuous operation of over 30,000 hours without problems is proof of the high quality, durability, and reliability of the systems - made in Germany. Through a combination of robust hardware development, advanced health management and innovative remote monitoring, we ensure that our products perform under even the most demanding conditions and meet our customers‘ requirements. This is not only a sign of technical excellence, but also of the trust our customers can place in us.

Carina Oody and Christine Schäfer

Tailored for Performance

b-plus Develops Custom DATALynx ATX4 Systems

Edge computing is revolutionizing data processing, but it also comes with its own set of challenges. From limited hardware resources and strict latency requirements to the need for high scalability, companies must find efficient ways to process vast amounts of data at the source. This is where b-plus steps in: „With the DATALynx ATX4, we have developed a solution that not only tackles these challenges head-on but also sets new benchmarks for performance, flexibility, and future readiness," says Roland Peindl, Product Manager at b-plus.

Challenges in High-Performance Edge Computing

Space and Energy Efficiency

One of the biggest challenges in edge computing is optimizing space and energy consumption. Edge devices need to be compact, energy-efficient, and, at the same time, robust enough to handle demanding applications. However, finding the right hardware that meets all these requirements can be a major obstacle. The DATALynx ATX4 addresses this challenge with its all-in-one design, replacing multiple separate devices and significantly reducing both footprint and power consumption. The result is a streamlined yet powerful solution that maximizes efficiency without compromising performance.

Performance Without Compromise

Another crucial factor in edge computing is performance. As data volumes grow and applications become more complex, edge systems must deliver high computational power with minimal latency. To meet these challenges, the DATALynx ATX4 is equipped with state-of-the-art hardware and is ideally suited for very demanding applications. The ATX4 specializes in complex data processing and data analysis, raw data recording, as well as high-performance AI applications. Its high graphics performance with multi-GPU systems enables the efficient processing of complex AI models and ensures fast and reliable computing power directly on site.

Unmatch Stability for In-Vehicle Applications

The DATALynx ATX4 is the only system in its performance class capable of directly operating on a 12V vehicle power network. Designed specifically for automotive environments, it supports a wide voltage range from 6V to 32V, ensuring reliable operation even under fluctuating power conditions. Unlike conventional systems, the ATX4 is built to withstand voltage drops, spikes, and transient loads, meeting the strict LV124 standard. This makes it resilient to challenges like start-stop cycles and jump-start events, providing uncompromised stability and performance in demanding vehicle applications.

Ultimate Precision Timing

Timing is critical in distributed multi-sensor systems but also highly complex. From signal generation to storage, data packets pass through multiple software blocks and hardware components, encountering propagation delays, transmission lags, and clock jitter along the way. As a result, measurement data often arrive at the recorder unit out of sync with their original timestamps, complicating accurate data fusion. However, precise temporal correlation is essential for correctly assigning sensor values and creating a complete system model. In order to meet these requirements for precise time stamping, the DATALynx supports the Universal Time Synchronization Services PTP and gPTP with the b-plusXTSS integration.

To counteract timing discrepancies, each data packet must be timestamped as early as possible, ideally at its point of creation. This allows transmission delays to be accounted for and ensures accurate data correlation. A unified time domain, maintained through continuous synchronization across all system clocks, is essential for safety-critical applications. It also forms the foundation for achieving safety certification in multi-sensor systems. With XTSS, we offer a widely configurable, plug-and-play capable and above all, highly accurate time synchronization solution.

Efficient Data Handling at the Edge

Handling large amounts of data directly at the edge is a growing challenge, especially in real-time applications that generate continuous high-speed data streams. Storing, accessing, and transferring this data efficiently is crucial, yet traditional storage solutions often struggle with the limited space, power, and bandwidth constraints of edge environments. Without an optimized data management strategy, valuable insights can be lost, and system performance can suffer.

The DATALynx ATX4 overcomes these challenges with high-performance storage solutions and advanced data management tools. The solution is compatible with hot-swappable and hot-pluggable xSTORAGE devices, as well as the Thunder Dock x8 docking station with Thunderbolt 3 connectivity. Together with the COPYLynx ATX4 for fully autonomous data ingest, it ensures seamless and reliable data offloading and management, even during data-intensive applications.

xSTORAGE
Removable Storage Unit

Thunder Dock x8
Docking Station with Thunderbolt 3

COPYLynx ATX4
Data Copy Station

Reliable Data Security

One often overlooked, yet crucial aspect of edge computing is data security. By processing data closer to its source, edge systems become more vulnerable to physical attacks and unauthorized access. On the other hand, encryption is becoming increasingly important considering the constantly growing legal requirements of global data protection regulations such as the GDPR. That is where the b-plus Encryption Manager comes in.

A key feature of the Encryption Manager is password-protected encryption, which automatically activates when the storage unit is disconnected or powered off.
This is especially valuable for mobile applications, where lost or stolen storage devices pose a security risk. Our encryption solution combines security with ease of use. Designed for effortless setup and management, it features an intuitive web interface that requires no technical expertise. For advanced users, a command-line interface allows full automation and script-based implementation. Built on the OPAL standard by the Trusted Computing Group (TCG), our technology integrates AES-256 hardware encryption directly into the storage devices. This ensures maximum security without compromising sustained write speeds on xSTORAGE units.

The Next Step in Edge Computing: Reliability, Scalability, and Cost Efficiency

High-performance computing at the edge is not just about raw power - it is about creating a sustainable, adaptable, and cost-effective system that continues to perform reliably over time. As edge computing deployments grow, companies face new challenges: How can systems integrate seamlessly into existing infrastructures? How can long-term stability be ensured in demanding environments? And how do businesses avoid costly replacements as technology advances?

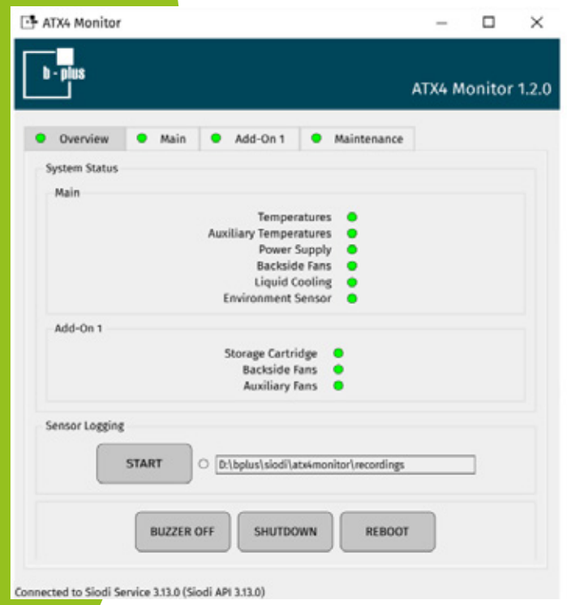
The DATALynx ATX4 is built for more than just today's challenges. It is designed to evolve with technological demands, ensuring standardized integration, intelligent system monitoring, flexible scalability, and long-term durability - all while optimizing costs.

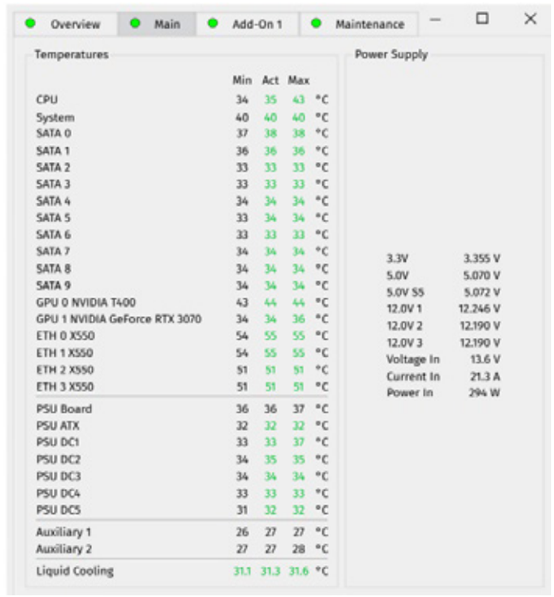
Standardization and Interoperability

The growing diversity of edge computing platforms presents a significant challenge for many organizations. Different hardware architectures, communication protocols, and software environments often lead to integration difficulties, increased development effort, and system inefficiencies. Without a standardized approach, ensuring seamless interoperability between various edge components becomes time-consuming and costly. The DATALynx ATX4 offers a standardized architecture that consolidates multiple devices and thereby enhances software compatibility.
By simplifying integration and ensuring smooth communication between systems, it reduces development time and accelerates deployment, allowing businesses to focus on innovation rather than technical obstacles.

Intelligent System Monitoring

In edge computing, system stability is critical, as deployments often run in decentralized, remote, or harsh environments with minimal direct oversight. Factors like fluctuating temperatures, power supply variations, or component wear can impact performance and lead to unexpected failures. Without proactive monitoring, these issues may go unnoticed until they cause system downtime, data loss, or hardware damage, resulting in costly maintenance and operational disruptions. The ATX4 is equipped with the Smart I/O Driver Interface SIODI, a software solution that acts as an interface to all components installed in the systems. The solution operates independently from the PC system and offers real-time monitoring and logging of key parameters such as system performance and status, temperature, fan speed, cooling, voltage, and storage units. This way, hardware-related malfunctions can be detected at an early stage. Therefore, the operation of the system, the test vehicle or the vehicle fleet can be maintained at all times. This proactive approach extends the system's lifespan and ensures long-term operational stability.



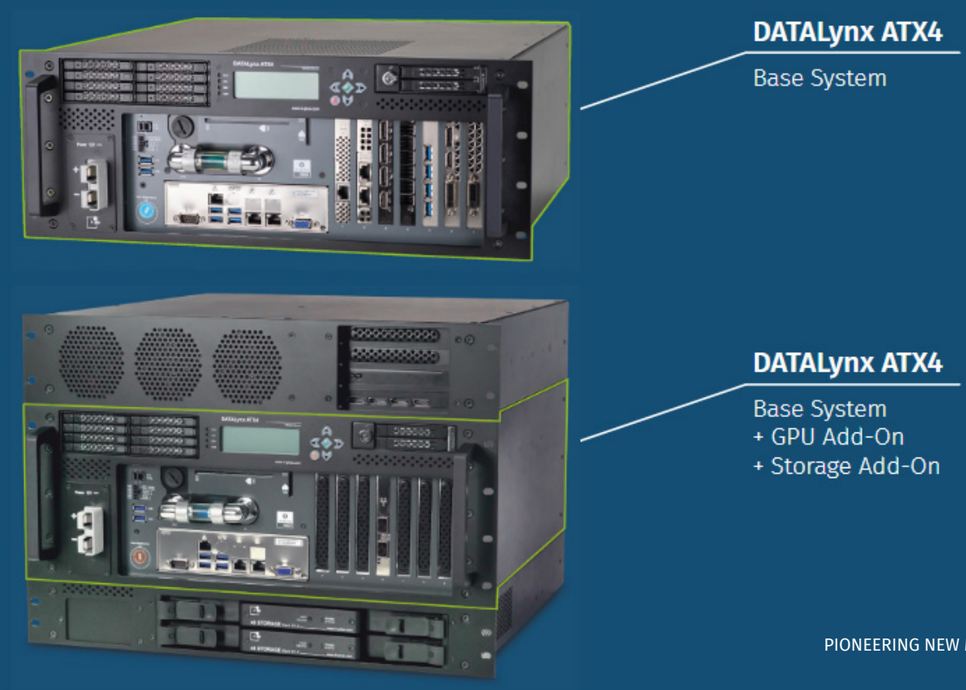


Scalable and Future-Proof

Edge computing environments are constantly evolving, requiring systems that can keep pace with increasing performance demands. However, many conventional embedded systems fall short due to rigid hardware configurations, limited expansion capabilities, and proprietary architectures. These restrictions often force companies to replace entire systems when their computing needs grow, leading to high costs, long integration times, and unnecessary hardware waste.

The DATALynx ATX4 is built for scalability, offering a modular architecture that adapts to a wide range of applications. With add-ons such as GPU expansion, additional storage, and PCIe extensions, the system can be configured as a multi-I/O recording solution or scaled up to a high-performance deep learning and AI platform. Its CPU, memory, and PCIe options provide nearly limitless flexibility, ensuring seamless adaptation to specific requirements.

"Nothing is impossible", says Product Manager Roland Peindl, highlighting the system's ability to evolve alongside technological demands.



Durability and Performance

Edge computing systems often operate in extreme conditions, where high temperatures, vibrations, and dust can severely impact performance and longevity. Many conventional systems struggle to withstand these challenges, leading to overheating, component failures, and costly downtime. Without robust engineering, reliability in such demanding environments becomes a major concern.

The DATALynx ATX4 is built to overcome these obstacles. Engineered for consistent peak performance in temperatures ranging from -10°C to +60°C, the DATALynx ATX4 features a vibration-resistant housing and a fully integrated liquid cooling system that efficiently cools the power supply, CPU, and GPU.

Unlike other setups, the entire system is cooled internally, eliminating the need for external extensions and ensuring reliable operation even under extreme conditions. Additionally, the secure fixation of all components and cables, along with moving-part-free design, ensures maximum durability. Rigorously vibration-tested up to 50 m/s² (5g), the DATALynx ATX4 delivers unmatched reliability.

Watch this video to see how we put our hardware through its paces!

Cost Efficiency

Purchasing multiple small system components may seem cost-effective at first, but the long-term expenses quickly add up. Separate units require individual maintenance, increased power consumption, additional cabling, and complex integration efforts, leading to higher operational costs and potential system inefficiencies. The DATALynx ATX4 eliminates the need for multiple smaller systems by consolidating key functionalities into a single, powerful unit. This reduces acquisition costs, minimizes maintenance efforts, and optimizes overall efficiency. Additionally, b-plus offers service packages with up to five years of functional warranty, ensuring long-term reliability and cost-effectiveness while significantly lowering total cost of ownership.

Carina Oody

Future-Ready Edge Computing with the DATALynx ATX4

The DATALynx ATX4 is more than just another edge computing system - it is a purpose-built solution designed to tackle the most demanding challenges in modern applications. Many conventional edge systems fall short in scalability, durability, integration, and performance, limiting their adaptability to evolving industry needs.

The DATALynx ATX4 overcomes these barriers by combining high computing power, modular flexibility, and robust reliability into a single, seamlessly integrated system.

Its scalable architecture allows for customized expansions, ensuring it can adapt to new workloads without requiring a full system replacement. Built to withstand extreme conditions, it features a vibration-resistant housing and fully integrated liquid cooling, maintaining peak performance in extreme temperatures. Additionally, its standardized design enhances interoperability, simplifying integration into complex system landscapes.

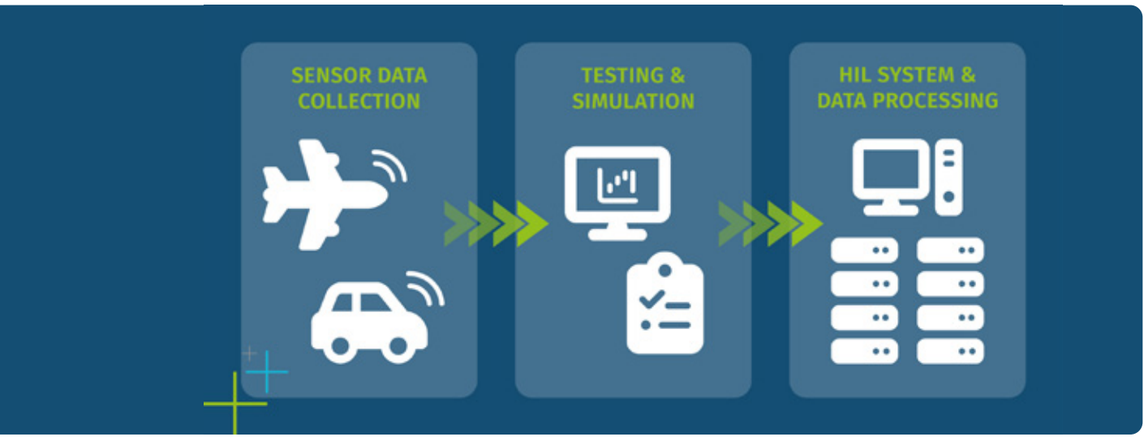
By merging cutting-edge technology with a future-proof design, the DATALynx ATX4 sets new industry standards, delivering the power and resilience businesses need to stay ahead in an increasingly data-driven world.

Seamless Validation of Your Systems with Our HiL Solutions

Overcoming Development Challenges with HiL Testing

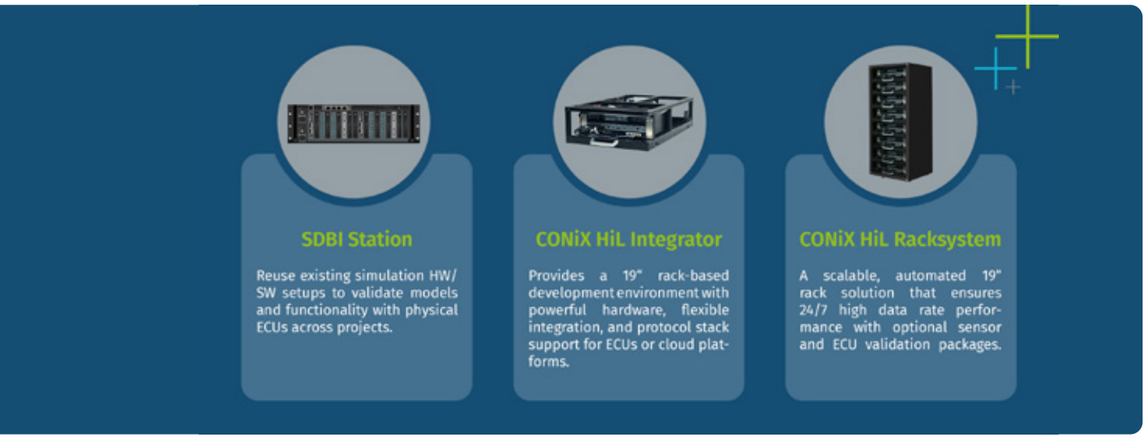
Developing control units for the automotive and aerospace industries presents engineers with complex challenges. They must meet stringent safety standards, simulate diverse real-world conditions, and deliver reliable systems within increasingly tight schedules. Traditional test methods - expensive, slow, and inflexible - can no longer meet these demands.

Enter hardware-in-the-loop (HiL) testing. HiL bridges the gap between physical hardware and simulated environments, enabling accurate and efficient validation of sensors, controllers, and systems. By facilitating testing under realistic, repeatable conditions, it eliminates the need for costly physical prototypes and minimize sreal-world testing efforts.



What makes Our Solutions Different?

- Accurate playback of real and synthetic data
- Seamless integration with the leading simulation platforms
- Reliable 24/7 performance in demanding environments
- Low latency for real-time simulation and test accuracy
- Accelerated development cycles with rapid validation



HiL Solutions for Performance and Precision

At b-plus we understand the growing complexity of system validation. Our CONiX HiL solutions are designed to meet the demands of modern automotive and aerospace development. With advanced replay software at its core, CONiX HiL enables real-time replay of high-bandwidth data streams such as radar, lidar, and video. This ensures that systems are validated under real-world conditions, delivering peak performance and safety.

Our Simulation Data Bridge and Inject Station

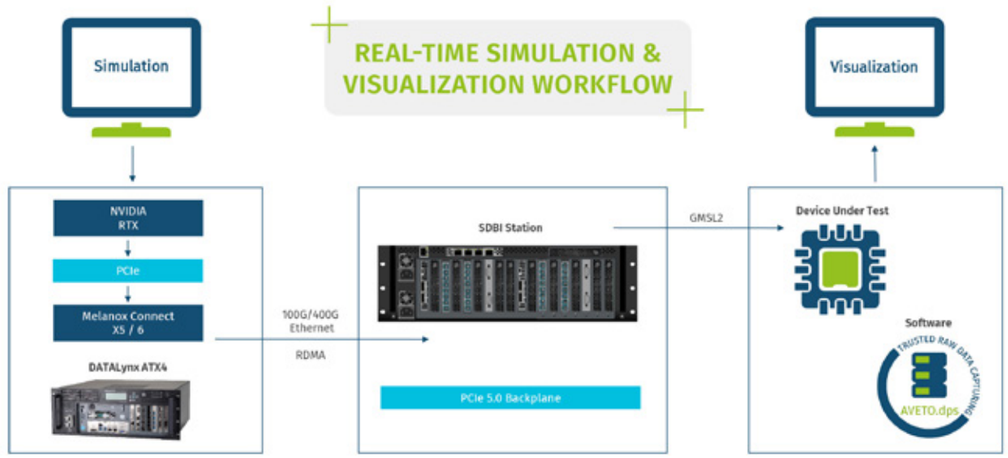
The latest addition to our HiL portfolio, the SDBI Station,

redefines the efficiency and accuracy of system validation. This innovative solution provides a cost-effective, high-performance platform for validating ECUs, sensors and autonomous driving systems.

With its advanced PCIe-based architecture, the SDBI Station offers unmatched speed, scalability and flexibility. Whether you're validating autonomous driving systems, sensors, or ECUs, it gives you the tools to tackle even the most challenging scenarios with confidence.

Why choose the SDBI Station?

- Injection of real and synthetically data
- Interfacing with different simulation tools of your choice
- Advanced PCIe architecture to meet today's validation challenges
- Scalable and adaptable to different test setups
- Cost effective without sacrificing reliability



Validation of Central ECUs with HiL Simulation

The SDBI Station enables the acquisition and playback of multiple data streams, e.g. video, radar, LiDAR, CAN, Ethernet, and other sensors. It provides a high-performance, real-time validation environment for central ECUs, ensuring accurate testing of system functions, e.g. autonomous driving function under realistic conditions. By replicating real-world sensor inputs with minimal latency, it accelerates development and improves system reliability.

Comprehensive Validation for Real-World Success

Our solutions simplify your development process, reduce costs, save valuable time and ensure that your systems perform reliably under real-world conditions.
Discover how our HiL solutions can transform your validation processes!

Laura Kraszewski and Thomas Mattes

Securing your Data Pipeline

CRA and GDPR as Regulatory Drivers for a Secure Data Pipeline

The European Union's Cyber Resilience Act (CRA) introduces mandatory cybersecurity requirements for products with digital elements. The goal is to ensure that hardware and software products are released with fewer vulnerabilities, and that manufacturers integrate security considerations throughout the product lifecycle.

In parallel, the General Data Protection Regulation (GDPR), in effect since May 2018, mandates the protection of personal data and requires strict safeguards to ensure compliance.

A related aspect is the role of data as a central element in the development of new functionalities. This data must be captured securely and protected from unauthorized access.

To meet the requirements of both regulations and maintain compliance, especially when capturing vehicle environments such as street scenes with people and buildings, robust mechanisms must be built into data capture tools from the outset.

Back Up your Data with Encryption Manager

One such data security mechanism is the implementation of encryption on the media itself. For example, after capturing video during a test drive, the recorded media is physically removed and sent to a data center for upload. Given the massive amounts of data, often in the high terabytes, physically transporting the media is the most practical solution. However, if the media is removed from the vehicle without encryption, the data remains exposed and vulnerable on the storage media (e.g. tapes).

This is where Encryption Manager comes in.
Encryption Manager ensures that all disks are fully encrypted while they are still in the system. The moment a disk is removed, the encryption protection is activated, making the data completely secure. The encrypted data cannot be securely decrypted until the disk arrives at the data center and is connected to designated upload stations. This process provides robust protection against unauthorized access while in transit, ensuring that sensitive information remains secure at all times.

The Cybersecurity Tool for your Automotive Data

To meet the standards and unique data protection requirements of the automotive industry, our Encryption Manager provides a secure solution that ensures both compliance and ease of use. Using hardware encryption based on the TCG OPAL standard, it protects all recorded data directly on the drive, preventing unauthorized access. In addition, Encryption Manager includes „Auto Unlock", allowing authorized personnel to easily access encrypted data without complex password management, balancing robust security with seamless usability.

Key Features to Help Improve your Security:

+ **No Driver Password Required:**
  Eliminates driver password entry, streamlining user experience without compromising security.

+ **Restricted Access to Logging Data:**
  Limits data access to authorized personnel, reducing potential access points.

+ **Performance Preservation:**
  Encryption does not impact logging performance, ensuring smooth, uninterrupted data collection.

This approach provides robust data protection for large fleets, keeping data collection secure and smooth.

Secure Logging in a Cyber-Driven World

Implementing the Cyber Resilience Act goes beyond compliance: **it's a strategic investment in protecting valuable data assets from today's cyber threats.** With our Encryption Manager, organizations can ensure secure data logging, achieve CRA compliance, and support ongoing data innovation.

When you choose Encryption Manager, you'll be able to meet regulatory standards and ensure that your data remains resilient and secure. Protect your data today and focus on what matters most: innovating without the risk of data compromise.

Laura Kraszewski and Adrian Bertl







Events 2024 / 2025

Always on the Road for You

How We Built an Internal Dataset Expert & Whats It´s Teaching us about It

In a growing tech company, you don‘t need just one kind of expert - you need a dozen. You need someone who understands your code base, your domain knowledge, your AI stack, your customer pain points, and your internal processes. And when you‘re in a space like automotive AI, with demanding security requirements and data complexity... well, things escalate quickly.

After more than 10 years in the industry — first as a founder, now as a CEO and techie at heart — I found myself in this classic bottleneck: too much tacit knowledge, too few ways to scale it across departments.

So I tried to deal with it using a proprietary solution:
I created a Data Set Specification Expert, powered by internal knowledge and structured like a modular curriculum.

This article will show you how I designed it — and what this „expert“ can already answer about labeling costs, ODD modeling, fusion errors, and more.

Marius Reuther, Managing Director
b-plus automotive GmbH

Why We Built an Internal Dataset Expert

You know the drill: engineering teams nowadays need deep AI and labeling knowledge. Colleagues need enough to plan and quote projects. Sales needs to speak the customer‘s language. And marketing? You need to translate it all into something you can put on a slide.

At b-plus, we built the **CONiX.dpc** solution to address this holistically — from dataset definition to curation to model training. However internally, that means aligning different teams with very different levels of knowledge.

Sure, we have workshops, kickoff meetings, tech wikis... but we wanted something you could interact with 24/7. Something you could ask questions and go as deep as you needed to.

How We Structured the Expert

We started by creating a modular knowledge map - a framework for what the expert should know. Here´s an excerpt of the key modules:

Module 1: Data Foundations & Quality Assurance
- Quality metrics: completeness, accuracy, coverage, time coherence
- Traceability, versioning, compliance (e.g. ISO 27001)

Module 2: Domain-Specific Context Knowledge
- Automotive ADAS/AD: PEGASUS, ASAM OpenODD®, ISO 26262, UNECE
- Off-highway: GNSS issues, field conditions, edge constraints, machinery directive compliance considerations

Module 3: Labeling & Annotation Guidelines
- Ontologies, annotation standards, QA workflows
- Automation via pre-labeling, human-in-the-loop and model-in-the-loop

Module 4: ODD & Use Case Engineering
- ODD modeling using strong frameworks such as ASAM OpenODD® for defining Operational Design Domains in a structured, machine-readable way or Project PEGASUS
- Taxonomy design, geo-temporal dimensions, abstraction levels (from logical to concrete)
- Scenario coverage and platform alignment for ADAS and autonomous systems

ASAM OpenODD®, in particular, has helped us bring consistency and formalism to our use case definitions - bridging the gap between domain experts and ML engineers.

Module 5: Sensor Modalities & Logging
- Camera, LiDAR, radar: sensor fusion implications
- Logging infrastructure (performance, trigger logic, time-awareness)

Module 6: ML & Model Training
- Bias, stratification, KPI mapping
- Feedback loops and data-centric AI principles

Module 7: Commercial Strategy & Governance
- Cost estimation, data monetization, auditability

Feeding the Expert

We collected and curated internal documentation, field experiences, process specs, and best practices into each module. Then, we fed the expert — not just prompts, but structured context, linked concepts, and even evaluation logic.

This wasn’t a simple ChatGPT prompt hack — it was the creation of a context-aware knowledge system, driven by our preference for intelligent, connected expertise over isolated islands of knowledge.

But... Can You Trust It?
Great, we built the expert. But how do we know it actually works?

We built a second expert: a testing one. Using a structured Q&A catalog, we compared:

- Human expert answers (from me and our team)
- AI expert responses
- Scoring rubrics to weight accuracy and structure

Here are two tests we ran:

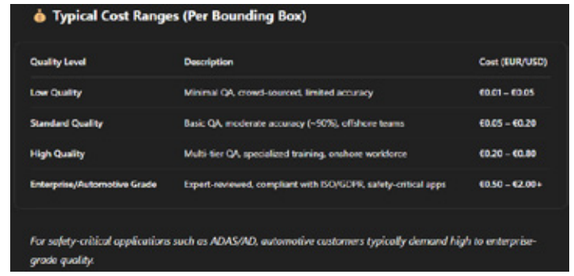
Test Case 1 Prompt:
„What factors influence the price of labeling a single 2D bounding box, and what ist the typical cost range across different quality levels?“

This question is deceptively simple but extremely useful — especially for assisting in project quoting or supporting sales teams in conversations with customers.

AI Expert Answer (v0.3 snapshot):
The response from the expert was structured and comprehensive. It broke the pricing down into several core factors:

- Annotation Quality (manual vs. automated, QA layers)
- Object Class Complexity (e.g., single-class vs. multi-class annotation)
- Scene Complexity (occlusion, crowdedness)
- Toolchain Efficiency (use of smart labeling tools, AI pre-labeling)
- Workforce Geography (onshore vs. offshore)
- Security & Compliance Requirements (e.g., GDPR, ISO 27001)

It also gave a detailed cost range:



💰 Typical Cost Ranges (Per Bounding Box)

Quality Level	Description	Cost (EUR/USD)
Low Quality	Minimal QA, crowd-sourced, limited accuracy	€0.01 – €0.05
Standard Quality	Basic QA, moderate accuracy (~90%), offshore teams	€0.05 – €0.20
High Quality	Multi-tier QA, specialized training, onshore workforce	€0.20 – €0.80
Enterprise/Automotive Grade	Expert-reviewed, compliant with ISO/GDPR, safety-critical apps	€0.50 – €2.00+

For safety-critical applications such as ADAS/AD, automotive customers typically demand high to enterprise-grade quality.

The Image shows a cost breakdown for labeling a single bounding box, categorized by quality level, ranging from low-quality crowd-sourced data to enterprise-grade annotations for safetycritical use cases.

The response also noted that prices for automotive use cases are significantly influenced by traceability, semantic consistency across annotators, and auditability — especially under ISO 26262 or SOTIF constraints.

Human Expert Answer:
While the AI expert’s answer did a good job structuring the influencing factors, my own project experience shows that its upper-end estimate of €2.00+ per box is not realistic, even for highly specialized, regulated domains like ADAS or autonomous driving.

Typical pricing — even for automotive-grade quality with high QA depth — rarely exceeds €0.30 per box. Anything above that usually points to misunderstandings in scope, inefficient tooling, or extremely low-volume, one-off cases. Presenting €2.00 as a common or expected rate can severely misguide sales teams or scare off customers during quoting.

My own calibrated range lands between $0.03 and $0.25, depending on:

- Scene and object complexity
- Class granularity
- Required QA depth
- Toolchain efficiency
- Regulatory overhead and workforce location

It’s critical to factor in real-world delivery dynamics and not just theoretical cost structures. The AI expert‘s framework needs anchoring in empirical benchmarks and historical pricing data to be truly useful.

Takeaway:
The AI expert shines when it comes to structuring complexity, but falls short in cost realism. By integrating actual domain-specific project data we’ll significantly improve its utility in quoting, planning, and internal alignment.

**Read Part 1 of 4
Don´t miss out
on following
Parts!**

Test Case 2 Prompt:

"How does incorrect switching or reassignment of object IDs — particularly in the context of camera–LiDAR fusion — affect the performance and reliability of trajectory planning models?"

This one hits at the heart of perception system integrity. It's highly technical, and answers here need to be precise — not just structured.

AI Expert Answer:
The response began by explaining what ID switching is — the misassignment of unique object IDs across frames or sensor modalities in a tracking pipeline. It clearly linked the issue to fused perception stacks where:

- Cameras provide semantic richness
- LiDAR gives spatial geometry and positioning

It Outlined 4 Main Impact Areas:

- Prediction Drift: Broken temporal chains lead to invalid motion priors and manoeuvre misclassification (e.g., confusing a lane change with a cut-in).
- Collision Risk: Lost identities lead planners to treat reacquired objects as "new," potentially missing imminent risks.
- Overconservatism or Rule Violation: Incorrect IDs may cause false positives or missed priority decisions.
- Training Feedback Loops: Poor label consistency trains unstable motion models — especially critical in occlusion-heavy or dense scenes.

It Also Proposed Strong Mitigation Techniques:

- Temporal association logic with 3D constraints
- Uncertainty-aware tracking (e.g., Kalman/PHD filters)
- QA validation in the data pipeline
- Use of ASAM OpenLABEL® to ensure consistent formatting

Side note: In a follow-up question, the expert even listed state-of-the-art KPIs for tracking performance and ID consistency in fused sensor systems — including ID switches per frame, MOTA (Multi-Object Tracking Accuracy), and IDF1 score.
That's when it hit me: this thing isn't just repeating articles — it's reasoning like a junior perception engineer. Huge potential!

Human Expert Answer:

My answer focused on practical risk implications - trajectory planners rely on ID consistency for motion modeling. When IDs get reassigned incorrectly, prediction errors can increase up to 28×, especially in cut-in or merge scenarios where fast reaction is key.

I Highlighted How Misidentifications:

- Can break continuity for planning modules
- Lead to unsafe behavior or rule violations
- Undermine trust in the system under UNECE regulatory expectations

The AI was strong in breadth and mitigation strategy, but weaker in grounded examples and metrics attribution (e.g., it refered to a 30% drop in performance but this metric wasn't linked to ID consistency).

The image shows two key performance indicators (KPIs) — ID Switch Rate (IDSR) and Track Fragmentation Rate (TFR) — used to evaluate object ID consistency in sensor fusion systems.

Takeaway:
The AI was impressive in how it broke down the system-level impact and proposed real solutions. And with a nudge, it can surface advanced KPIs that perception and QA teams actually use.

Still, it needs better grounding in real failure case data and more calibration from our past projects. The potential is clearly there — especially when you treat the AI like a colleague you're training.

What's Next
We'll continue refining the expert:

- More domain-specific calibration
- KPI-linked validation metrics
- Versioning and update pipelines

And we're now inviting others to challenge the expert. Got a tough labeling, QA, or ODD question?
Let us know!

Marius Reuther

KPIs for Object ID Consistency in Sensor Fusion

1. ID Switch Rate (IDSR)

- **Definition:** Number of ID switches per object track per time interval.
- **Formula:**

$$\text{IDSR} = \frac{\text{Number of ID switches}}{\text{Total number of object tracks}}$$

- **Goal:** As low as possible. <2% is acceptable for structured road scenes.

Impact: High IDSR breaks temporal continuity → corrupted motion priors → unreliable trajectory predictions.

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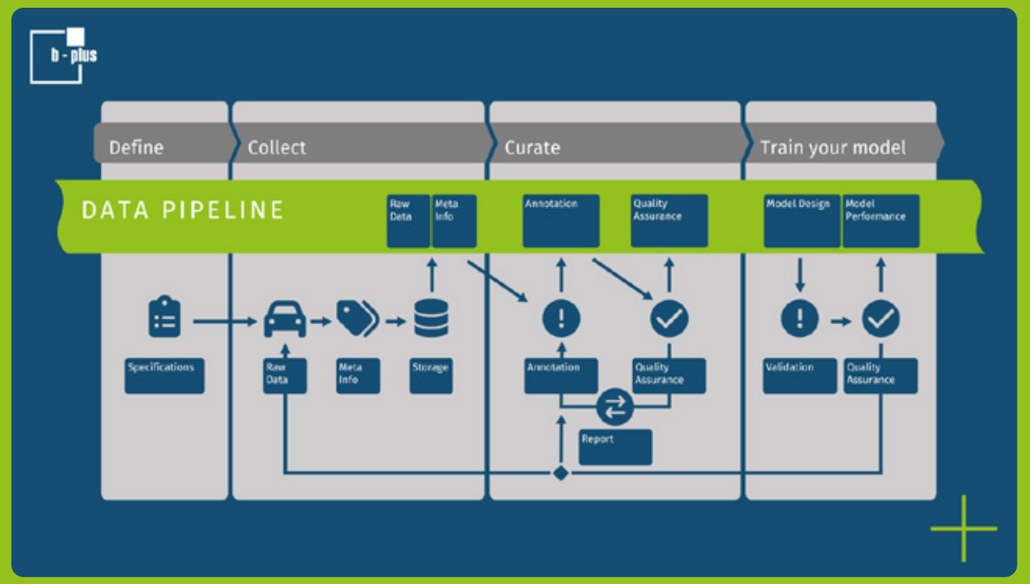
2. Track Fragmentation Rate (TFR)

- **Definition:** Ratio of broken tracklets (short-lived IDs for same object) to total valid track sequences.
- **Formula:**

$$\text{TFR} = \frac{\text{Number of fragmented tracks}}{\text{Total number of ground-truth tracks}}$$

- **Benchmark:** TFR < 0.05 for high-quality urban perception datasets.

Impact: Leads to artificial "new object" creation and unstable behavior modeling.



The image shows the b-plus data pipeline, outlining key steps from data collection to model training and quality assurance.

Why Collecting Less Can Deliver More

After introducing the Dataset Specification Expert in Part 1 of this series (see pp. 21-24), **it's time to take a step back - or rather, a step closer to the vehicle.**

Because when your machine learning model fails to predict correctly, the problem often isn't in its architecture... it's in the data.

More Specifically: what you did or didn't collect.
In this article, we dive into how to structure and optimize your data collection pipeline — with a particular focus on selecting edge cases for ADAS and autonomous systems. Not just to capture more — but to capture what matters.

Why This Matters

Modern software-defined vehicles (SDVs) rely on plenty of sensors, ECUs, and learning loops to function. With each iteration, more intelligence is pushed to the edge, and data becomes the driver — not just for perception, but for development, testing, and validation.

And yet, some still operate like it's 2015: Record everything. Filter later. Label what's left.

This approach was okay when storage was cheap and validation was simpler. But with growing **regulatory expectations, (ODD) complexity, and cost pressure,** it no longer scales.

A Testfleet Reality Check
Test vehicles are equipped with around 16 TB of storage, and common datarates are around 2 GB/s. Multiply that by a 50-car fleet and a typical month of test days, and here's what you get:

METRIC	VALUE
Datarate	2 GB/s
Per Test Day (8h)	~ 58 TB
Per Month (20 Test Days)	~ 1.15 PB
Storage Cost (at € 150/TB)	€ 172,800/month
Processing (at € 150/TB)	€ 57,600/month
Transfer & Fleet Handling	€ 23,040/month
Monthly Total	**€ 253,440**

The table shows how a 50-car test fleet generates massive amounts of data, leading to monthly cloud handling costs of over € 250,000 — even before considering in-vehicle or personnel expenses.

That's over € 3 million/year — just to handle the raw logs in the cloud. And we did not even consider in-vehicle storage costs, wages for data engineers, and so on. "Data is the new oil," sure — but unless refined, it's just expensive sludge.

Capture what matters (and leave the rest)

Lets explore two personas:

The Farmer - Collect Everything

- ⊕ Guarantees completness
- ⊖ Overwhelming volume
- ⊖ High cost, los signal
- ⊖ Curation nightmare

The Hunter - Collect Smart

- ⊕ Relevance first
- ⊕ Scalable workflows
- ⊕ Taggable, searchable, explainable data
- ⊖ Needs planning, triggers and feedback

Our strategy at b-plus — via CONiX — is designed around this second approach. We don't aim to capture all data. We aim to capture the right data — and know why it was collected.

Continental uses CONiX.tfs worldwide. Read here how they scaled it! >>>

The Core Components of a Modern Collection Pipeline

Let´s break down what it takes to build a reliable, explainable and edge-case-focused recording system.

1. A High-Fidelity Logging Backbone

ADAS/AD vehicles are sensor orchestras: camera, radar, LiDAR, ultrasonic, GPS/IMU, CAN, Ethernet... all playing together at gigabit speed. Our data loggers (e.g. BRICK, DATALynx) capture up to 16 Gbit/s, 50 Gbit/s, support hot-swappable SSDs, and are rugged enough to handle vibration, temperature extremes, and road chaos. But it's not just speed — it's stability, integrity, and lossless performance over hours or days.

2. Time Sync: Because Sensor Fusion Demands It

Without precise timestamps, sensor fusion becomes guesswork. That's why our XTSS (Time Synchronization Service) delivers:

- **Nanosecond-level timestamping**
- **Support for IEEE 802.1AS (gPTP) and IEEE 1588 (PTP)**
- **A unified clock domain across all modules**

This enables us to correlate a LiDAR pulse with a CAN brake signal and a video frame – within nanoseconds. Without that? You're not building datasets — you're building noise.

3. Triggering the Interesting

The core of a smart logging system is knowing when to press record. That's where edge computing comes in — with embedded logic that triggers data capture based on:

- **Sensor events**
  (e.g. "LiDAR sees object unknown to vision")
- **Context** (urban + night + rain = edge-case likelihood ↑)
- **Anomalies**
  (confidence drop, bounding box entropy spike)
- **Heuristics**
  (e.g. "log only if emergency braking + object in path")

Think of it as real-time triage at the edge: the car gets a "gut feeling" and decides, "That looked weird - let's save it."

4. Test Fleet Coordination — Without Spreadsheets

Smart data collection doesn't scale unless you coordinate your test cars like a team.

Our CONiX Testfleet Solution does just that:

- **Set collection objectives**
  (e.g. „foggy intersections with pedestrians")
- **Human-in-the-loop in-vehicle tagging**
- **Route planning: assign and manage test routes**
- **Monitor vehicle status & sync**
- **Trigger updates remotely**
- **Track fleet-wide ODD coverage**

5. Manual and Automatic Tagging — Together

Even the best triggers miss some things. That's why human-in-the-loop matters.

Drivers and engineers can add tags via tablet during test runs:

- **"Construction zone"**
- **"Fog, low contrast"**
- **"Unexpected pedestrian"**
- **"Special event"**
- **"False positive alert"**

The result? Your dataset is no longer a black box. It's indexed. Searchable. Auditable.

Here are some example tags from a recent test run focused on "unusual events":

- **Lost lane detection under rain**
- **GNSS drift near city center**
- **Cyclist in vehicle lane**
- **Emergency braking with occluded view**
- **Person walking dog on highway ramp (!)**

These tags are later used to prioritize labeling, QA, and retraining — closing the feedback loop.

6. The CONiX.dpc Approach: Define → Collect (→ Curate → Train)

The real power comes when you connect logging with requirements and validation logic. That's where CONiX.dpc enters. It lets you:

- **Define ODDs and scenario goals** (e.g. "urban, wet, dusk, pedestrians")
- **Translate them into data capture strategies**
- **Collect mission-relevant data — in real time**
- **Tag, filter & select with minimal human effort**
- **Route high-value data directly into labeling with integrated quality assurance**

Result:

- **Up to 90% data volume reduction**
- **Faster iteration cycles**
- **Lower cloud & infrastructure bills**
- **Stronger KPIs for coverage, edge-case diversity, and scenario completeness**

All while staying aligned with standards like **ASAM OpenODD®, ISO 26262, and UNECE VMAD.**

Takeaway

Smart data collection isn't just a technical problem.
It's a strategic one.

By building your data platform around modularity, real-world triggers, and feedback loops, we've shifted from:

"Let's collect everything" became "Let's collect what we need."

What's Next

This is the second article in our 4-part series on building and using high-quality dataset pipelines.
Stay tuned for:

- **Curate:** Label. Audit. Repeat: Building Trustworthy Datasets at Scale
- **Train:** Going Data-Centric: Closing the Data Loop with Confidence

In Part 3, we'll move from "COLLECT" to "CURATE" diving into the QA and labeling workflows needed to build trustworthy training data sets that don't just satisfy regulators... but actually help your models get better.

Marius Reuther, Managing Director,
b-plus automotive GmbH

State-of-the-Art Displays

Modern displays are not just a tool for displaying information, but an essential component of digitalisation in the off-highway sector. A modern display significantly improves the operation and safety of your machines.

The use of advanced displays can increase efficiency, reduce operating costs and optimise machine performance. Digitalisation also opens up other new options, such as saving working time or material resources like fuel. Remote access and continuous vehicle condition monitoring are also possible. Users have real-time access to all relevant data and can use it directly for their work. This not only leads to an increase in productivity, but also to improved machine control and faster fault diagnosis.

In mobile machines, displays must also be extremely robust in order to function reliably even under extreme conditions such as heat, cold, dust and vibrations. The displays of our renowned partners are specially designed for such challenges and ensure optimum performance, even in demanding environments.
Choosing the right display for each specific application is of great importance. b-plus offers a wide range of robust displays from leading manufacturers to provide you with customised solutions for your requirements. Whether in agriculture, on construction sites or in municipal technology - we are happy to advise you to find the right display for your machines and your individual needs.

Our partners have developed innovative models that stand out with exceptional connectivity and intuitive operation. In Addidtion to that our team of experts is at your disposal for choosing and programming the displays with CODESYS® and Qt. With our extensive experience, we support you in the realization of custom HMI solutions that are optimally tailored to your individual requirements.

crosscontrol
CCpilot V1090/V1290

DSE
DSEM810

ifm
ecomatDisplay 4,3"

Topcon
B2/B2+ ISOBUS

TTcontrol/HYDAC
eVision² 7.0

Sabine Igl

Your Vision, Our Solution

Customized Control Systems for Mobile Machines

In the world of mobile automation, individuality is the key to success. At b-plus, we understand that no two projects are the same and that standardized solutions are often not enough to meet our customers' unique requirements. That's why we offer customized control solutions that are tailored precisely to your needs.

From conception to implementation, we stand by your side to ensure your vision becomes a reality. Our experienced team of engineers brings not only technical know-how, but also the flexibility and creativity to realize even the most challenging projects. We listen to you, understand your requirements and then develop solutions that meet them perfectly.

Maximum Safety and Reliability
Our customized control systems for mobile machinery are not only developed to meet your technical requirements, but also to ensure maximum safety and reliability. We take into account all relevant safety guidelines and standards to ensure that your system is not only efficient, but also safe.

Through our many years of experience as system integrators, we have in-depth knowledge of various bus communication protocols such as ISOBUS, J1939, CANopen and CAN. This enables us to ensure that our control systems can be seamlessly integrated into your existing infrastructure.

Versatile Portfolio and strong Partnerships
Our portfolio ranges from compact small controllers to powerful, freely programmable systems, and we are proud to work with leading manufacturers to offer you the best possible solutions.

So if you're looking for a customized control solution tailored to your exact requirements, contact us today. Let's work together on your vision and make your project a success.

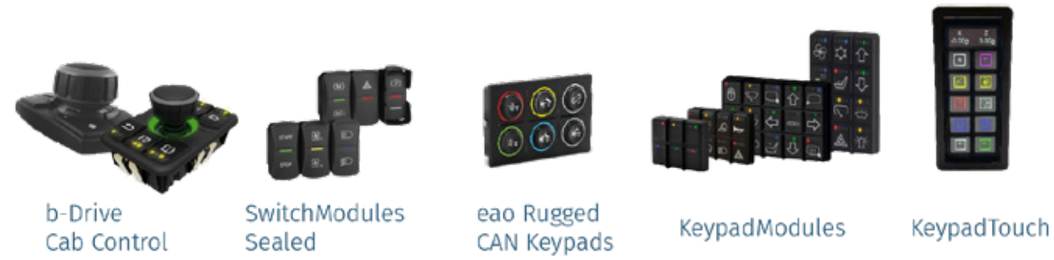
Sabine Igl

Robustness and Ergonomics:

Key Features for Controls in Mobile Machinery

Extreme conditions demand reliable solutions – especially for mobile machinery. Whether in dusty fields, vibrating construction sites, or frosty winter services: controls must withstand all weather and operate precisely under the toughest conditions. Moisture, dirt, vibrations, and temperature fluctuations impose high demands on electronics. At the same time, expectations for ease of use and efficiency are rising. Machine operators need a reliable, intuitive control system that avoids errors and enables quick responses to any situation. This calls for robust, well-designed controls that ensure safe and precise machine operation.

Modern mobile machines are more than just tools; they are connected, intelligent systems. Sensors, controllers, displays, and control elements communicate to ensure maximum performance and safety. Yet, this complex technology must be user-friendly.
Ergonomic control design ensures that humans can efficiently and errorlessly act as central control entities. This involves not only button layout but also tactile feedback, durability, and adaptability to various environments. The challenge for machine manufacturers is to develop control solutions that are technically powerful and intuitive, even under extreme conditions.



Therefore we offer a wide range of CAN modules specifically designed for use in extreme conditions. Our products are distinguished by durability, user-friendliness, and flexibility.

- **b-Drive Cab Control:** Ideal for mobile applications with SAE1939 or CANopen interface. Available in variants with five or six buttons, encoder with push-button, or joystick encoder with push-button. These devices are vibration and impact-resistant, offering dimmable LED indicators and symbols.
- **SwitchModules:** Modular construction makes these switch modules perfect for installation in commercial vehicles. They provide flexibility and reliability in control.
- **eao Rugged CAN Keypads:** Intelligent HMIs for E1 applications with functional safety feature individual 4-segment and RGB halo ring illumination.
- **KeypadModules:** These modules with SAE J1939 interface are available in various configurations with 6, 8, 12, or 15 buttons, enabling intuitive and efficient machine operation.

We are excited to unveil our latest product: KeypadModules Touch. This innovative solution combines the robustness of mechanical keys with the flexibility of modern touch technology. The KeypadModules Touch are designed to provide even more user-friendly control and meet the demands of modern machinery.

Key Features of KeypadModules Touch:

- **Robust Design:** Developed for use in extreme conditions, ensuring high reliability and durability.
- **Versatility:** Available in 6 and 12-button variants, offering flexibility for different applications.
- **Intuitive Operation:** The combination of tactile feedback and touch functionality enables precise and comfortable control.
- **Custumised Symbols also in operation:** Symbols can be dynamically changed via CAN bus, optimizing the control panel for current work processes.

Sabine Igl

MDILink is now Bridging the Gap from ADAS Development to Series Production with ASAM CMP

In the rapidly evolving world of advanced driver-assistance systems (ADAS) and autonomous driving (AD), the ability to handle large volumes of raw sensor data with precision and efficiency is paramount. The conversion and transmission of data from cameras, radar, and LiDAR sensors are crucial stages in the development and validation of these systems. This is where measurement data converters come into play.

The Core of MDILink
At its heart, the MDILink is a SerDes (serializer/deserializer) measurement data converter that facilitates a seamless transition from ADAS/AD development and validation to series production. It is engineered to provide high-speed data conversion to 10Gbit Ethernet and offers transparent decoupling of raw data streams in TAP mode. What sets the MDILink apart is its ability to not only control sensors but also to provide I²C backchannel communication for precise time synchronization.

Perfect Environmental Imaging
Through synchronized trigger capabilities with cameras, radar, or LiDAR, the MDILink enables the creation of an impeccable environmental image comprised of precisely timed recordings. This is critical for ADAS/AD applications where split-second decisions based on sensor data can make the difference between a safe journey and a potential accident.

Sensor Data Integration and Analysis
Sensor data that is transferred via the MDILink can be easily integrated into data recording platforms and other modules within the AVETO Toolbox. This flexibility allows for comprehensive analysis and application across various stages of ADAS/AD development.

The 2-in-1 Device
The dual function of the MDILink as a data converter to 10Gbit Ethernet and as a device for transparent raw data decoupling in TAP mode stands as a testament to its versatility. With such capabilities, developers can select the mode that best suits their current developmental phase or data analysis requirements.

Customization and Adaptability
The modular concept of the MDILink ensures that it can adapt to a wide range of interfaces and data formats, from standardized interfaces such as GMSL, CSI-2, and FPD-Link III, to bespoke configurations. Data compression, conversion, and encryption can be tailored to meet specific needs, a service that b-plus is ready to provide, along with the physical adaptation to the chosen sensor chip.

Time Synchronization and Protocol Support
All MDILinks come equipped with hardware-based time synchronization (IEEE1588 802.1AS), ensuring that data from various sensors are precisely time-stamped for coherence. This product supports the XTSS Time Synchronization Service and is part of the highly accurate and performant timing concept of the AVETO Toolbox.

Introducing the ASAM CMP Standard
b-plus is now incorporating the ASAM (Association for Standardization of Automation and Measuring Systems) CMP (Communication Measurement Protocol) standard on all MDILink Measurement Data Interfaces.
ASAM CMP is specifically tailored to handle the communication and measurement data in test and measurement environments. It defines how data from various sources should be formatted, transferred, and stored, ensuring compatibility and ease of integration among various automotive systems and tools.

Key Benefits of the ASAM CMP Standard:

Interoperability
By adhering to a standardized communication protocol, the MDILink ensures that it can operate seamlessly with other ASAM CMP compliant devices and systems. This is crucial in a field where interoperability can significantly speed up development cycles.

Standardization
ASAM CMP helps in standardizing the procedures for measurement and calibration. This standardization ensures that different organizations and parts of the supply chain can work together more efficiently. It reduces errors and discrepancies in the measurement data, leading to more reliable results.

Scalability
The ASAM CMP standard is designed to be scalable, catering to small-scale experiments as well as large-scale productions. This means that as project requirements grow, the MDI link can continue to serve as the cornerstone of the data acquisition and conversion process without the need for major overhauls.

Data Integrity and Security
The protocol ensures that data integrity is maintained throughout the process of data collection, transmission, and storage. This is crucial in automotive testing, where accurate data is essential for analyzing and improving vehicle performance and safety.

Future-proofing
As standards evolve, they pave the way for future technological developments. By adopting the ASAM CMP standard, MDILink positions itself to be adaptable to future innovations in ADAS/AD technology.

Conclusion
The MDILink stands as a powerful tool in the hands of ADAS/AD developers, providing a comprehensive solution for the conversion and synchronization of sensor data. Its adaptability, robustness, and adherence to the ASAM CMP standard make it an invaluable asset for bridging the gap between development, validation, and series production. As autonomous technologies advance, the role of devices like the MDILink will only become more critical in ensuring that the data driving these systems is as accurate, secure, and reliable.

Carina Oody

New Measurement Generation

A New Era Begins – Introducing the New Xeon® Processor for Our BRICK2 and LOGifyer Line

BRICK2 X11

As demands for data acquisition and processing in ADAS and AD development continue to grow, the need for high-performance hardware becomes increasingly critical. With the BRICK2 X11, b-plus is launching the next generation of its proven BRICK series, presenting the direct successor to the proven BRICK2. The system combines robust data logging and powerful computing capabilities.

At the core of the BRICK2 X11 lies the new COM Express® module COMe bTL6-H, featuring a powerful industrial-grade Intel® Xeon® processor. It delivers significantly enhanced performance while ensuring long-term durability even under demanding conditions. Thanks to its modular architecture, the system can be flexibly expanded – for example, with the PCIe GPU Add-On or the SPC Add-On, which allows the integration of two x8-PCIe 3.0 cards.

In the long term, b-plus plans to expand the BRICK2 X11 series with additional add-ons, enabling the direct integration of further raw data interfaces for centralized measurement technology. The actively cooled, closed finned heat sink housing enables operation across a wide temperature range from –20 °C to +60 °C. Thanks to its open system architecture based on Windows or Linux, the BRICK2 X11 offers versatile deployment options - both as a central and decentralized logging system for the validation of ADAS and AD components.

Precise time synchronization is ensured — as with other b-plus products — through the combination of the IEEE 802.1AS multi-domain standard and the proprietary XTSS solution. Additionally, the Smaart I/O Driver Interface (SIODI) allows users to monitor, manage, and flexibly adjust individual system parameters in real time, providing a crucial advantage when setting up and configuring customized systems.

Certified according to CE, FCC, VCCI, ICES, RoHS, and REACH standards, the BRICK2 X11 is now available and will be presented live for the first time at the ADAS & Autonomous Vehicle Technology Expo 2025 in Stuttgart.

LOGifyer

With the LOGifyer, b-plus presents a sophisticated hardware and software solution that has been specially developed to meet the requirements of today's automotive industry. The system enables measurement data to be recorded, stored and analyzed in real time without major integration effort. The software considerably simplifies the development and validation of ADAS, AD and off-highway applications, not least thanks to its user-friendly and intuitive interface.

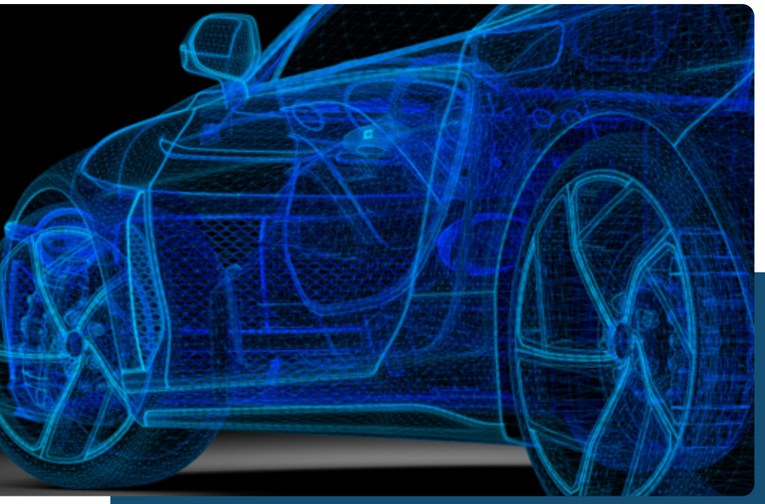
The LOGifyer is the complete solution for efficiently processing and storing large volumes of data. It impresses with its high data capture capacity, support for various data formats, powerful processors and flexible storage options. Particularly noteworthy is the integrated recording software solution AVETO.dps, which combines various data sources and presents the data in a standardized format. This increases the efficiency and accuracy of data analysis.

The Time Synchronization Service XTSS precisely synchronizes all recorded data and plays a crucial role in the accurate analysis and correlation of multi-sensor data. It offers high recording performance and makes efficient use of bandwidth.

With robust network capability, numerous interfaces (1000 BASE-T / 10 GBASE-T / 100G QSFP56 / GMSL2 / GMSL3) and integrated encryption, the system ensures secure data transmission and storage. The compact design offers flexible interfaces that support both wireless and wired transmission standards.

The data recorder collects and analyzes data from various sensors and control units in the vehicle, including radar and camera systems. Thanks to its robust and flexible design, it can withstand extreme environmental conditions and enables easy replacement of memory modules.

This makes the LOGifyer a reliable solution for data acquisition and data management to support and optimize development and validation processes in the automotive and off-highway industry.



Setting new Standards in Data Transmission

b-plus presents the latest Docking Station Thunder Dock x8.

Deggendorf, 29.10.2024 – With the launch of the Docking Station Thunder Dock x8, b-plus is setting new standards in data transmission. This innovative solution enables high-speed transfer rates of up to 20 Gbit/s via Thunderbolt 3. The Thunder Dock x8 is a stationary solution that is suitable for both continuous operation and rack installation.

The Thunder Dock x8 is the ultimate solution for users who need a stable, secure and fast connection to their x8 STORAGE removable storage devices. Equipped with Thunderbolt 3 interfaces, the Thunder Dock x8 enables transfer rates of up to 20 Gbit/s, making the transfer of large amounts of data seamless and efficient. The Thunder Dock x8 is designed for stationary use, continuous operation or rack installation. The active cooling and ventilation on both sides ensure that the storage units remain at an optimum temperature even under intensive load, making the Thunder Dock x8 particularly suitable for data-intensive processes or ingest processes.

"With the release of the Thunder Dock x8, we are offering our customers an unprecedented combination of speed, reliability and flexibility," explains Roland Peindl, Product Manager at b-plus. "This solution has been developed to meet the growing demands for data management and data transfer in all industries, especially where large amounts of data need to be moved in the shortest time possible."

In addition, the docking solution offers advanced control options with its SIODI management port, including integration into the SIODI API for disk management and firmware updates as well as access to production and temperature data. These features enable precise monitoring and management even for encrypted data carriers, for example with the b-plus Encryption Manager, providing users with additional security and control over their storage systems.

Carina Oody

Worldwide Partnering

Cooperation Between b-plus and AVL Optimizes Data-Driven Development of ADAS/AD Systems

Graz, Austria, April 2025

There is no way around data-driven processes in the development and validation of advanced driver assistance systems (ADAS) and automated vehicles (AD) today. The tools and methods used generate huge amounts of data. This "flood" of terabytes (TB) leads to major challenges for ADAS/AD customers. AVL and b-plus offer an integrated overall solution for this, with which the data volumes obtained during real driving can be efficiently recorded, reduced if necessary, managed and further processed.

In order to check the performance of ADAS/AD sensors and driving functions, many representative test drives in traffic situations that are as real as possible are required. This applies all the more the higher the degree of automation (SAE level 0 to 5) of the vehicle. Nevertheless, cost-efficient and reliable methods for validation can be implemented - for example, through objective comparisons between vehicle perception and a high-precision environmental reference, also known as ground truth.

The AVL Dynamic Ground Truth System™ (DGT) is leading the way in this field. This reference system enables 360° environment detection that is completely independent of the test vehicle's sensors. Lidar sensors, high-resolution cameras and GNSS systems record the environment around the vehicle. At the same time, the sensor data of the test vehicle is also recorded.

Over 20 TB per vehicle is the norm in a standard 8-hour shift. Global driving campaigns, which are typically carried out with 20 or more vehicles, quickly reach daily values in the order of 0.5 petabytes (PB). These figures illustrate how important an efficient and powerful validation environment is for successful validation.

The DGT system from AVL masters these challenges thanks to the BRICK 2 from b-plus. This integrated data logger records the input from the reference system and the vehicle sensors synchronously. Performance and scalability are essential for subsequent further processing: Using the b-plus COPYLynx, the data is automatically transferred to a high-performance data center or to a corresponding cloud environment, where the AVL ADAS/AD Analytics Platform (AAP) immediately takes care of the organization and analysis.

"Data-driven development is a key method for the development and validation of ADAS/AD systems. With the AVL Ground Truth data acquisition system, the powerful b-plus data logger and the analysis platform from AVL, we can rely on a standardized and scalable environment to implement this method."

Thomas Mauthner, Solution Manager in the ADAS/AD Testing Solutions division at AVL.

"It is becoming increasingly important for our customers in the ADAS/AD environment to obtain high-quality data that they can use as a basis for their data-driven development. The combination of the reference sensor system from AVL with the hardware and software toolbox from b-plus is a comprehensive solution block. Our technologies complement each other perfectly when it comes to feeding large amounts of data into the data center."

Stefan Rankl, BU Lead Mobile Measurement & Data Solutions at b-plus.

About AVL

With more than 12,200 employees, AVL is the world's largest independent company for development, simulation and testing in the automotive sector and other industries. Based on its pioneering spirit, the company delivers concepts, solutions and methods to shape the mobility of tomorrow. AVL develops cost-efficient and innovative systems for effective CO2 reduction and achieves this by using a multi-energy carrier strategy in all areas - from hybrid to battery-electric and fuel cell technologies. The company supports customers throughout the entire development process, from the idea phase to series production. In the areas of ADAS, autonomous driving and digitalization, AVL has extensive expertise to turn the vision of intelligent and connected mobility into reality.

AVL's passion is innovation. Together with an international network of experts spanning 26 countries and 50 competence and development centers worldwide, AVL is driving sustainable mobility trends for a more environmentally conscious future. In 2024, the company generated a turnover of 2.03 billion euros, of which 11% was invested in R&D activities.

More Information:

Full Control in ADAS Development - Data Logging with ADTF

Efficient Data Logging for Complex Requirements

The development of advanced driver assistance systems (ADAS) demands precise and reliable acquisition of diverse data sources – including sensors, bus communication, and navigation data. Proprietary systems often lack the required flexibility.

ADTF (Automotive Data and Time-Triggered Framework), combined with Digitalwerk's Smart Logging Solution, offers an open, configurable platform for complete control over the data flow – from configuration to post-processing.

Seamless Integration into the ADAS Development Cycle
A major strength of this solution is its seamless integration across all development phases – from agile function development to simulation (SiL/HiL) and real-world vehicle testing.
Through continuous data flow, development, testing and validation processes can be closely linked – ideal for fast iteration and targeted validation.

Open Architecture & Scalability

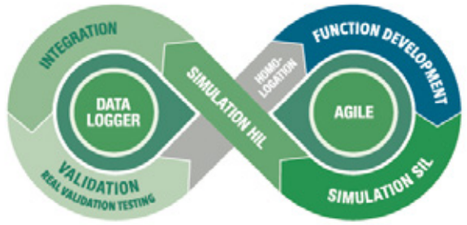
ADTF relies on open interfaces and modular expansion. It allows the integration of custom components and easy adaptation of existing setups – whether in the vehicle, on a PC, or in the cloud.

Key Features Include:

- High-performance bus tapping (e.g. AUTOSAR ARXML, DBC, Fibex)
- Compatibility with common loggers (b-plus, Vector, Technica, etc.)
- Camera and 3D sensor data support (USB, GigE Vision, Blickfeld, Ouster)
- Audio, navigation systems, and ETAS receiver integration
- Data anonymization and reusable configurations
- AUTOSAR and ASAM compliance

Event-Based Logging & Resimulation

Digitalwerk's Smart Logging Solution enables event-based recording: the system can be configured to respond to specific triggers or complex event chains.
This reduces data volume, enhances the relevance of recordings, and simplifies downstream analysis. Deterministic resimulation allows for fast, repeatable evaluation of recorded scenarios – even offline and faster than real-time. Ideal for regression testing and continuous opti-



End-to-End Overview

The ADTF data logging process spans the full development chain – from raw data acquisition to real-time logging and post-analysis.

Conclusion

With ADTF and the DW Smart Logging Solution, Digitalwerk provides a robust and future-ready platform for data logging in ADAS development.

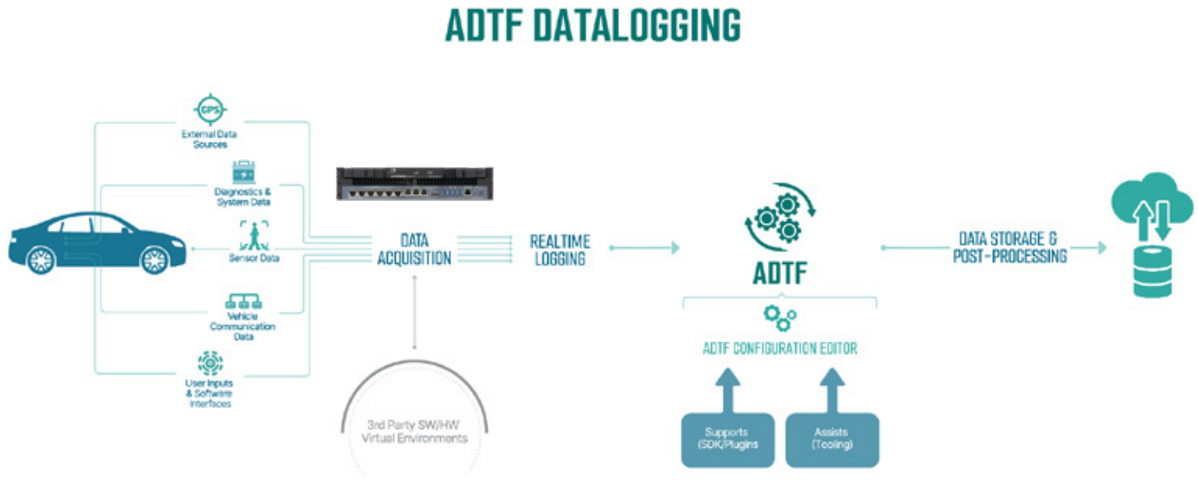
The Solution offers:

- Full system control
- Open, scalable architecture
- Efficient, event-driven logging
- Seamless integration into existing workflows

A true backbone for the safe and efficient development of automated driving functions.

Enrico Engel, Managing Director Digitalwerk

digitalwerk



Partnering-Up: b-plus & Technica Engineering

Pooling Expertise for Precise Data Acquisition and Storage

Two Bavarian companies are working together to enable high-speed recording of large volumes of data, covering both the raw data streams from the sensors and the bus and network communication in the vehicle.

The capture modules from Technica Engineering were developed to record vehicle communication technologies (e.g. CAN, FlexRay, LIN and Automotive Ethernet) in a distributed, modular and scalable manner.
This allows users maximum flexibility and cost efficiency through reusability.

At the same time, the data recorder from b-plus not only impresses with its high performance and robust hardware, but with AVETO.dps also offers a software solution that makes it possible to log data rates of over 100 Gbit/s precisely and synchronously. How does this combination of solutions benefit users?

The volume of data has increased dramatically in recent years, particularly in the ADAS/AD environment.
In addition, the communication technologies used, such as the SerDes solutions used, are changing. A modular and powerful complete solution is therefore essential in order to protect the customer's investment and at the same time achieve high data quality.
The increased use of SDV (Software Defined Vehicle) architectures will further intensify the trend towards more data with increasing demands on data quality over the next few years. The use of the new and open protocol standard ASAM CMP will play a key role in future-proofing the system. It provides the basis for modern, distributed and time-synchronized data recording and is supported by b-plus and Technica Engineering.

Thanks to its outstanding scalability, it can be used cost-effectively in test vehicles, vehicles, functional tests and complex test benches (HiL, system network test benches, LabCar, etc.) and in practically all vehicle domains.

technica engineering
Member of KPIT Group

What If? - A Customer Searching for a Logging Solution with eight Cameras

A PROFRAME FAQ

POV: A customer is looking for a data logger to record sensor data with their test vehicle. It is equipped with eight cameras that send their video data to a central ECU.

Hi, I'm looking for a system where I can record and feed eight camera streams into the ECU at the same time. Is this possible?

Yes, that's exactly what our data loggers are made for. Are you looking for a distributed or centralized setup?

I need a setup that is as compact as possible, i.e. a kind of "all-in-one device" that I can install in the trunk and to which I can connect all eight cameras and the ECU directly.

We can do this with a centralized setup together with the proFRAME from our partner Solectrix. proFRAME is a very powerful PCIe-based modular video grabber that we install in our loggers. It can handle all common transmission protocols such as GMSL, FPD-Link, GVIF or ASA Motionlink. You can record up to eight 4K cameras with a single proFRAME.

What do you mean by "modular"?

It's simple: the proFRAME setup consists of a PCIe base board on which one or two camera adapter modules can be plugged. These adapter modules contain the appropriate deserializers and serializers for the respective transmission technology. Depending on which protocol, such as GMSL2 or FPD-Link IV, is used in your application, simply select the appropriate adapter.

Transmission protocol is a good keyword. We are not quite sure yet which technology we should use.
We are currently using GMSL3 cameras, is that possible with proFRAME?

Let me bring a colleague from Solectrix into our conversation, he can answer all your questions in detail.

Yes, suitable adapter modules are available for GMSL3 for installation on the proFRAME baseboard. If you want to install the proFRAME for data forwarding as a man in the
middle (tap mode), you can use the corresponding adapter with GMSL3 deserializers and serializers, allowing you to record and forward four camera data streams on one baseboard.

But I have eight Cameras?

No problem. You can install multiple proFRAMEs in our Logger, to which you can connect additional cameras.

This means in my case I need two base boards and the appropriate adapter modules for GMSL3 for the eight cameras in tap mode?

Yes, that´s right!

What about Software?

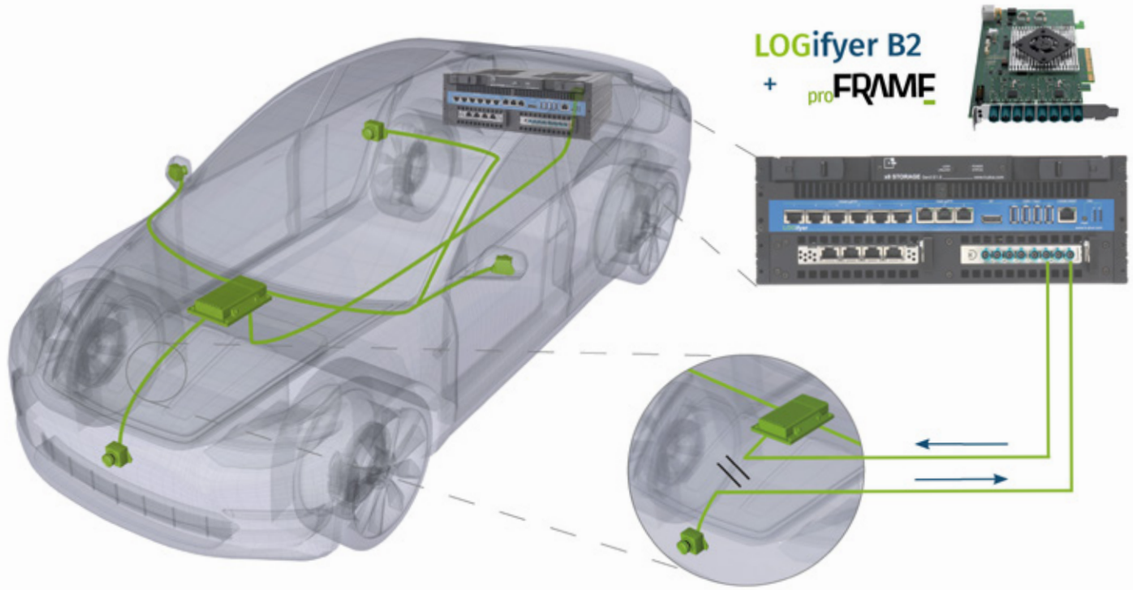
Of course, we will also provide you with the appropriate software including drivers for accessing the proFRAME. You then have a very compact C/C++ library at your disposal with a compact API with all relevant functions, for example for system configuration, data acquisition and much more. Data replay is also possible if you want to use the proFRAME later in a HiL setup for ECU validation.

Which operating systems are supported?

Windows and Linux.

What about the I²C communication, is this also recorded and forwarded by the proFRAME? In our case, this is important because the ECU initializes the camera sensor, among other things.

That's right. As the "man in the middle", the proFRAME operates completely transparently, which applies to video data and I²C communication. This means all I²C commands from your ECU are captured and forwarded to the cameras.



Data Logger setup b-plus LOGifyer with proFRAME (here: surroundview system with four cameras)

Is the power supply for the cameras also provided by the proFRAME?

This depends entirely on your setup. The proFRAME can take over the power supply, but there is also the option of PoC forwarding, i.e. the voltage then comes from the ECU and is passed through by the proFRAME.

Back to the modular concept with the adapter modules. I have a PCIe base board on which two of these adapters are then plugged, depending on what protocol I am using. Can I change the adapter modules myself? I'm asking because we will probably be using other cameras at a later date, which will then have an FPD-Link IV serializer. How does the changeover work?

As you mentioned, you replace the adapters yourself. You can also replace the associated proFRAME firmware yourself using the software.

Looks like the proFRAME is exactly the video grabber we need. As we are not experts in this field ourselves, can you help us set it up? The whole thing has to be integrated on the software side and the chips for the data connections between the proFRAME and the cameras as well as the ECU have to be configured. We definitely need your support here.

No problem, one reason why proFRAME is so successful on the market is our support. We have extensive expert knowledge of SerDes technology, are in close contact with the chip manufacturers and have already integrated a number of cameras from well-known manufacturers. Our customers should of course benefit from this knowledge!

You say "proFRAME is successful on the market", what does that mean in concrete terms?

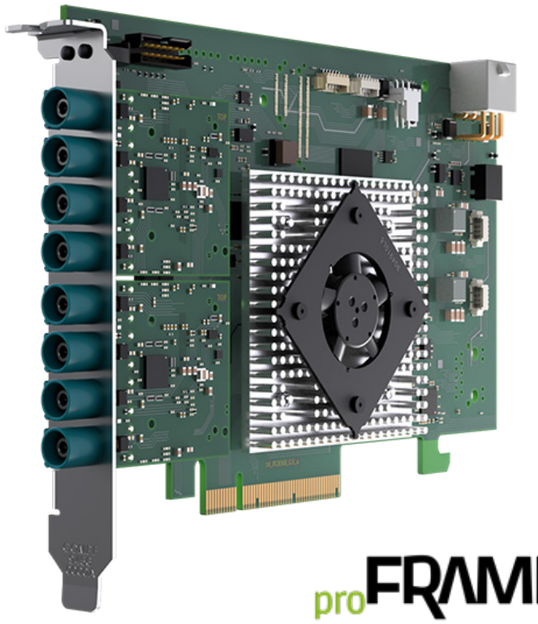
The proFRAME has been around for over ten years and several thousand devices have yet been shipped worldwide for the use in data loggers, HiL test systems and similar fields of application. As the name suggests, today's proFRAME 3.0 is the third generation.

You can also install and commission the proFRAME in the b-plus logger and integrate the software?

Let me answer this question. In fact, this has already happened to a large extent. The proFRAME has already been successfully put into operation in a BRICK system as well as in a DATALynx ATX4. The XTSS interface for time synchronization with the host system is also already working out of the box. This means there is nothing to stop it being used in a project within a short period of time.

Which data formats are supported for data storage? Can the Brick handle MDF4, for example?

Yes, MDF4 is supported, but other formats are possible too. For example, you can also use ADTF 3 on a BRICK2 or LOGifyer system and save your data in ADTF DAT format. The proFRAME has also already been integrated into ADTF 3.



To Conclude - Achieving More by Working Together:

Through our partnership, the aim of b-plus and Solectrix is to offer a largely pre-integrated system, so the customer is not burdened with installation and configuration tasks that typically require specialist knowledge he may not have. The focus is on the joint success of the project and this is known to begin with a holistically thought-out solution.

And the use case does not simply end with the recording of the data. The proFRAME can also be used for data replay in a b-plus system as part of a hardware-in-the-loop system.

Thanks to our close cooperation, we can respond to your individual requirements - from testing to series production. We rely on many years of experience, technical expertise and maximum flexibility.

proFRAME

Find out more ->

b - plus

Stefan Lobmeier
Channel Sales Manager
b-plus

solectrix
high end electronics solutions

Peter Kirsch
Business Development Manager
Solectrix

Partnering-Up: b-plus & driveblocks

Data Pooling and Foundation Models as a Cost-Effective Alternative for Developing Safe and Robust AI Applications Based on High-Quality Data

b-plus and driveblocks join forces to offer a data pooling and foundation model approach for the development of autonomous driving AI models in the off-highway sector.

Cost pressure and performance are often the decisive factors in the development of autonomous driving functions. This applies especially to the off-highway sector, where the variety of different use-cases and vehicle configurations make the build-up off a large data collection fleet and the required high-quality data annotation time-consuming and cost-intensive. The costs involved can amount to several million euros per machine type and therefore represent a significant barrier to enter the development of autonomous driving AI models for many companies.

To tackle this challenge, driveblocks, a specialist in commercial vehicle autonomy and AI model development, is deeply integrating the b-plus data processing and quality management solution into its core product, the Mapless Autonomy Platform. This partnership will allow customers to build cost-efficiently on foundation models that are pre-trained with high-quality data, and it will facilitate their entry into the development of AI-based autonomous driving functions.

The concept works as follows: Driveblocks offers its neural networks pre-trained upon a data pool from various industry sectors, sensor types and operating conditions. Users of these pre-trained models can decide to contribute data recorded with their respective setups in exchanges for substantial discounts.

The b-plus annotation and data management solutions ensure, that the training and validation data in the data pool is annotated and curated up to highest quality standards and therefore suitable for future production projects.

In addition, the partners handle the complete data infrastructure and process flow, ranging from specification creation, data collection, selection and labeling to quality assurance and testing, training and validation of the autonomous driving AI models. As a final step, customer-specific data is used to fine-tune the foundation model pre-trained on the data pool. At all times during the process, it is ensured that data privacy (users only get access to the trained model and not the data pool itself) and GDPR compliance is maintained.

„We are in the process of implementing a data pooling approach that will produce an incredibly robust foundation model. This approach will allow us to develop AI applications for our customers not only faster, but also extremely cost-efficiently," explains Alexander Wischnewski, Managing Director of driveblocks. „With a constantly growing overall pool of data, we can access reliable test data at any time. While we are still in the development phase, current predictions are that customers could save around 90% of cost when building upon the pre-trained foundation models."

„Our contribution is to ensure that ML applications are only trained with the most valuable data. We take great care to ensure that only relevant data is included in the data pool," adds Marius Reuther, Managing Director of b-plus automotive. „We achieve this through our extensive quality assurance processes established in the OEM environment, which guarantee a verifiable data quality of 98%! Even though we are still in the concept phase, the initial results are extremely promising."

The joint work of b-plus and driveblocks is revolutionizing the development of safe, robust and high-performance autonomous driving AI models. It minimizes the required amount of data, effort and costs caused by inadequate data quality, the need to set up in-house databases and infrastructures, and project delays. The first results of this groundbreaking approach will be published during the summer 2025.

driveblocks

Live Webinar "TRIPLE-D Sessions"

A Complete Success for Data-Driven-Development

On October 23 and 24, the stage was set for the TRIPLE-D Sessions - our two-day online event dedicated to data-driven development for AD/ADAS validation. With exciting presentations, interactive Q&A sessions and a varied program, we were able to inspire both existing and new contacts for our broad portfolio.

Strong Project Management and a Dedicated Team

The organization was headed by Levke von Drathen, who, with the support of the entire marketing team, put together a professional and smooth event.
From rehearsal rounds to ensure technical and content quality to accompanying advertising measures in social media and external media, nothing was left to chance. Even House B at the ITC Deggendorf was largely taken over for the event!

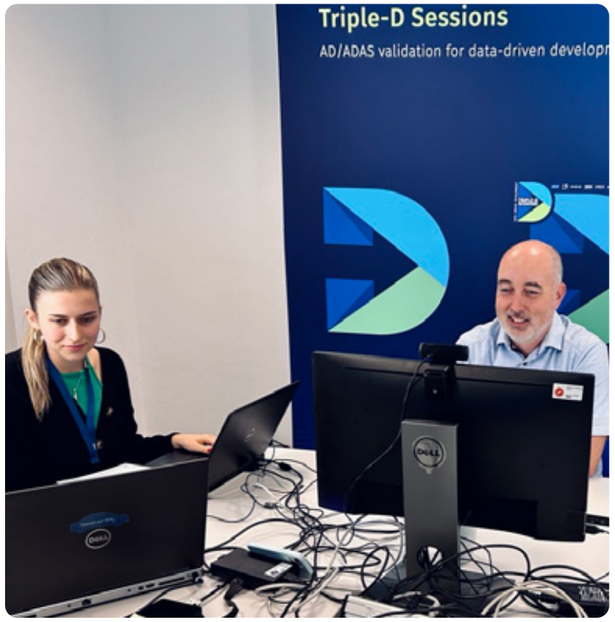
An Overwhelming Response

With more registrations for speaker slots than available places, the event showed how great the interest of our partners and customers is. The aim was to communicate our expertise and that of our partners in a simple and understandable way, strengthen contacts and initiate new collaborations - and we did this with flying colors.

Thanks to the collaboration between Business Development and Partner Marketing, we were able to attract top-class speakers and put together an exciting program.

We would like to take this opportunity to express our special thanks to all our partners - but of course also to our own internal speakers, who contributed to the success with their commitment and expertise!

Missed our TRIPLE-D Sessions? - No Problem!
You can re-watch every lecture on our website for free.



Diversity and Expertise in 13 Lectures

The TRIPLE-D sessions presented a diverse and in-depth program, structured into four main topics:

1. A Successful Start: Focus on Test Vehicles
Alexander Noack, Managing Director & Head of Development at b-plus technologies GmbH, opened the sessions with the presentation “The perfect data set for data-driven development and validation”. - He discussed the various possibilities of a measurement technology setup. The first block was supplemented by further hardware and software solutions for test drives. This was followed by practical contributions from partners such as Solectrix, Quasara and AVL on video recording and data processing.

2. Datacenter
In the second block, the focus was on solutions for data management. Topics such as scenario mining, hybrid multi-cloud environments, new storage technologies and suitable integration measures for mass data were presented by companies such as IVEX, NetApp, SVA and IBM.

3. Hardware-in-the-Loop & Simulation
The spotlight was on scalable hardware-in-the-loop tests and the use of synthetic data to optimize ADAS/AD systems. Speakers such as Johann Führmann (b-plus automotive) and Matt Daley (rFpro) provided in-depth insights into current developments.

4. AI Training and Data Optimization
In his presentation, David Stengel (b-plus automotive) emphasized the importance of data quality testing for autonomous driving systems, while Tim Stahl (Driveblocks) presented innovative approaches to scalable sensor fusion. Both showed how data quality and AI are driving the further development of autonomous technologies.

DATA DRIVEN DEVELOPMENT
TRIPLE-D SESSIONS

Thank you!
We would like to thank all participants and speakers for the successful event.

Applied Research Projects at a Glance

SKINET - Innovative Security Solutions through AI

Deggendorf, 2024/03/21 – On Tuesday, the consortium of the SKINET research project presented its research results and progress in the field of IT security for automotive and Industry 4.0 applications. The consortium coordinator, b-plus, invited all project partners to the final presentation at the main headquarter of the technology company in Deggendorf.

IT networks are omnipresent today. Given their increasing complexity and central role, it is crucial that they are effectively managed and protected. The core objective of SKINET is to create a framework using artificial intelligence that enables the early detection and mitigation of issues in IT networks. As consortium leader, b-plus has led a team of experts over the past three and a half years to tackle this challenge. Project partners including the University of Augsburg, AVL Software and Functions GmbH, Carl Zeiss AG, TG alpha GmbH, Technische Hochschule Deggendorf, Technische Universität München, and b-plus technologies GmbH have developed AI methods for a distributed system for the detection and treatment of security-critical incidents.

„We are pleased to present our research results today. With SKINET, we are taking an important step towards secure IT networks of the future," said Stefan Seidl, Research Engineer at b-plus. „With our results, IT security systems can be developed to dynamically detect novel threats using AI," Seidl explained.

Ms. Eickhoff, representative of the project sponsor VDI/VDE, is also satisfied with the results: „The consortium worked very well together. Even if there were changes to the original plan in the course of the project, good results were achieved that can be built on."

The system architecture of SKINET is highly versatile and flexible, suitable for both vehicle and industrial networks. Of particular interest is the use of anomaly detection components, which enable reliable detection of deviations from the network's normal behaviour.

Bundesministerium
für Bildung
und Forschung

We at b-plus are proud to announce that our SKINET research project has been successfully completed! Over the past three and a half years, we have worked intensively with our strong partners from science and industry to develop innovative security solutions based on artificial intelligence (AI) - and the results are impressive!

Projectpartner: AVL, Carl Zeiss, ProtectEM, TH Deggendorf, TU München, Universität Bremen

Automated Bus tested as Part of the 5GNPR Project

On Thursday, August 8th, the partners of the 5G in the National Park Region (5GNPR) project came together in Spiegelau for the completion of a part of the project, in which the construction of an automated bus shuttle for tourists was tested. In addition to the Technology Campus (TC) Freyung, a research location of the Deggendorf Institute of Technology (THD), which is in charge of the project, the companies Schiller Automatisierungstechnik, b-plus technologies, DBRegio and the municipality of Spiegelau are involved in this part of the project. The pilot project is intended to provide important insights into the efficiency of autonomous vehicles in remote and natural areas.

The 5GNPR project is funded by the Federal Ministry for Digital and Transport Affairs and is researching 5G applications for various scenarios in the rural and densely wooded low mountain region around the Bavarian Forest National Park. These are being tested in tourist communities such as Spiegelau. Testing the construction of an automated bus shuttle covers the mobility and transport pillar of the project. The actual test route of the bus led from the P+R parking lot in Spiegelau to the "Gfäll" parking lot. According to the project coordinator at TC Freyung, Sebastian Kohler, the route presented a number of challenges that had to be overcome as part of the project. Numerous sensors and cameras attached to the bus collected and evaluated data in real time to enable safe and precise navigation.

The results obtained can then serve as a model for similar regions worldwide and thus contribute to sustainable mobility in the future. "There is already a huge shortage of drivers in Germany. Automated and, in future, autonomous driving can help to close this gap in the future. The findings from the 5GNPR project will be incorporated into new and ongoing projects in order to come a step closer to the goal of strengthening public transport through automation," says Lars Abeler from DBRegio.
Bernhard Pfeffer from b-plus technologies also sees further potential in the simulation solution developed in the project, which virtually maps the route, bus and other road users. In future, this could be used to illuminate various capacity utilization scenarios and improve traffic and visitor management.
In the project, b-plus is responsible for equipping the automated bus with additional sensors and measurement technology, for evaluating the vehicle environment using AI-based perception algorithms, as well as for the virtual simulation of scenarios to optimize traffic and visitor management to optimize traffic and visitor management.

„Research is to see what everybody else has seen, and think what nobody has thought."
– Albert Szent-Györgyi

Group photo of the INSTATE Team. From the left: Prof Thomas Limbrunner, Dr Florian Bauer, Christina Sigl, Simon Steiger, Patrick Kühnel, Michael Schötz

INSTATE

Successful completion of the joint project between b-plus and the Deggendorf Institute of Technology (DIT) for the development of data-based algorithms with intelligent edge nodes.

Deggendorf, February 12, 2025 - With the INSTATE funding project, b-plus technologies GmbH and Deggendorf Institute of Technology (THD) are setting a new milestone in the development of data-driven algorithms for autonomous driving.

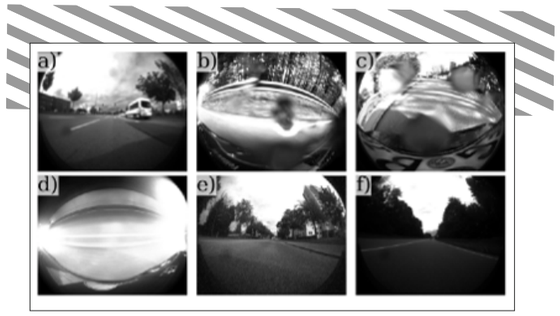
Due to the increasing number and performance of sensors, such as high-resolution cameras, data complexity is constantly increasing. These sensors generate enormous amounts of data that challenge even the most modern data centers. The INSTATE project is tackling this problem with an innovative approach that relocates data processing to the vehicle itself. This enables intelligent filtering and processing of sensor data while the vehicle is still on the road.

The aim of the INSTATE project was to develop innovative approaches for processing and analyzing large volumes of data directly in the vehicle. The topics of intelligent edge devices, artificial intelligence (AI) and state-of-the-art data transmission technologies played a central role in this.
The edge devices enable time synchronization in accordance with IEEE 802.1AS and the conversion of raw sensor data to 10GBASE-T Ethernet to ensure precise and uniform data acquisition.

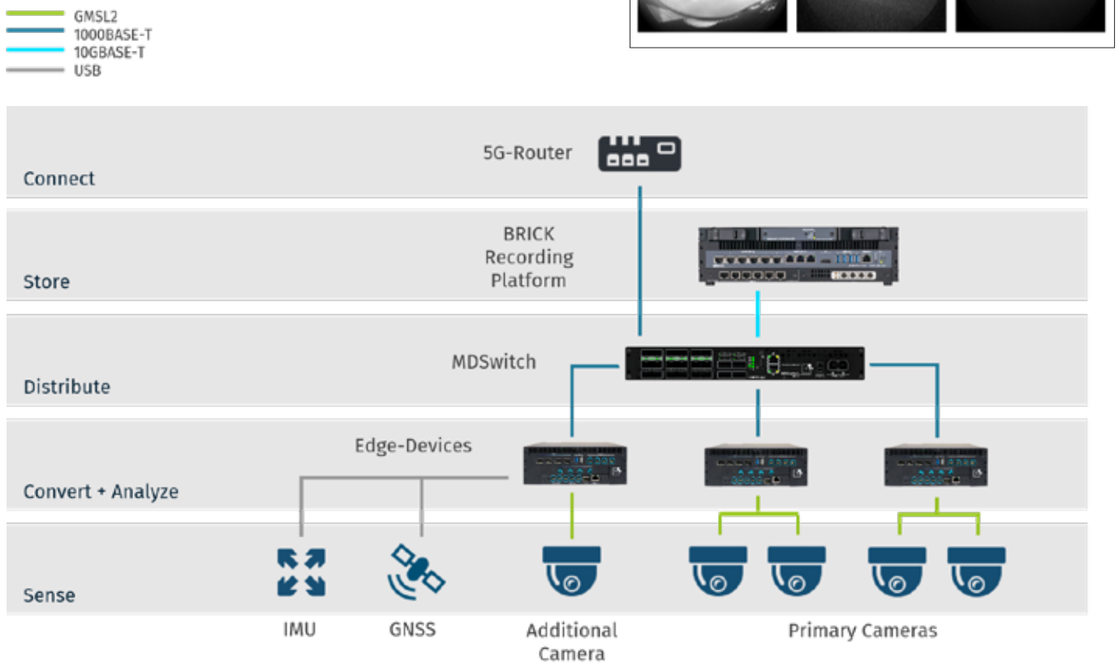
The metadata generated from the edge devices is then used to understand the current driving scenario. This includes important information on environment recognition (e.g. weather conditions), image interference detection (e.g. soiling of the camera lens) and the driving situation itself (e.g. turning maneuvers, overtaking maneuvers). The identification of relevant driving scenarios and the triggering of data storage is partially automated using predefined triggers. In summary, the project underlines the importance of cooperation between research and industry.

The partnership with the Deggendorf Institute of Technology ensures that state-of-the-art technologies and scientific findings are incorporated into the development of practical solutions for the mobility of the future.

INSTATE thus provides an important impetus for the further development of autonomous driving technologies and the efficient use of vehicle data - a significant step towards safe, intelligent and sustainable mobility. The project was funded by the Bavarian State Ministry of Economic Affairs, Regional Development and Energy. Further information on INSTATE and other b-plus research projects can be found at b-plus.com



Vehicle Setup



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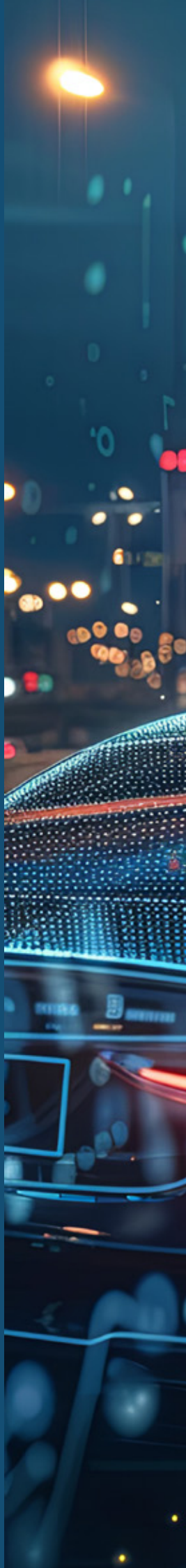

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