

NTTrainSolutions

Engineering for safe and cyber-resilient railway systems



EN

Creating safety.
With passion.

NewTec

Our Core Competencies



Electronics & Embedded Software

Development of safety-critical electronics and software platforms for vehicles, infrastructure, and control and signalling technology.



Functional Safety

Development of safety-related systems in accordance with current regulations and standards – from RAMS through safety engineering to the safety case.



Cybersecurity

Security-by-design for railway systems – from threat analysis to secure operation in accordance with the CRA, IEC 62443 and TS 50701.



Train Communication

Communication solutions in accordance with IEC 61375, backed by many years of experience in TRDP, ECN, ETB and interoperable Ethernet networks.



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Innovative Railway Technologies

Engineering for safe and cyber-resilient railway systems

Modern railway systems place the highest demands on electronics and software. Control units perform safety-critical functions, communicate via standardised networks, and must operate reliably and safely for decades. At the same time, regulatory requirements for functional safety and cybersecurity are continuously increasing. NewTec develops electronics and software solutions for these demanding conditions.

Our expertise spans system architecture, electronics and embedded software development, integration, verification and secure operation. Building on this engineering expertise, we support our customers in the three central disciplines of modern railway technology: functional safety, secure train communication and cybersecurity.

Engineering is more than development. Safe railway systems are not created by individual technologies or standards alone. They emerge from the interplay of system understanding, engineering expertise and many years of project experience.

As critical infrastructure, the railway sector is subject to strict European and national requirements.

Functional Safety

- EN 50126
- EN 50129
- EN 50716

Cybersecurity

- Cyber Resilience Act
- NIS-2
- IEC 62443
- TS 50701

Communication

- IEC 61375-2-3
- IEC 61375-2-5
- IEC 61375-2-8



Electronics & Embedded Software

Engineering for rolling stock, infrastructure and control & signalling technology

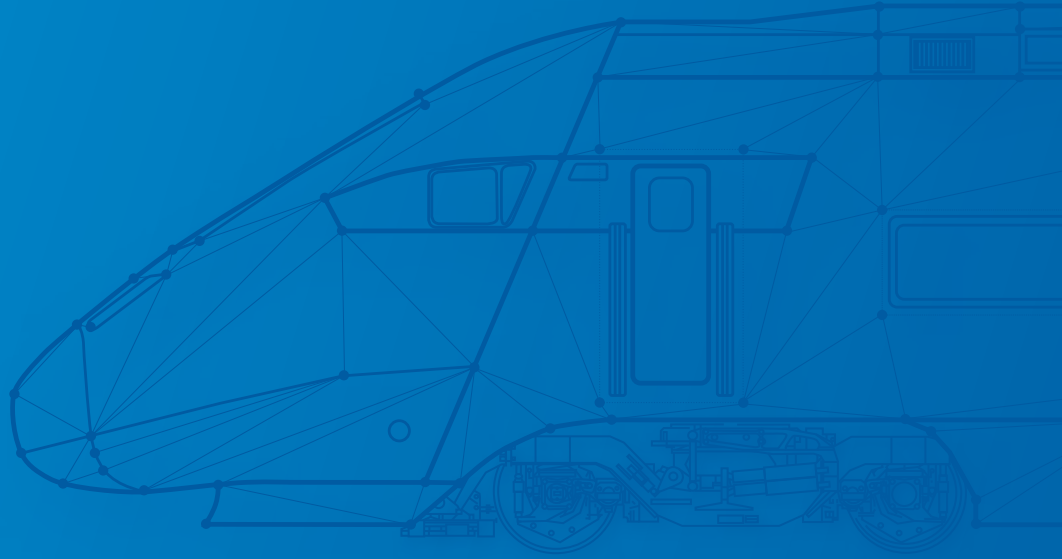
Whether interlocking, vehicle control, track monitoring or train communication – modern railway systems are based on high-performance electronics and embedded software. They must operate reliably for many years, withstand extreme environmental conditions, and at the same time meet increasing requirements for safety, availability and maintainability.

Developing such systems requires far more than conventional electronics and software development. What is needed is a deep understanding of the system, standards-compliant development processes, and the ability to incorporate regulatory requirements into product development from the very beginning.

We develop electronics and software solutions that meet the high demands of modern railway systems – technically, in regulatory terms, and economically.

From the initial system architecture through electronic and embedded software development to integration, verification and series support, we accompany our customers in safety-critical railway applications:

- **Control and signalling technology**
Interlockings, points control systems and signalling technology
- **Rolling Stock Engineering**
Control units for rolling stock and auxiliary functions
- **Infrastructure**
Track monitoring, sensor technology and diagnostic systems
- **Communication systems**
Networked control units and communication platforms



System Engineering

- System architecture
- Requirements analysis
- Requirements engineering
- Systems engineering
- Technical project support



Embedded Software

- Embedded software development
- Middleware
- Device drivers
- Communication software
- Real-time operating systems



Electronics Engineering

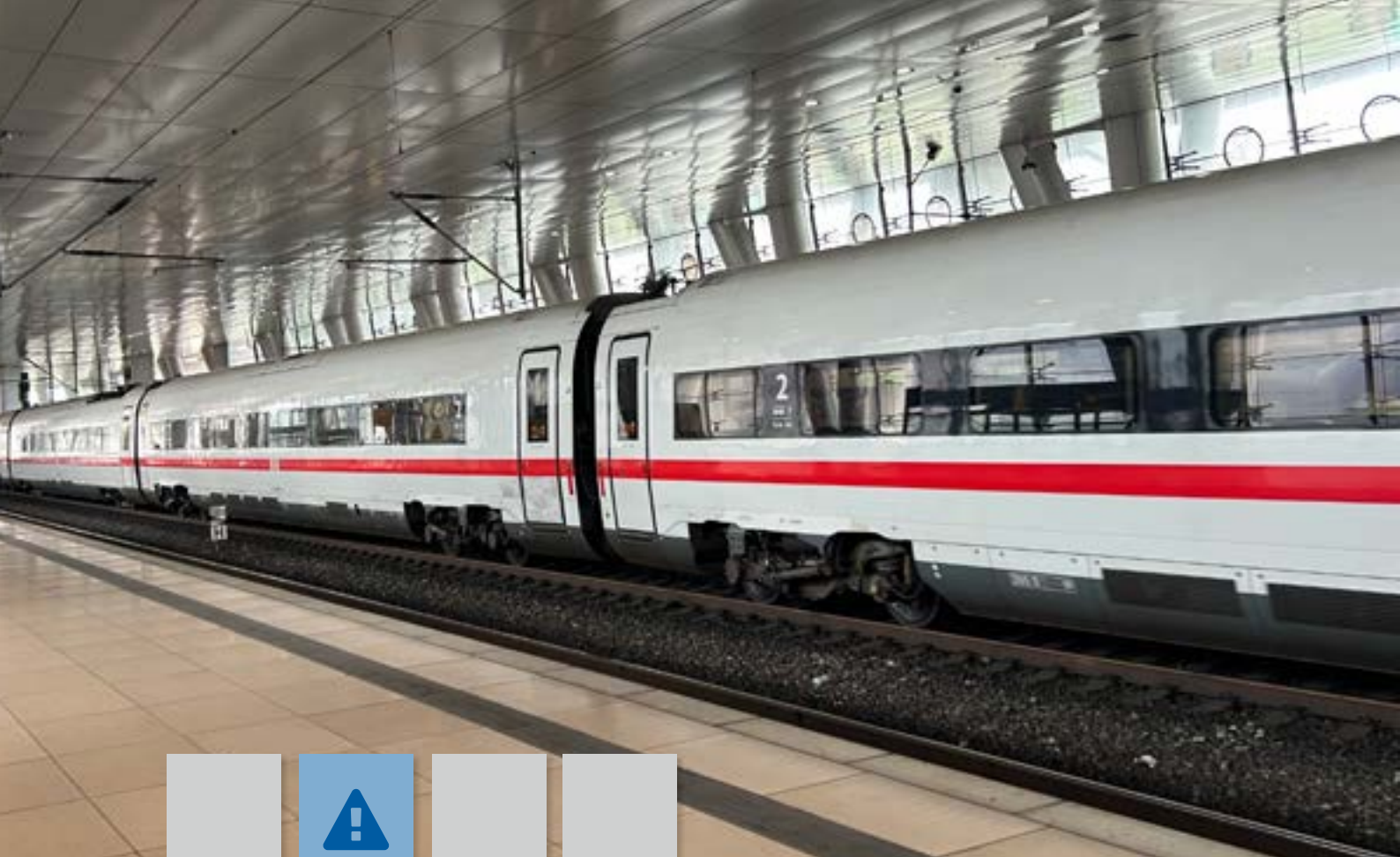
- Processor- and FPGA-based systems
- Architecture
- Design
- Implementation
- Test rigs



Verification

- Integration of electronic and software
- Module and system tests
- Test automation
- Regression testing
- FIT testing

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Functional Safety

Consulting and development for safety-related railway technologies

Safety-critical railway systems must operate reliably at all times – even when faults occur. Functional safety ensures that risks are identified and assessed at an early stage and controlled through appropriate technical and organisational measures.

NewTec supports customers in developing safety-related systems in accordance with current CENELEC standards. We regard functional safety not as a downstream verification step, but as an integral part of the entire development process – from system definition through to approval.

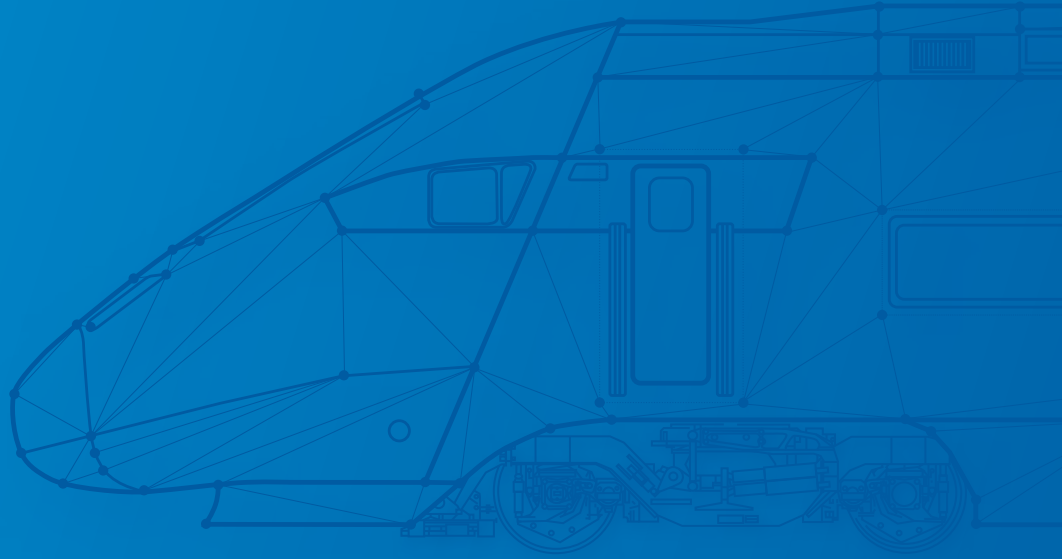
Our safety experts work closely with electronics, software and system developers. This results in solutions that meet regulatory requirements while also being economically viable to develop and operate over the long term.

Standards expertise

- EN 50126 – RAMS process and lifecycle
- EN 50129 – Safety case
- EN 50716 – RAMS process and system lifecycle

Our added value

- Functional safety as an integral part of product development
- Support throughout the entire safety lifecycle
- Systematic evidence documentation through to approval



Safety Consulting

- Conceptual consulting
- Development of safety concepts
- RAMS analyses
- Reliability and availability assessments
- Safety assessments



Safety Engineering

- Safety management
- Functional safety engineering
- Support throughout the entire safety lifecycle



Assessment of Functional Safety

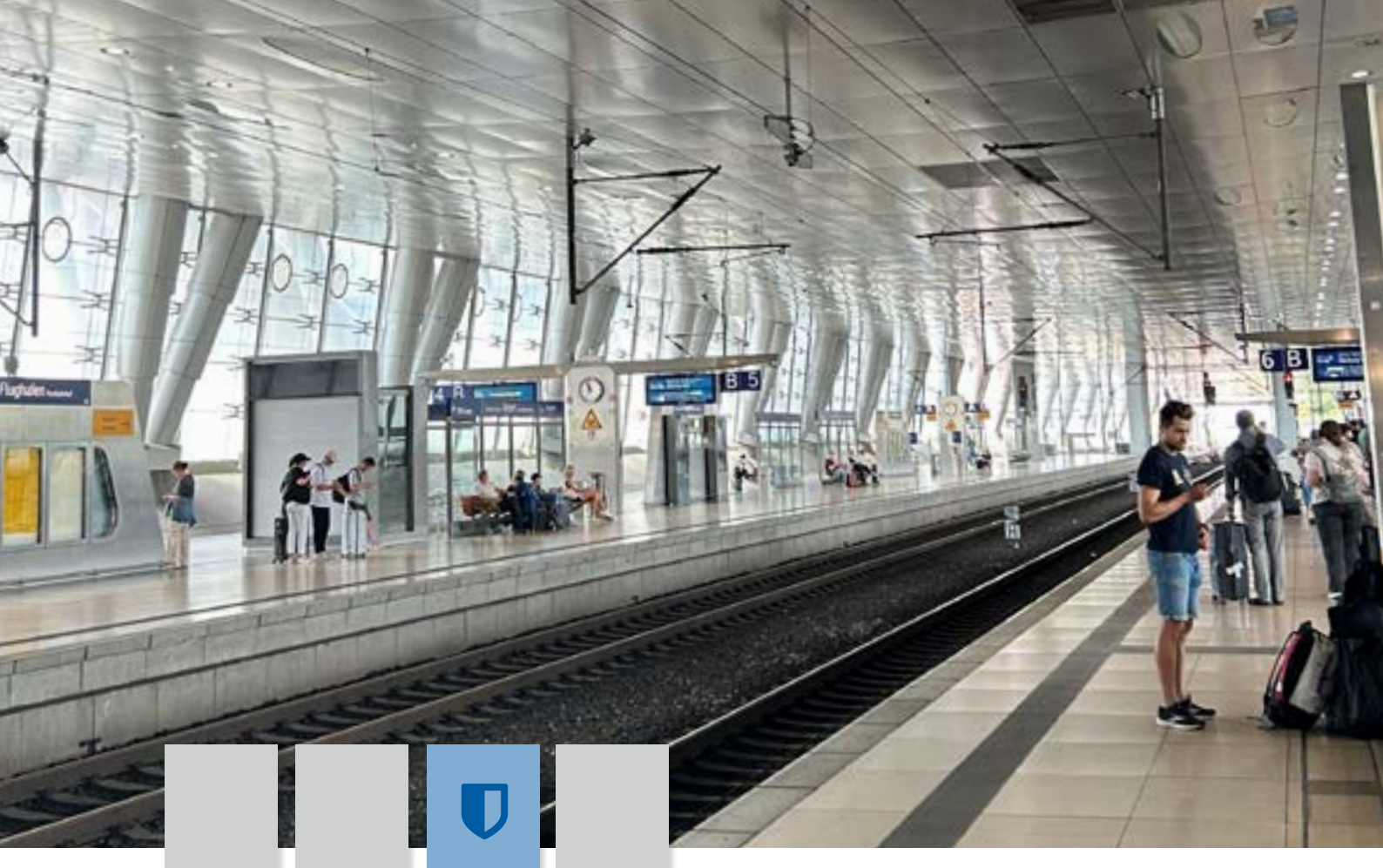
- Safety cases
- Hazard log
- Argumentation structure and documentation



Validation

- Safety reviews
- Verification planning
- Validation of safety-related functions
- Evidence documentation

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Cybersecurity

Security-by-design for railway systems – from threat analysis to secure

The digitalisation and networking of modern railway systems open up new possibilities – while at the same time increasing the requirements placed on their cybersecurity. Networked vehicles, control and signalling technology, and infrastructure-side systems must not only function reliably but also be protected against cyberattacks. At the same time, regulatory requirements such as the Cyber Resilience Act, NIS-2 and TS 50701 create new requirements for development, operation and maintenance.

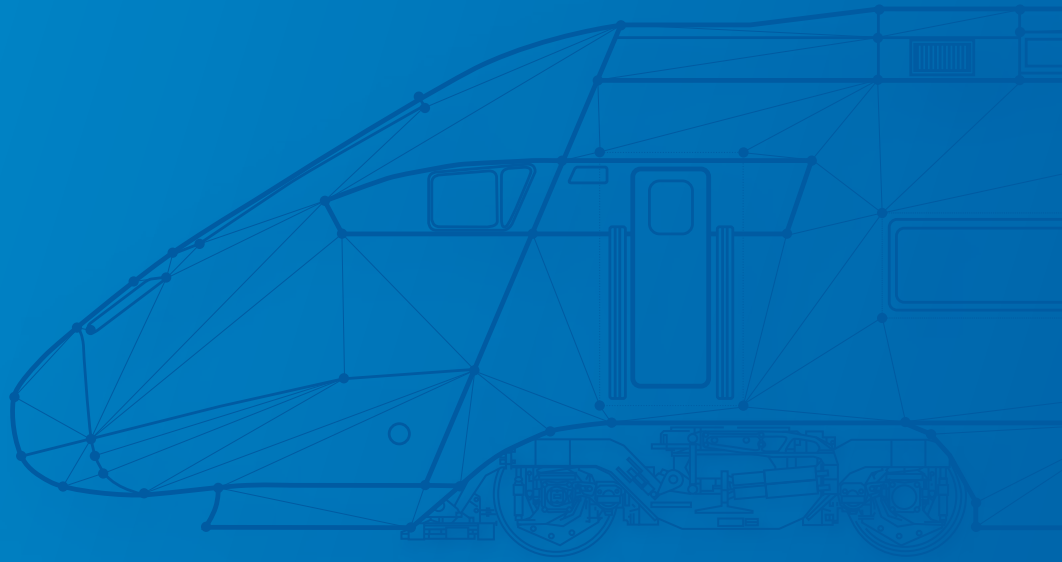
NewTec supports manufacturers and operators in establishing cybersecurity as an integral part of product development. Using a security-by-design approach, we support projects from risk analysis through secure development to safeguarding the entire product lifecycle. This results in solutions that meet regulatory requirements and can be operated securely over the long term.

Standards expertise

- Cyber Resilience Act (CRA) – cybersecurity requirements for products with digital elements
- NIS-2 – cybersecurity and reporting obligations for critical and essential entities
- IEC 62443 – cybersecurity for industrial automation and control systems
- TS 50701 – cybersecurity management for railway applications

Our added value

- Security-by-design as part of product development
- Support throughout the entire product lifecycle
- Translating regulatory requirements into practical engineering solutions
- Security lifecycle management (CVE monitoring, SUMS)



Security Consulting

- Gap analysis
- Process consulting
- Method and role descriptions
- Conceptual consulting
- Training



Threat & Risk Analysis

- Threat Analysis and Risk Assessment (TARA)
- Risk and threat analyses
- Security risk assessment
- Security requirements
- Derivation of protective measures



Security Engineering

- Security-by-design
- Secure Software Development Lifecycle (SSDLC)
- Security architectures
- Secure coding
- Hardening concepts
- Security reviews



Secure Operation

- Security monitoring
- PSIRT (Product Security Incident Response Team)
- Vulnerability management
- Security updates and patch management
- Toolchain for PKI and certificate management
- Security lifecycle management

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Train Communication

TRDP (Train Realtime Data Protocol): the common standard for network communication in trains

Today's rail vehicles feature numerous networked components from a wide range of manufacturers – with steadily increasing requirements for the bandwidth and reliability of train networking.

That is why the IEC and UIC have set the course for the future: new standards for Train Communication Networks (TCNs) based on IP technology (Ethernet) are intended to ensure the necessary performance and provide cross-manufacturer compatibility.

The IP-based TCN protocol TRDP (Train Realtime Data Protocol), specified in the international standard IEC 61375-2-3, forms the common basis for network communication in trains – and also the foundation for future SN-based train networks.

As recognised experts in TRDP and train networking, NewTec offers manufacturers and OEMs a complete TRDP package from a single source:

Consulting and Project Support

Project workshops, architecture reviews, requirements engineering (TRDP & SIL), project management

Development and Testing Services

Bespoke TRDP solutions including safety (SDTv2) and security, customer-specific system development, individual test environments, conformance testing, residual bus simulation

Training and Coaching

TRDP introductory seminars, expert workshops, technical one-on-one coaching, project and process assessments

NTOnTrack Test Environment:

The flexible, automatic test system for TRDP



NTOnTrack TRDP Analyzer:

Network protocol analyser for TRDP

The NTOnTrack TRDP Analyzer is the protocol analysis tool for TRDP and other Ethernet protocols – designed for train manufacturers, component suppliers and test benches that want to develop or test TRDP-based systems efficiently. Thanks to high-performance hardware, it captures Ethernet telegrams with minimal intrusion “in-line” at up to 1000 Mbit/s in “tap” mode, making it easy to analyse any network segment of a train. In “single” mode, it also records data traffic on two ports.



NTOnTrack TRDP High Layer:

Comfort API for the TCNOpen TRDP Stack

The NTOnTrack TRDP High Layer simplifies use of the lightweight C API of the TRDP Light Stack for faster TCN application development. Functions that the TCNOpen TRDP Stack offers only in rudimentary form – such as XML-based configuration, train naming detection and thread handling – are fully supported, so your system is directly compatible with the ECN requirements of IEC 61375-2-3.



NTOnTrack TRDP Responder:

End-device simulator for TRDP

The NTOnTrack TRDP Responder is communication software for Microsoft Windows and Linux that enables the sending and receiving of process data (PD) via TRDP over a network. The TRDP telegrams and their datasets are onfigured flexibly via XML files, allowing a TRDP-capable device to be imulated on your PC that communicates with your devices under test with minimal effort.



NTOnTrack TRDP Conformance Test:

Testing end-device conformance in accordance with IEC 61375-2-8

The NTOnTrack Conformance Test is designed for end devices that use the TRDP communication protocol within the Train Communication Network (TCN) in accordance with IEC 61375-2-3.

Why NewTec?

- ✓ **Reliable development partner**
for safety-critical electronics and embedded software
- ✓ **Many years of experience**
in functional safety and cybersecurity
- ✓ **TRDP expert**
Co-developer of the standard and full TCNOpen member
- ✓ **Proprietary platforms and tools**
for development, testing and validation
- ✓ **Long-term support**
throughout the entire product lifecycle

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With passion.

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