# B-TO-B RAILMAG

## UIC

INTERVIEW OF CHRISTIAN CHAVANEL, UIC RAILWAY SYSTEM DIRECTOR

## BRAIN CREATORS

THE RAIL INDUSTRY NEEDS DIGITAL CLONES BEHIND HUMAN EXPERTS

## NVENT SCHRÖFF

RAILWAY CERTIFIED SUBRACKS, CABINETS AND ENCLOSURES

## FERROCAMPUS

DEMONSTRATION TERRITORY FOR EUROPE'S RAIL

## CLEARSY

SAFETY PLATFORM, A NEW SOLUTION FOR DESIGNING NEW SAFETY CRITICAL SYSTEMS

## ZEDAS

ECM : OPPORTUNITIES FOR RAIL VEHICLE OWNERS AND THE EUROPEAN RAIL NETWORK

# SHIFTING TO EUROPE'S RAIL

CARLO BORGHINI / EXECUTIVE DIRECTOR OF EUROPE'S RAIL

WE ARE LOOKING FOR

# DOMAIN PARTNERS

TO FURTHER DEVELOP AND APPLY AUTOMATED SOLUTIONS FOR THE RAILWAY INDUSTRY

- SMART SYSTEMS FOR PASSENGER INFORMATION
- IN-TRAIN SURVEILLANCE AND VEHICLE MONITORING
- IN-TRAIN AND ON-TRACK AUTOMATED ASSET INSPECTIONS
- ACTIONABLE INSIGHTS FOR REMOTE OPERATIONS AND EMERGENCY RESPONSES

BRAIN CREATORS
digital inspectors

**Instead of cloning people, we clone digital employees.**

BRAINCREATORS.com

# EDITO

Today, too many organizations are using social interactions as a way to make a quick impression, rather than an opportunity to foster a mutually beneficial experience. In a world where we constantly have our eye on the immediate goals of delivering the right message to the right audience at the right time, we overlook key elements: relationships and relevance.

Time equals revenue. You have limited opportunities to sell, so you want to spend time on the people who are more likely to respond and ultimately buy. It's pretty simple. We spend a lot of time working on things that become nothing. Literally.
Increasing your odds will increase revenue.
When you look for content to share with your prospects, focus on providing insights that will help them make more informed decisions about the challenges they face in their industry.
Influencing buyers isn't an easy task, but it has a heavy upside if achieved. The driver of influence starts with making a commitment to content creation. The second way is to make a commitment to sharing buyer's content in strategic ways that add value to your buyer's day, career or personal life.
Actively listening to your buyers and engaging proactively to stay visible and valuable throughout the entire journey and sales process.

**Linda Farain**
Managing Director

**Patrick Osei**
Chief Executive Officer

# SOMMAIRE

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MOOVA
ABSOLUTE MOBILITY
LET'S_MOOVA_
ON_TOGETHER.

# MOOVA_A_NEW_WAY TO MOVE

Moova is an integrated, modular and seamless mobility platform, created by Almaviva. It is able to connect different modes of transport within a unique, advanced technological framework for a Mobility which is easy, fast, interconnected and flexible.

## MOOVA: ONE INNOVATIVE PLATFORM DIVIDED INTO 5 OFFER LINES THAT COLLECT 19 PRODUCTS

A single point of access for real-time monitoring and event handling thanks to Control Room. The heart of the mobility platform, that manage services, operations and assets in a single integrated enviroment as well as the Information HUB product that transforms data into precious information: intelligent, integrated, standardized and effective.

All the 21 Products support the main core mobility processes. They also implement an innovative Transport Digitalization concept that allows for the creation of a keen digital view over a full transport system that's both integrated and intelligent. This includes not only the digital twin of the assets but also the information relating to processes, results of the forecasting and calculation of indicator algorithms all in a single, integrated view made available to the entire platform by the Information HUB product.

# CUSTOMER CENTRIC MOBILITY
## Dedicated to People

Advanced ticketing solutions for Customer-centric business models: a multichannel and multidevice info mobility, all integrated within a complete suite of products.

Control Room | Automated Fare Collection | Passenger Information System | Smart Mobility | Customer Relationship Management

### Automated Fare Collection

Dedicated to Electronic Ticketing for Local Public Transport, it works by a multi-modal, multi-operator and multi-channel paradigm that's designed to manage most common tariff models by allowing for the flexible configuration of transport product fares and access rules. It allows for price definition differentiation according to customer profile, media used or distribution channel and also offers the possibility to create commercial bundles that include both multi-operator transport services and complementary services. Thanks to its modular structure, it can adapt to any transport context, and it can be integrated with third-party components.

### Passenger Information System

It provides tools for the provision of information concerning multimodal mobility, accessibility and security, both in places where mobility is used and on personal devices. It exploits innovative technologies and tools aimed at improving customer experience and guaranteeing security, consistency, completeness and timeliness of information respecting different delivery methods and channels. It manages the trip in its entirety, providing accompanying services and assisting the Customer through the various travel stages. It analyses the functioning of the equipment and delivery results while indicating the quality of the service provided.

### Smart Mobility

It creates multimodal mobility ecosystems through the integration and interoperability of various subjects. Mobility becomes a service (MaaS) and with it, a new mobility services integrator role is born, which must be able to provide an integrated offer and sell and monitor services while being also able to report and manage discrepancies as well as analyze performance indicators. By so doing, it allows new operators, each acting as supplier to an integrated service and governing its offer and service complexity, whether for traditional or complementary mobility - such as, for example, those deriving from the shared economy.

### Customer Relationship Management

It supports the acquisition of new Customers and increase the engagement of those who are already loyal, improving productivity, perceived satisfaction and corporate reputation. Thanks to the integrated service framework, it offers a unique experience and consistent messaging through various communication channels, by aggregating customer activities from different source systems inside and outside MOOVA. It manages a central repository for all customer data. Key insights can be used to enhance and nurture business relationships.
It also allows for the E2E management of travelers and provides the production of reports for corporate business.

# TRAFFIC & TRANSPORT

## Governing, planning and managing all mobility processes

For both TPL and Rail, all dimensions are covered: network modelling, service planning and resource scheduling, all-round operation management, quality control.

Control Room | Network & Service Planning | Transport Management | Traffic Management

### Network and Service Planning

It responds to the programming needs of Transport Operators, Authorities, Infrastructure Managers. With the same tool it is possible to work operate buses and trams, trains and metro, as well as route-based mobility services in general. A multimodal service can also be built by linking different services together. It allows for an integrated view and management of the resources needed for the production of transport services in terms of vehicles, crews and infrastructures. For these functions it can provide additional interfacing with external tools to optimize the use of resources.

### Transport Management

Integrating management of transport services and resources, it supports operations during transport execution for all transport companies. It can meet the needs of local and long-distance transport operators, whether single-mode or multimodal. It's also geared towards mobility integrators and governance bodies. It supports both production activities performed in "normal" service conditions, and those carried out in the event of "disturbances", at different levels of criticality. Together with its service provision, it allows for the collection and interpretation of data at the performance level of the production and transportation offered.

### Traffic Management

Designed for Infrastructure Managers, it supports the management of railway traffic. It can improve processes, shortening the time needed to identify a problem and determine the solution via realtime traffic monitoring tools and decisional support. It provides useful graphic tools to monitor regular traffic execution and facilitating operators. It can analyze traffic inside stations by monitoring rolling stock movements at interlocking level and by optimizing platforms, tracks and route deployment. It can be interfaced with Traffic Control Systems. All information collected is used for service quality indicators (real time and backdated to the past).

# TRANSPORT DIGITALIZATION
## A unique digital skin

It enables innovative digital services for every other line: field, assets, infrastructure, devices and touchpoints of all interactions with people.

Control Room | Asset Digitalization | Smart Train & Vehicle | Smart Station | Information Hub

### Asset Digitalization

This product allows for the digitization and geo-referencing of all network assets in order to build a unified physical infrastructure model while correlating all from various functional angles. Facilitates and increases the exchange and integration of information, implementing a detailed knowledge of all events in the field - including the state of the network and its components.It adopts international standards and supports various business tasks - from maintenance to traffic to network development. It includes both software components and equipment for diagnostics, as well as service delivery throughout network.

### Smart Train & Vehicle

It's based on integration between the ground systems and such state-of-the-art onboard technologies as onboard multimedia displays and digital and analogue audio equipment. The onboard control unit operates as a multiservice gateway and is equipped with both wireless connectivity and all software modules that allow other systems to use a stable connection to the ground to provide real-time journey information. GPS receiver constantly checks vehicle position and speed, there by providing passengers, onboard staff and the operating room. Thanks to the video surveillance system, passengers remain aware of the situation within their coach.

### Smart Station

The product allows for the digitizing of such nodal interconnection points of the transport system as stations, airports, logistics terminals and simple stops. It allows for the monitoring and control of civil systems and technological devices by which the system is transformed into an intelligent site that remains manageable from remote. It allows for the optimization of energy. It also provides services dedicated to Building Management; a PSIM (Physical Security Information Management) allows for interaction among events from different security devices and video analysis algorithms to facilitate safety and security processes.

ASSET MANAGEMENT

# Asset maintenance planning and management

It enables process optimization: from corrective to predictive, from warehouse management to supply chain, from investment planning to cost accounting management.

Control Room

Infrastructure Maintenance

Rolling & Vehicle Maintenance

Predictive & Optimized Maintenance

## Infrastructure Management

It equips transport infrastructure managers to carry out the entire fixed railway, road and plant assets maintenance process, starting from preventive maintenance. Corrective maintenance is performed to identify and correct some entities or equipment failure. Treating of maintenance activities: field visit management needs and, more generally, those of programming and management of operators in the field are all supported. It helps performing logistics activities that relate to spare parts. Finally, it manages accounting by way of forecasting, allocating costs and the value of goods through the integration of purchasing processes.

## Rolling & Vehicle Maintenance

It supports Transport Operators in planning and executing maintenance processes throughout the entire lifecycle of rolling stocks, vehicles, etc. Preventive maintenance aims to reduce the probability of breakdowns. Maintenance Plans are based on calendar deadlines, mileage, hours of functioning and other technical measurements related to specific equipment. Corrective maintenance aims to resolve some failure, anomaly or breakdown. It allows for logistic processes related to serialized equipment and spare parts, such as consumption, reordering, inventory status, physical location and traceability between warehouse and rolling stock or among vehicles.

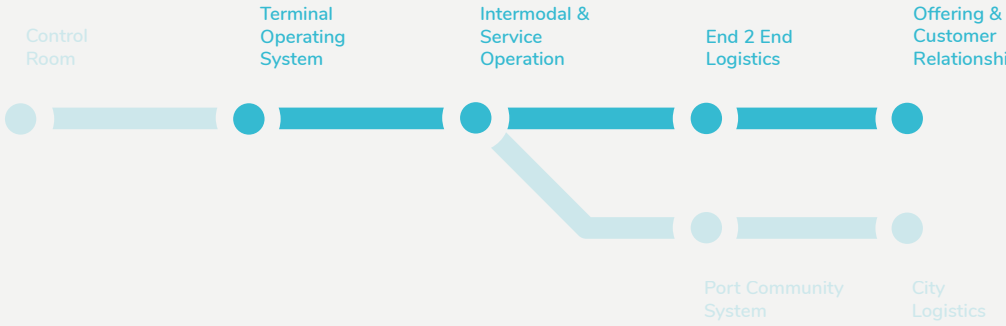
## Predictive and Optimized Maintenance

This product affords Transport Operators the opportunity to adopt a new maintenance paradigm, from a scheduled/corrective maintenance based on fixed parameters, such as time and mileage, to predictive maintenance based upon life and health indicators for significant Infrastructure, Rolling Stock and Vehicle components. The product includes a diagnostic solution for collecting, managing and analyzing signals and onboard events of the Rolling Stock and Vehicle or transmitted from the field. Diagnostic data can support Transport Operators in identifying recurrent behaviors and to refining both maintenance policies and preventive plans.

# INTERMODAL LOGISTICS 1/2

## Dedicated to Freight

It enables cooperation among operators to ensure document and information management can optimize processes and give a clear and integrated overview of the situation.




### Terminal Operating System

It supports both operators within the terminal and those following rail and road transport in all programming and management operations associated with goods movement, entry and exit of vehicles and trains, as well as management of the intermodal rendez-vous. The product allows for standardization of the information flow among the various actors as well as for tracking of all activities of the terminal throughout each phase of the process and all the movements, both within the terminal and at its borders.

### Intermodal & Service Operation

The pick-up of empty containers, handling, verification and training nowadays are necessary for the logistics nodes and, so, logistic needs a set of operations for the preparation of loads and trains. This product allows to support the various actors involved in the programming, management and reporting of the services provided through the operations. Furthermore, it improves the efficiency of the processes and the interoperability inside the supply chain thanks to standardized information flows.

### End 2 End Logistics

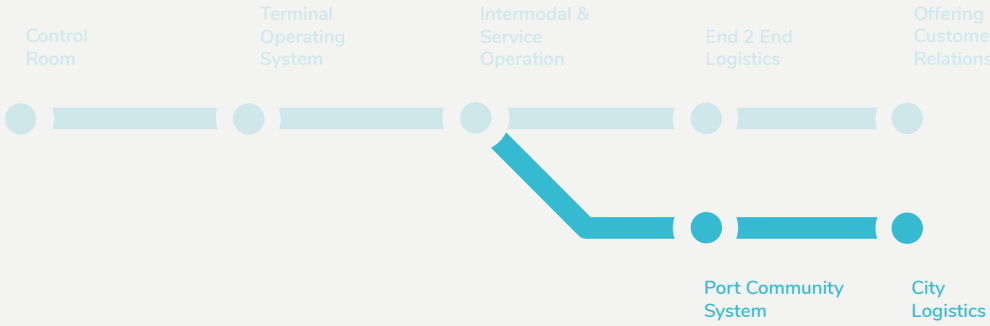
The product enables programming and management of the transport of goods, from their origin to their destination, through a combination of one or more modes of transport. By so doing it allows for the operational management of the contract as well as for interaction with all the transport operators and terminals involved in supply chain, preparation, coordination, tracing and reporting of both the overall service and of each one specifically. It also supports the management of any recovery actions owing to potentially anomalous situations or to unexpected conditions respecting service forecast.

### Offering & Customer Relationship

Throughout customer relationship management this product allows for a complete B2B logic, starting from definition and publication of the logistics or transport service offer and continuing then to management of the contract in all its phases (operational support, communication during the provision of contracted services and, finally, preparation of the information necessary for invoicing services).

# INTERMODAL LOGISTICS 2/2
## Dedicated to Freight

It enables cooperation among operators to ensure document and information management can optimize processes and give a clear and integrated overview of the situation.




### Port Community System

This product supports the Port Community by allowing for the development of intermodal logistic systems through the interconnection and cooperation among those multiple actors operating within the port area.It facilitates paper-free procedures via a common information platform that improves logistical processes. Various modules support cooperation among Agents, Freight Forwarders, Customs, Terminals, Haulers, Railway Operators, Authorities and all Port Community stakeholders. Also, it fully supports the cycles of authorization and

### City Logistics

The product improves the entire mobility ecosystem within urban areas by helping to prevent congestions well as by promoting environmental sustainability via traffic flows optimization. It allows for the management and monitoring of the entire supply chain by focusing on the last mile, from warehouse workflow to Customer order management, from fleet disposal and location to final delivery. To cover the needs of the service center, monitoring and management functions are all provided and integrated thanks to devices, sensors, metropolitan area ITS systems, Limited Traffic Zones and Parking lots as well as to systems used by Commercial Operators.

# LET'S_MOOVA_ ON_TOGETHER.

Scan the QR code and watch our video!

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# PRESENTATION OF ERCI - EUROPEAN RAILWAY CLUSTERS INITIATIVE

ERCI EURAILCLUSTER

WHAT IS ERCI? FOUNDED IN 2010, I.E. MORE THAN 10 YEARS AGO, ERCI COMPRISES 15 RESEARCH AND INNOVATION-ORIENTED RAILWAY TECHNOLOGY CLUSTERS, COVERING 16 COUNTRIES. ERCI REPRESENTS MORE THAN 2,000 COMPANIES (OF WHICH 1,500 SMES) AND AIMS TO PROMOTE INNOVATION AND THE DEVELOPMENT OF NEW BUSINESS OPPORTUNITIES AS A MEANS TO SUSTAINABLY STRENGTHEN COMPETITIVENESS WITHIN THE EUROPEAN RAILWAY INDUSTRY. ERCI PROMOTES COOPERATION BETWEEN INDUSTRY AND RESEARCH, INITIATES INNOVATION PROJECTS, ORGANISES B2B MEETINGS AND WORKSHOPS. THIS ALSO INCLUDES PROMOTING VISIBILITY AND STRONG NETWORKING AT EU LEVEL, AND ALSO OUTSIDE EUROPE. ERCI FOCUSES ON RAILWAYS, MOBILITY AND MULTIMODALITY BRINGING CUSTOMERS, SUPPLIERS AND SUPPLY CHAIN OPPORTUNITIES TOGETHER.


ERCI presence at Eurasia Rail in Istanbul (Turkey) in November 2021

**The ERCI partners**

ERCI regroups under the territorial care of its clusters, SMEs, large enterprises, universities, R&D organisations, education institutions, incubators and accelerators.

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## Our main actions

**The ERCI Innovation Awards**

Every year, the European Railway Clusters Initiative honours pioneering innovation projects from European rail industry companies with its annual ERCI Innovation Awards.

The ERCI Innovation Awards are organised and staged by the ERCI partner clusters; the submissions can come from European companies providing products, systems, technologies, processes or services, with proven innovative features. Submissions are nominated by ERCI clusters and the competition is a 2-stage contest: firstly, at national or regional level (according to ERCI clusters' geographical area of responsibility) to select companies; secondly, at European level.

Winners are selected by a European jury comprising independent experts representing industry, research and public authorities.

The categories of the ERCI Innovation Awards include:

- "Best Large Enterprise"
- "Best SME"
- "Coup de Cœur" special jury prize

The selection of winners is based on the following criteria:

- Innovative features of the solution
- Economic and social benefits for the railway sector
- Integration of new digital technologies
- Impact on "human capital"
- Creation of the innovation by networking (cooperation and collaborating with other private or public entities)

The two-stage application process for the 8th ERCI Innovation Awards will start in the spring of 2022 and the ERCI Innovation Awarding Ceremony will take place at the InnoTrans trade fair show (Berlin from 20 to 23 September 2022).

**Previous winners of the ERCI Innovation Awards:**

| Year | Winning Innovations |
|---|---|
| 2021 | • Bozankaya (Turkey) – Bozankaya Battery Tram<br>• PJ Monitoring GmbH (PJM) (Austria) – WAGGON TRACKER<br>• Everysens (France) – Transport Visibility & Management System (TVMS)<br>• PANTOhealth GmbH (Germany) – Predictive Maintenance via real and synthetic data<br>• Te.Si.Fer. S.r.l. (Italy) – SmartTrack |
| 2020 | • ASELSAN (Turkey) - MIDAS-R<br>• CG Rail GmbH (Germany) - Lightweight bogie frame<br>• ENEKOM (Turkey) – RailacousticASELSAN (Turkey) - MIDAS-R<br>• CG Rail GmbH (Germany) - Lightweight bogie frame<br>• ENEKOM (Turkey) – Railacoustic |
| 2019 | • Siemens Mobility GmbH (Germany) - First autonomous tram in the world<br>• D-Rail AB (Sweden)- Anti-derailing system<br>• IVM S.r.l. (Italy) – POWERVE |

**The hosting of the awarding ceremony rotates among the ERCI partners:**

| Year | Place | Hosting Cluster |
|---|---|---|
| 2021 | SIFER, Lille<br>(current planned for 26 October 2021) | i-TRANS |
| 2020 | Online | i-TRANS |
| 2019 | EXPO Ferroviaria, Milan | DITECFER |

If you want to apply to the next competition, please contact your regional / national cluster!

**Booths on rail shows in Europe and worldwide**

The ERCI clusters are very active in promoting ERCI at important international railway trade fairs. In 2021, ERCI was represented, among others, at Railtex (United Kingdom), TRAKO (Poland), Expo Ferroviaria (Italy), SIFER (France), Eurasia Rail (Turkey) and RAIL LIVE! (Spain).

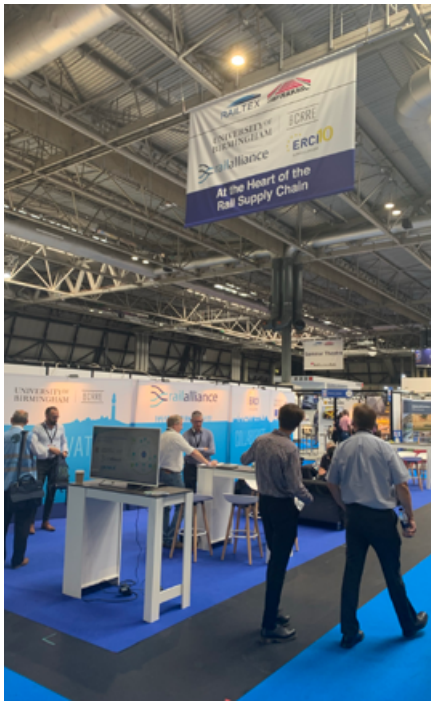




ERCI presence at EXPO FERROVIARIA (Italy) in September 2021

ERCI presence at Eurasia Rail in Istanbul (Turkey) in November 2021


ERCI presence at Rail Live in Madrid (Spain) in November and December 2021




ERCI presence at the RAILTEX exhibition in Birmingham (United-Kingdom) in September 2021


ERCI presence at the SIFER exhibition in Lille (France) in October 2021

### ERCI webinar series

ERCI regularly organises webinars on innovation topics, e.g. predictive maintenance, energy consumption management, data-driven applications for the railway sector, green and sustainable mobility and freight transportation, cybersecurity etc.. Small and medium-sized enterprises in particular will have the opportunity to present their innovative solutions and products to the interested professional public here.

### Task Forces

Task Forces and other working groups have been implemented on topics with high innovation potential, also as a support for the SMEs members of the ERCI network to refine and scale-up ideas through meetings and collaborative work:

- Cybersecurity
- MultiModality & Logistics
- Green&Sustainable Mobility

A Task Force on Human Factor has to be shortly launched.

## Our current european projects

ERCI clusters continuously develop European-level projects in order to address together some key challenges for the competitiveness of the rail supply industry, with specific focus on SMEs: from support to

internationalisation outside EU to support to adoption of advanced technologies; from improvement of regional instruments for innovation to improvement of the clusters themselves, in order to better assist their members.


ERCI presence at the TRAKO trade show in Gdansk (Poland) in September 2021

eXTRA

Co-funded by the COSME programme of the European Union

- To professionalise Clusters' skills and services
- To offer the European SMEs of the Rail Supply Industry with short-term exchanges in another EU country to improve own skills on topics of interest (Green transition, Internationalisation in a specific country, etc.)

S-ACCESS

Co-funded by the COSME programme of the European Union

- To support the European SMEs of the Rail Supply Industry in successfully applying to Public Procurements in USA, Canada and Norway

STARS

Co-funded by the COSME programme of the European Union

- To support the European SMEs of the Rail Supply Industry in successfully adopting Advanced Technologies to boost their products, services, manufacturing processes, organisation

RECORD
Interreg Europe

European Union
European Regional Development Fund

- To improve the regional funding instruments in some European regions home to the Rail Supply Industry to support the innovation processes of the SMEs

# INTERVIEW OF CHRISTIAN CHAVANEL, UIC RAILWAY SYSTEM DIRECTOR / FEBRUARY 2022

UIC

CHRISTIAN CHAVANEL IS A RAILWAY PROFESSIONAL WITH MORE THAN 30 YEARS' EXPERIENCE IN INTERNATIONAL DEVELOPMENT, PROJECT MANAGEMENT, OPERATION, MAINTENANCE, SAFETY, STANDARDISATION, AND REGULATORY AFFAIRS.
HE IS AN ENGINEER AND HOLDS AN EXECUTIVE MBA. HE HOLDS A CERTICIFATE FROM THE COLLEGE OF EUROPE AND A CERTIFICATE FROM MIT ON ARTIFICIAL INTELLIGENCE.HE HAS NOTABLY BEEN:

- Interoperability & Standardization Director at SNCF from 2014 to 2019
- Chairman of CEN-CENELEC Sector Forum Rail (ex-JPC-R) from 2016 to 2019
- COO (SNCF Regional Transportation)
- PMO (SNCF Regional Transportation)
- Head of Paris Gare de Lyon station
- Infrastructure District Manager

The UIC Rail System Department supports the work of the Rail System Forum. This forum relies on its members to continuously improve the railway system. The forum is divided into six sectors dedicated to keep railways at the edge of technology and to seamlessly interconnect with other modes of transport. Rail System deals with a wide range of subjects such as Train-Track Interaction, Track and Structures, Rolling Stock, Energy Management, Asset Management and Operations, Telecoms, Signaling and Digital Applications. More than 150 experts are involved in the department's activities, which covers 78 ongoing projects.

**1 – According to you, what means Artificial Intelligence?**

The term 'Artificial Intelligence' (AI) is a suitcase term and is not easy to define. There is nothing artificial about it. A.I. is made by humans, intended to behave by humans


and, ultimately, to impact humans lives and human society. Massive computing power, which only performs requested routine tasks and is controlled at every step by software programmers using a classical analytical approach, is not AI. A classical algorithm, however complicated, which does not deviate from the problem-solving method programmed by a software programmer, is not capable of learning. It is not AI. A large part of artificial intelligence today is based around automatic learning.

Today there are three important subtypes for IA : Machine Learning, Natural Language Processing, and Robotics.

**2 – For machine Learning, what are the key points to be focused on?**

The typical Machine Learning process requires both data and algorithms. A three-step process maximises the chances of learning success (Towards Data Science, 2018):

- Training: "A subset of real data is provided to the data scientist. The data includes a sufficient number of positive and negative examples to allow any potential algorithm to learn. The data scientist experiments with a number of algorithms before deciding on those which best fit the training data."
- Validation set: "The data scientist will run the chosen algorithms on the validation set and measure the error. The algorithm that produces the least error is considered the best. It is possible that even the best algorithm can overfit or underfit the data, producing a level of error which is unacceptable."
- Testing: "To obtain an accurate and reliable measure of error, a third set of data should be used, known as the test set. The algorithm is run on the test set and the error is calculated." During this learning process, data scientists must choose the best algorithm from a considerable number of them.

The quality of the data chosen is also crucial.

Eight biases must be avoided : propagating the current state, training on the wrong thing, under-representing populations, faulty interpretation, cognitive biases, analytics bias, confirmation bias, and outlier bias (Search Business Analytics, 2020).

**3 – What are the business applications for the Railways concerning Natural language processing?**

Natural Language Processing (NLP) is at the crossroads of linguistics, computer science and artificial intelligence. It deals with the interactions between computers and human language (text and speech). The result is a computer able to 'understand' the content of documents or speeches, including the contextual nuances of the language within them. Existing technology can accurately extract the information and insights contained in documents or in speeches, as well as categorise and organise the documents themselves.

The main application for the Railways is customer service : many companies transcribe and analyse recordings of customer calls. They also deploy chatbots and automated online assistants to provide immediate responses to simple needs and reduce the workload of customer service representatives.

**4 – What are the different use cases for robotics?**

The different use cases of Robotics are:

- Industrial robots able to streamline picking and packing processes in warehouses.
- Robots facing people: robots as workers in the fast food industry, robots delivering medication in hospitals, robots able to accompany ill people in hospitals in Japan, robots cleaning up airports or railway stations in the presence of passengers, and robots providing passenger information.
- Collaborative robots specifically designed to work alongside human employees are on the rise. They are cheaper, built with human cooperation in mind, and therefore easier to programme.

**5 – How AI technologies are currently being deployed within the railway sector?**

At this stage, forerunners have carried out innovative solutions. But AI has not yet been widely implemented in Europe.

For example, the current innovative solutions implemented are :

- Image recognition in the fight against terrorism
- Chatbots and virtual assistants for passengers
- Sales prediction through ML
- Robotics in railway stations
- Robotics in trains
- Robotics in warehouses

**6 – What are the main perspectives?**

The main perspectives for the Railway sector is predictive maintenance for both infrastructure and rolling stock.

**7 – What could be the role of UIC regarding AI?**

AI technologies solve problems but remain rather opaque (Machine Learning, Deep Learning, Convolutional neural networks, NLP, etc). Consequently, their interpretability is an essential question. However, there is currently no system on the market for interpreting the results provided by Machine Learning. Under these conditions, the role of experts will remain crucial for several years to come. In addition, the authorisation to place AI on the market, particularly for safety cases, will be granted only if the human-machine system as a whole is considered.

UIC will help its Members to create a vision and to publish guidelines for each use case, notably for predictive maintenance for infrastructure and rolling stock. The simple fact is that rail environment is tough on electronics. So many of the standard devices used in other industries can fail when confronted by the daily operational realities of vibration, dirt, contamination or high-voltage transients.

Take the example of a power supply used to drive an on-board Train Protection and Warning System (TPWS). The unit has to provide a good fit for the system's electrical and mechanical specifications and needs particularly operational reliability.

The primary switched DC/DC converters PCMDS150WK-IP65 from MTM Power are specially designed for applications in vehicle and rail technology. The standard version of this supply features patented thermoselective vacuum encapsulation and an IP65 rating for maximum protection against external contaminants.

The thermoselective vacuum encapsulation process (EP 1 987 708, U.S. Patent No. 8,821,778 B2) completely and permanently encapsulates the power supply to create a cemented joint to provide an inseparable link between the potting material and the components. This ensures that aging, heat, cold, rapid temperature changes and other environmental influences do not result in delamination, cracking or air pockets which can compromise reliability and potentially lead to failure. The thermoselective vacuum encapsulation guarantees uniform heat dissipation within the modules as well as excellent resistance against environmental influences such as shock, vibration and moisture. Remarkable features of this DC/DC converter are the profile of the casing made of black anodised aluminium with a heat sink and its connection via special rugged industrial connectors according to protection degree IP65. Thus they are complying with EN 60 068-2-1/2-2/2-11/2-14/2-30.

The push-pull topology used in the design of these converters enables a wide input voltage range with high efficiency. The 150 W converters are available with a wide input range for battery voltages of 24 V, 36 V, 48 V, 60 V, 72 V, 80 V, 96 V and 110 V acc. to EN 50 155. With the help of a transformer and a secondary linear choke, the converters offer a galvanically isolated output voltage of 24 V or 48 V which are adjusted by pulse-width modulation according to the current mode principle. The dimensions are 192 x 115 x 68 mm (length x width x height).

The converters need no ground load and are short-circuit protected by primary and secondary power limiting. They are maintenance-free, prepared for the use in devices with Protection Class II and fulfil the low voltage directive. Furthermore, they show a mechanically and electrically rugged design using SMD technology and undergo an automatic piece-by-piece test. Cooling is achieved by free convection.

In recent years, MTM Power has constantly grown to one of the largest power supply manufacturers for railway applications in Europe. The decisive factor here has been the quality of innovative products and the flexibility and reliability of the company business. MTM Power products meet all relevant standards and VDE/EN/UL regulations if applicable. The wide range of EN 50155 compliant DC/DC converters with

14 – 600 W are especially designed for vehicle and railway applications. Particularly for the sophisticated use in trains, these devices supply the electric and electronic systems on board and track side. Besides these rail converters, the product range includes AC/DC modules, filters and multi-power supply systems.

**FOR FURTHER INFORMATION :**

www.uic.org/IMG/pdf/artificial_intelligence_case_of_the_railway_sector_state_of_play_and_perspectives.pdf
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UIC RAIL SYSTEM DEPARTMENT

# Artificial intelligence
# Case of the railway sector
# State of play and perspectives

March 2021

INTERNATIONAL UNION
OF RAILWAYS

# GREENER RAILWAYS WITH BITZER

BITZER

AS ONE OF THE MOST CLIMATE-FRIENDLY MODES OF TRANSPORTATION, THE RAILWAY PLAYS AN IMPORTANT ROLE WHEN IT COMES TO REDUCING CARBON EMISSIONS. MOST OPERATORS ARE BUILDING ON THIS ENVIRONMENTAL ADVANTAGE IN ORDER TO SAVE $CO_2$ EMISSIONS, COSTS AND ENERGY. ONE OF THEIR RELIABLE PARTNERS IS THE SPECIALIST FOR COMPRESSION TECHNOLOGY IN REFRIGERATION AND AIR CONDITIONING, BITZER.

In the last few years, railway operators have started several projects to significantly reduce power consumption and $CO_2$ emissions of their vehicles. Besides improvements such as brake energy recuperation, many components of a train can contribute to reduce both energy consumption and emissions.

With decades of experience in mobile applications, BITZER manufactures compressors for the most varied air conditioning applications associated with railway. BITZER compressors meet the high demand for climate-friendly solutions for mobile refrigeration and air conditioning applications and prepare users for the challenges of the future.

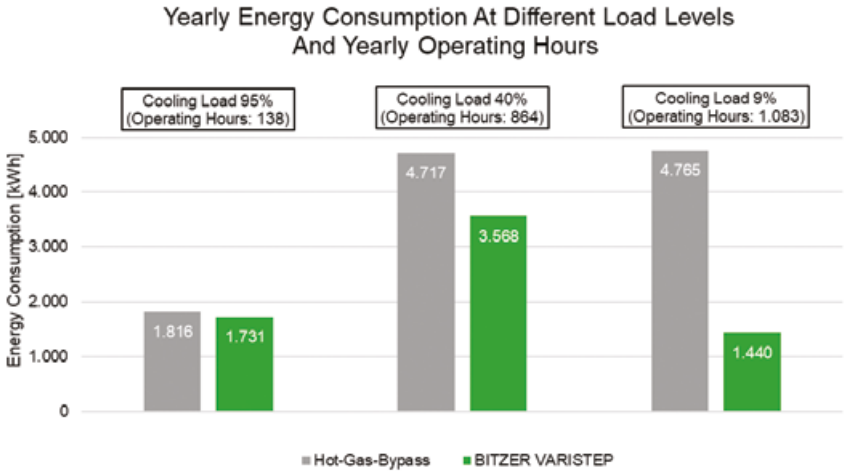
## Cost-effective and sustainable

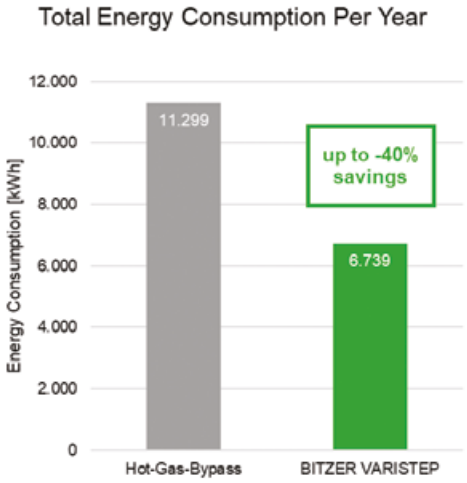
In railway, today's air conditioning systems are most often equipped with simple installations for capacity control such as hot-gas-bypass, in order to ensure passenger comfort. However, such control systems are at the expense of energy consumption. For both BITZER and railway operators, energy efficiency is a decisive factor, both ecologically and economically. Where costly frequency inverters can't be used, but the convenience of efficient capacity control is required, BITZER can offer a cost effective alternative with the VARISTEP. VARISTEP is based on the tried-and-tested system of mechanical capacity control and enables the capacity of reciprocating compressors to be adjusted in fine steps under all operating conditions. Its unbeatable benefit: the system offers a virtually stepless capacity control from 10 to 100 per cent, which enables outstanding system efficiency with maximum passenger comfort. The yearly operating costs of railway refrigeration and air conditioning systems can thus be significantly reduced in comparison to conventional hot-gas-bypass systems.

## Where does the energy saving come from?

The VARISTEP design is based on blocked suction technology, reduces the refrigerant volume flow of the compressor and consequently lowers the cooling capacity and compressor power consumption together. In addition, adapting the compressor cooling capacity to the system cooling demand results in reduced pressure fluctuations and increased evaporating temperatures. This improves the overall efficiency of the air conditioning system even further.

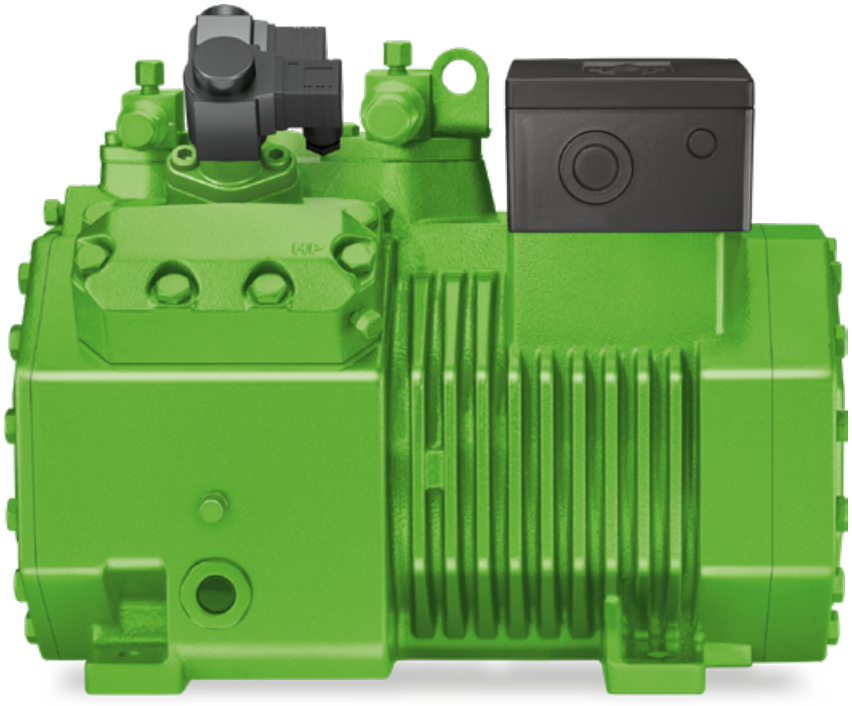
The following graphs show that seasonal energy savings are substantial. It's a calculation based on a typical light rail vehicle air conditioning system operated in central Europe. Two identical refrigerant circuits are compared, one with VARISTEP, the other one with a hot gas bypass. Different cooling loads and operating hours over a seasonal year are taken into account. Where part load operation is required frequently, the VARISTEP technology contributes to a decrease in energy consumption of up to 40 per cent for the compressor.




## Designed to be on track

Also the use of natural and alternative refrigerants contributes to climate friendliness. BITZER develops suitable compressors for almost all common and alternative refrigerants. With its ECOLINE reciprocating compressors, BITZER offers a wide range for the use of natural refrigerants such as hydrocarbons and $CO_2$. Quiet in operation and low in vibration, it is optimised for refrigeration and air conditioning applications and even the VARISTEP is ready for use with natural refrigerants.



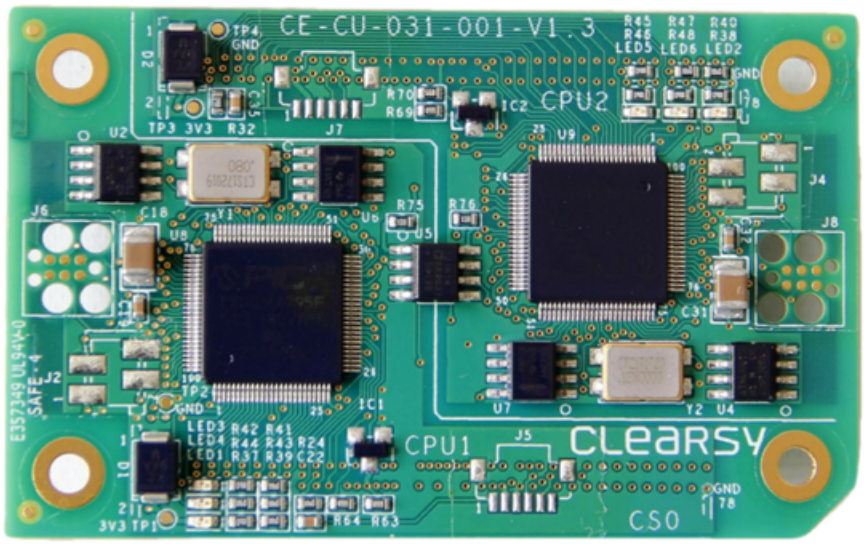
BITZER ECOLINE reciprocating compressors with the optimised capacity control system VARISTEP

Contact:
www.bitzer.de
transport@bitzer.de

CLEARSY
Safety Solutions Designer

# THE CLEARSY SAFETY PLATFORM, A NEW SOLUTION FOR DESIGNING NEW SAFETY CRITICAL SYSTEMS

BASED ON ITS 25 YEARS OF EXPERIENCE, CLEARSY HAS DESIGNED THE CLEARSY SAFETY PLATFORM: A CERTIFIED SINGLE-BOARD COMPOSITE FAILSAFE COMPUTER (PER EN50129 DEFINITION).




Certified single board CLEARSY Safety Plateform.

Since its creation in 2001, CLEARSY is a major player in the industrial use of formal methods to improve the functional safety of systems and critical software.

Thanks to this innovation, the end-user can now focus only on designing his custom business system/application, saving the complexity and costs associated with the design and certification of processor safety software layers. According to existing use-cases, the CLEARSY Safety Platform allows a reduction of up to 80% of the design cost and certification effort, leading to a shorter time to market for the solution based on the CLEARSY Safety Platform.

The CLEARSY Safety Platform facilitates the development of SIL3 and SIL4 applications and is already certified against EN50126, EN50129, and EN50128 with a SIL4 level by CERTIFER (French Independent Safety Assessor).

## A solution for safety critical applications

The CLEARSY Safety Platform is a comprehensive and consistent set of hardware, software, and tools easing the development of SIL4 systems. As the vital computer board is already certified, the end-user only needs to focus on the design of its own business application and system.

**CLEARSY Safety Platform is made of:**

- A single board vital computer (SIL4) bundled on credit card sized printed circuit board. External interfaces and peripherals have to be designed on a dedicated motherboard accordingly to customer requirements. CLEARSY offers support and services to design this custom motherboard.
- A software library that includes all the safety principles required to reach a SIL4 execution level. This library is in charge of performing all the vital built-in health tests. This software library is formally proven with the B formal method.
- A fully integrated toolchain (running on a docker or within a virtual machine) allows building directly the final binary. Thanks to this setup, all the configuration and installation steps related to the tools' ecosystem are completely avoided.

### Integration

The CLEARSY Safety Platform is ready to use industrial solution for anyone who wants to build a custom SIL3/4 device at a limited cost and with managed risks. To effectively use the CLEARSY Safety Platform you simply need to:

- design a motherboard with all the required hardware interface with your custom application environment
- write and validate your custom vital and non-vital software

FRANCE

# CLEARSY

## Safety Solutions Designer

> THE MORE AUTOMATED THE SYSTEMS ARE,
> THE MORE RELIABLE AND SAFE THEY HAVE TO BE.

**CLEARSY** has been innovating for 20 years by designing and deploying safer systems, based on the software tools and secure computer we develop.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Transport
Defence

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Exportation

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Hardware
Safety

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Equipment
Supplier

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www.clearsy.com • www.fersil-railway.com


Product fitted for Stockholm City Line platform screen door operation (System certificate BUREAU VERITAS #63937413 3rd March 2017 SIL3)

- check that your design meets the Safety Related Application Conditions (SRACs) of the CLEARSY Safety Platform (SCACs are conditions of use included in the certificate).

Then you are done: the CLEARSY Safety Platform ensures the SIL4 processing. CLEARSY can provide support for all or part of each of these design and validation activities. Especially you do not need to address all the complex questions of safety-critical computational architecture like (non-exhaustive list):

- Does my program memory is healthy or corrupted?
- Does my RAM is corrupted?
- Does my compilation is correct or not?
- Does my time counter is accurate or not?
- ...

All these sensitives items are already addressed and compliant with the CENELEC standard as established by the SIL4 certificate of the CLEARSY SAFETY Platform (type certificate n°9954/0262 from CERTIFER).

So the global safety case will integer all these points already supported by this certificate, which represents the major part of the global cost development.


CBTC Remote Input/output module (Generic product certificate BUREAU VERITAS #7092509 23rd July 2019 SIL4 and AREMA compliant, asserted by TÜV)


Certificat de type

N° 9594/0262 édition 1

CLEARSY

CERTIFER

GENERIC PRODUCT

CLEARSY SAFETY PLATFORM

# DC/DC CONVERTERS WITH PROTECTION DEGREE IP65 FOR RAILWAY APPLICATIONS

MTM POWER

IT IS A GENERAL PROBLEM: A FAILURE IN THE ELECTRONICS USUALLY LEADS TO A LARGER PROBLEM IN THE COMPLETE SYSTEM. THE SEARCH FOR A REPLACEMENT FOR THE FAILED ELECTRONIC COMPONENT OFTEN IS A SPECIAL CHALLENGE. CREATIVE THINKING AND A LITTLE CUSTOMISATION ARE REQUIRED IF AN ELECTRONIC COMPONENT FAILS IN AN AREA WITH SPECIAL DEMANDS ON THE ENVIRONMENTAL CONDITIONS. A SCENARIO THAT IS ALL TOO COMMON IN THE RAILWAY INDUSTRY.


DC/DC converter PCMDS150 110S24WK-IP65

The simple fact is that rail environment is tough on electronics. So many of the standard devices used in other industries can fail when confronted by the daily operational realities of vibration, dirt, contamination or high-voltage transients.

Take the example of a power supply used to drive an on-board Train Protection and Warning System (TPWS). The unit has to provide a good fit for the system's electrical and mechanical specifications and needs particularly operational reliability.

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14 – 600 W are especially designed for vehicle and railway applications. Particularly for the sophisticated use in trains, these devices supply the electric and electronic systems on board and track side. Besides these rail converters, the product range includes AC/DC modules, filters and multi-power supply systems.

**MTM POWER MESSTECHNIK MELLENBACH GMBH GERMANY**

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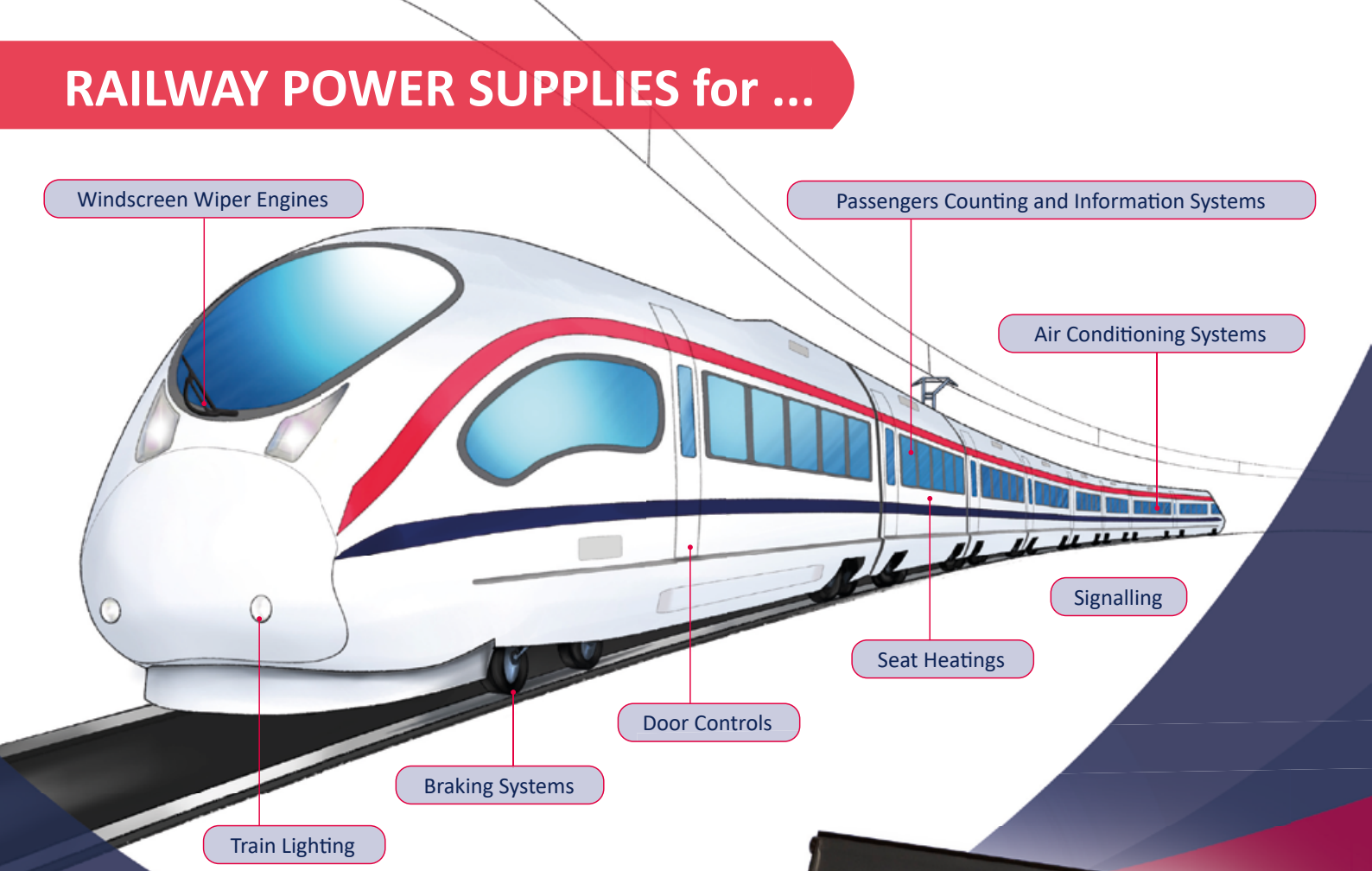
MTM Power's Thermoselective Vacuum Encapsulation

# RAILWAY POWER SUPPLIES for ...





## STAY ON TRACK.
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- Output power: 400 W; Efficiency: ≥90 %
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- EN 50155 / EN 50121-3-2 / EN 61373 Cat 1., Cl.B
- Fire protection acc. to EN 45 545-2

**www.mtm-power.com**

MTM POWER®

# IGE+XAO: POWERFUL ELECTRICAL ENGINEERING AND MANUFACTURING PLM PACKAGES FOR THE RAILWAY INDUSTRY

IGE + XAO GROUP

## Having collaborated for several years with

- railway equipment manufacturers,
- operators,
- infrastructures providers,
- MRO companies,

and being part of the Mipirail international cluster, IGE+XAO has developed deep understanding of issues facing railway design engineers such as intelligent train, equipment reliability, safety, eco efficiency, additional comfort and services to name just a few. This has led to increased requirements for electrical cabling, as well as configuration and variants management.

To help them cope with these issues, the IGE+XAO Group has developed an innovative and complete software range for railway equipment electrical design and manufacturing.

## Covering the full engineering and manufacturing process

IGE+XAO range covers the full electrical system design and manufacturing process and enables companies to build a powerful "digital twin":

- Define
- Model
- Integrate
- Produce
- Document
- Maintain

The solution is highly scalable and clients can implement it step by step depending upon their requirements.

## DISTINCTIVE COMPETITIVES ADVANTAGES

IGE+XAO powerful PLM (Product Lifecycle Management) suite provides equipment manufacturers' with advanced configuration tools. They allow for instance to define once a rolling stock and then re-use it in several configurations.

Teams work on shared data in a single repository. By sharing data, engineering and manufacturing teams save time, identify and solve problems early in the design stage.

Railway specific functions help accelerate the design process and lead to significant cost reduction. For instance, advanced wire routing features will allow engineers to design and calculate wire harnesses very precisely.

Information system integration with company global PLM, 3D mechanical CAD, PDM, ERP, etc. is also key and eliminates unnecessary data entry, therefore reducing error risks.

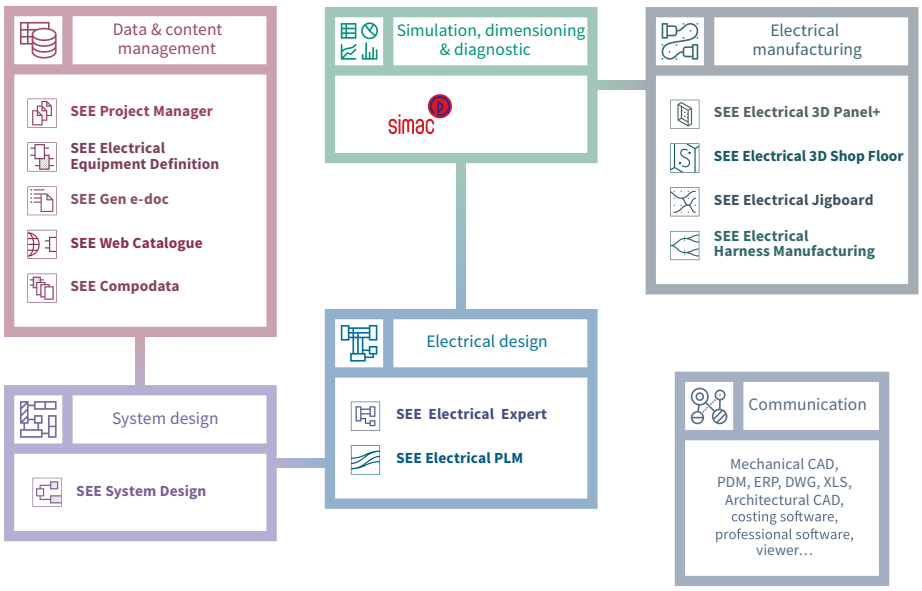
At last, strong traceability features will enable teams to follow up the different design stages and retrieve information through versioning.

## CONVINCED CUSTOMERS

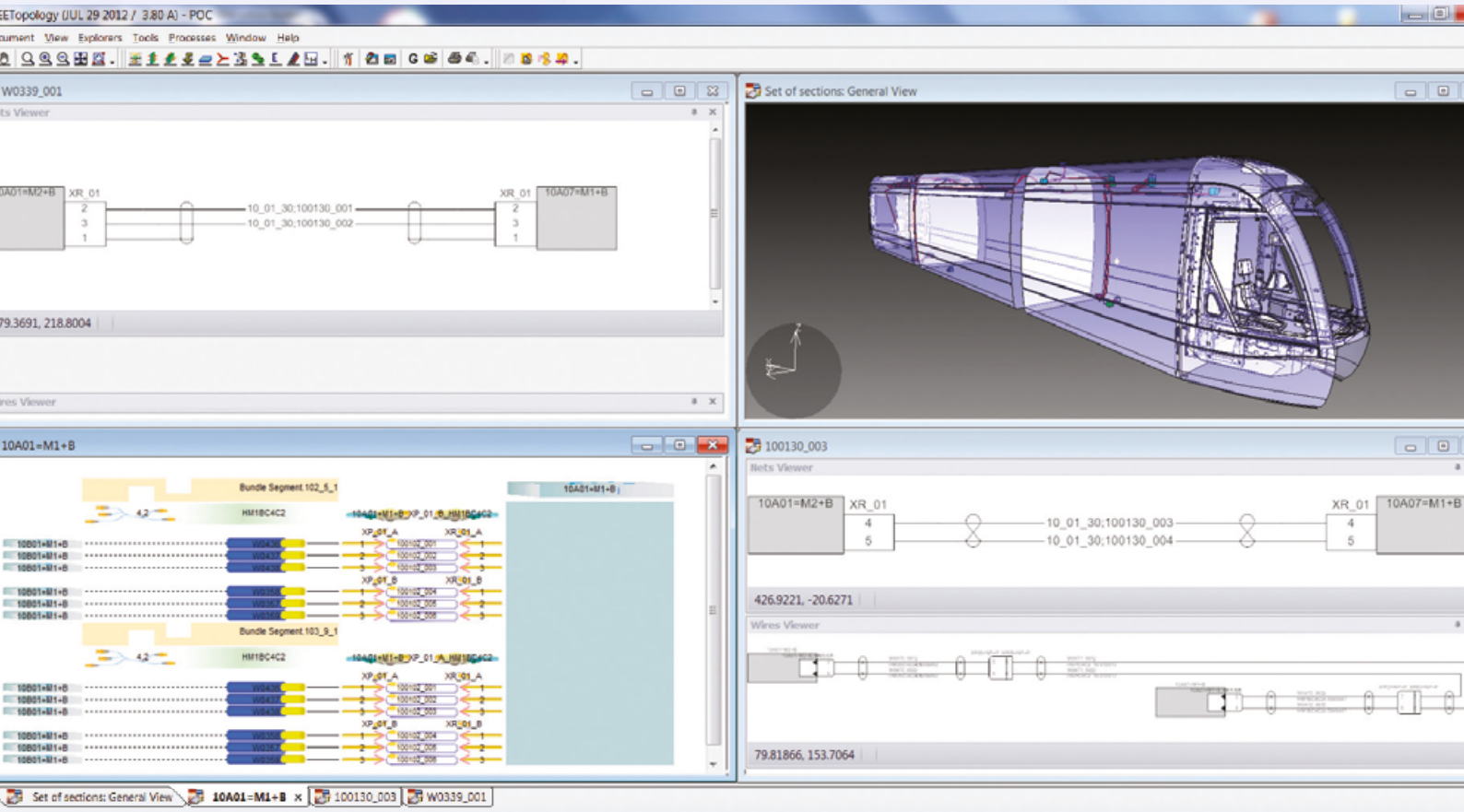
IGE+XAO solutions have already attracted major equipment and infrastructures manufacturers, MRO companies as well as their subcontractors. All have been able to save weeks and even months on their new equipment design and manufacturing.

## MEMBER OF THE MIPIRAIL INTERNATIONAL CLUSTER

The Mipirail cluster includes companies in the rail sector in French Occitanie region. At the national and international level, Mipirail coordinates its actions in conjunction with the three other French rail industry clusters (Association of Railway Industries, Mecateam Cluster and Neopolia). Since 2013, the four railway clusters have initiated an interclustering approach called Railway Business Clusters, a network hosted by the Federation of Rail Industries.



# Shaping the Future of the Electrical PLM, CAD and Simulation

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# THE RAIL INDUSTRY NEEDS DIGITAL CLONES BEHIND HUMAN EXPERTS

ALTHOUGH INNOVATION AND DIGITAL TRANSFORMATION SEEM ALL ABOUT TECHNOLOGY, THEY ACTUALLY REVOLVE AROUND HUMANS. COMPLEX ALGORITHMS USED FOR ARTIFICIAL INTELLIGENCE (AI) CONTRIBUTE TO MAKING PEOPLE'S EVERYDAY LIVES A BIT EASIER. AND, ESPECIALLY IN THE RAIL INDUSTRY, AI CAN HELP TO SOLVE ONE OF THE SIGNIFICANT CHALLENGES: THE SKILLS GAP. THERE IS A LACK OF PEOPLE WITH THE RIGHT SKILLS. SO, WHAT IF TECHNOLOGIES LIKE DEEP LEARNING AND AI WILL ALLOW US TO SPEND LESS TIME ON REPETITIVE TASKS AND SHIFT OUR ATTENTION TO MAKING CHANGES THAT IMPACT THE SUSTAINABILITY OF OUR ENVIRONMENT AND NATURAL RESOURCES?

> AI solutions won't replace your well-skilled inspectors, it will duplicate them.

**No flying trains, but a topical issue**

«When people first asked me about how I see the future of the rail industry, they might have expected a story about flying trains,» says AI-expert Glenn Brouwer. He is one of the founders and Chief Revenue Officer at BrainCreators that develops digital inspectors with domain partners. «Hopefully, I didn't disappoint them because I don't think that flying trains are the way that AI can benefit the rail industry. I do think, though, that AI can and will contribute to a topical issue; the skills gap the railway sector is experiencing right now. We are here to automate repetitive inspection work. The inspection results are presented as actionable insights that make a positive impact on our common future whilst contributing to closing the skills gap."

The skills gap that many industries experience was discussed by the World Economic Forum (WEF) in 2020. The gap pointed out there is the one between the skills that enterprises need and the skills that potential workers have to offer. As a result, there is a significant shortage of skilled workers.

Education and training systems try to keep pace with the demands of labour markets. It does, however, appear that the challenge is more extensive than this. Technological disruption, demographic change, shifting business models, and work's evolving nature are almost impossible to keep up with. This means a challenge for many industries. Between 2018 and 2022, it is estimated that 42% of the skills demanded for jobs across all industries has changed.

Reskilling and upskilling are necessities and not just nice extras for the rail industry. Fundamental skills have to be trained, like basic digital literacy, to boost people's chances of getting a job. But then again, we can ask ourselves if even well-trained people can close the skills gap on their own.

## Clone your domain expertise

"It might come as a shock, but I often start my presentations with the story that there is a digital clone behind every human expert,» says Brouwer with a friendly but determined smile. «Obviously, it's not possible to clone people, however, we can do the next best thing which is clone digital inspectors. We allow expert human inspectors to clone their knowledge in a digital counterpart, so their knowledge and expertise can be used almost infinitely.» The AI-driven digital inspectors of BrainCreators aim for faster, more consistent and cost-efficient inspections. These make a big impact on sustainability, maintainability, and public safety by efficiently monitoring the environment and effectively alerting to issues.

Moreover, BrainCreators directly impacts the future of work by offering intelligent automation solutions to solve the growing problem of human domain expert scarcity.

BrainCreators augment the performance of human inspectors by automating the repetitive components of their work, allowing them to focus on the interpretation of inspection results.

The point Brouwer wants to make is that humans are very well-equipped to do creative and high-value work. The 'boring' repetitive tasks can be handled by machines — they are faster and more reliable at this kind of task. "Let's say you have very experienced railway inspectors. They are well-trained and have years of experience on the tracks. These people are your most valuable asset; you don't want to lose them. Actually, you'd rather clone them so that you have skilled people on the tracks 24/7 or can replace them when they retire. And cloning is what you can do with a digital rail inspector."

"No worries," assures Brouwer. "AI solutions won't replace your well-skilled inspectors, though they will support them at all times. The labour intensive work of checking the status of rails, railway stations and even crowd management can all be supported by AI solutions."

Right now, it is people who inspect surfaces, objects, spaces, and crowds throughout the railway industry. But people...

- Get distracted;
- Aren't available 24/7;
- Require years of education;
- Will leave eventually;
- Are expensive.

Hence, inspections done just by humans are costly, labour-intensive, inconsistent and often unsafe.

## This is how it works

BrainCreators delivers Digital Inspectors that reduce cost and improve consistency at an unrivalled speed. Human inspectors can now train their digital counterparts on AI-powered software. Once trained, digital inspectors perform their jobs as scalable cloud or on-edge solutions.

Digital inspectors perceive the world through cameras and sensors. They inspect spaces, objects, and people to detect changes that require action. Their output consists of interactive reports, alerts, and API calls to maintenance systems. Each Digital Inspector is built on BrainCreators' BrainMatter platform, a proprietary technology stack containing cutting-edge AI and fine-tuned deep learning models. The revolutionary BrainMatter platform generates Digital Inspectors based on the knowledge and skill of a human inspector.

Knowledge transfer between the human and the machine is based on taxonomy and examples. "We're automating digital inspectors' knowledge transfer and training to enable a fast and smooth transition from human to digital," says Brouwer. "A trained Digital Inspector can be cloned infinitely to serve global customers as digital employees."

Automating visual inspection tasks accelerates businesses in verticals such as infrastructure, smart cities, recycling, and retail by eliminating the costly bottleneck: manual visual inspections. A great example is BrainCreators' digital road inspector - INSPECH or their digital crowd inspector within built-in privacy protection used in busy areas such as airports. Customers benefit from increased process speed, lower cost, higher consistency, and increased worker safety.

Digital Inspectors perform their work as a cloud-based software service, dedicated edge device, or embedded solution. They interact with existing cameras and scanning systems. If these are unavailable the digital inspector can be delivered with camera installations and edge computing devices through BrainCreators' partners Bosch, IBM, Nvidia, and Advantech.

Once installed digital inspectors perform the work that was previously performed by trained experts. The human expert stays in the loop as a supervisor overseeing a much faster, more consistent, and more frequent performance of inspection tasks resulting in a safer, more cost-efficient, and reliable business process.

Obviously, within the railway sector, there is a broad range of visual tasks in the industry that can be covered. Therefore, BrainCreators is looking for new Domain Partners.

The main focus is to work with domain partners on

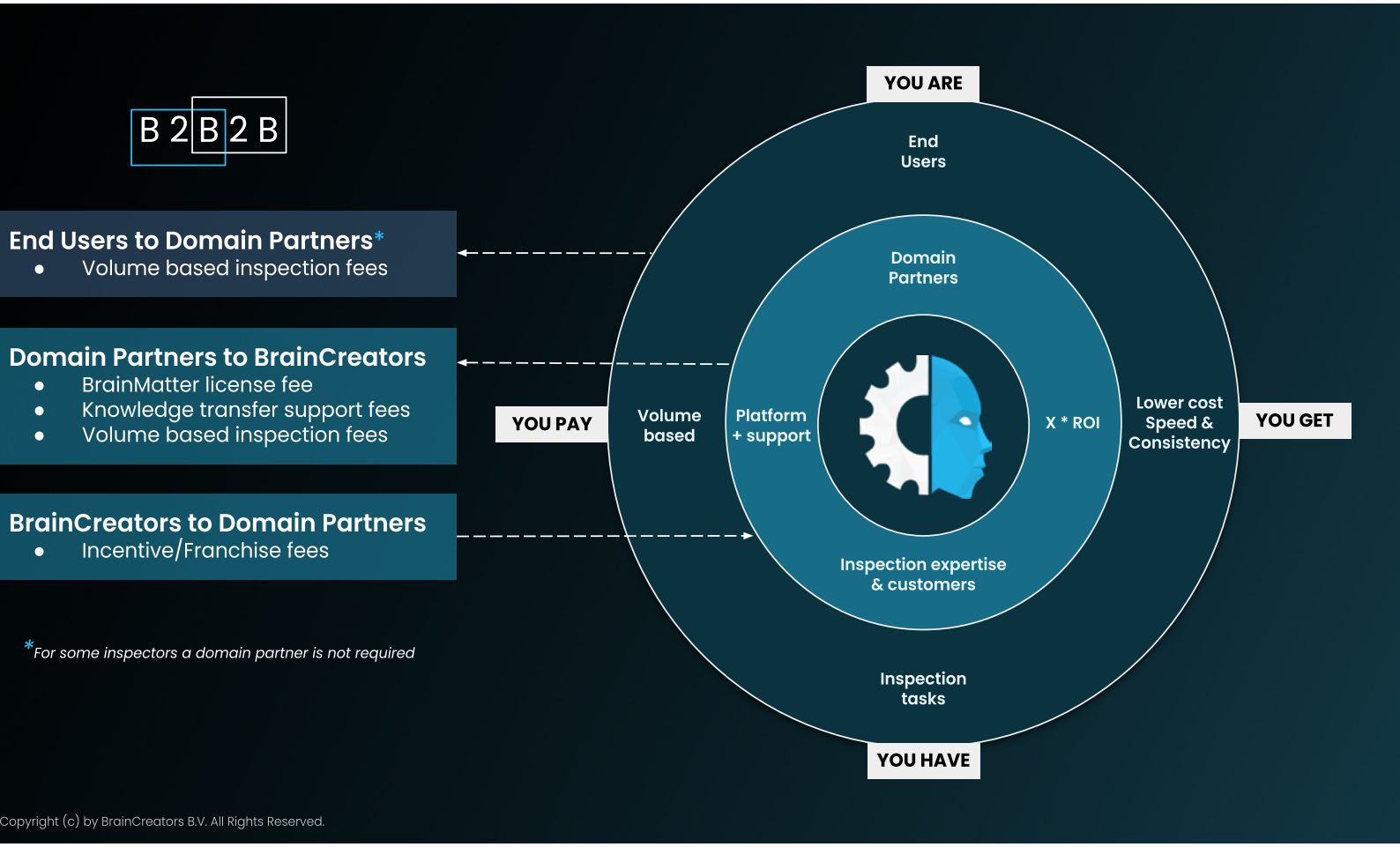
- Smart systems for passenger information
- In-train surveillance and vehicle monitoring
- In-train and on-track automated asset inspections
- Dashboards and (or) actionable insights for remote operations and emergency responses

Although many people in the rail industry seem to understand that this technology can be a game-changer, it is hard to find working business cases. Untill now, because BrainCreators is not only developing great AI solutions, it has also found a way to apply them. Along with (your) trustworthy partners that know the market.

Brouwer and his team chose a B2B2B model for the rail industry to help solve the most urgent challenges first. One of them being the skills gap. «As a scale-up, we are already in conversation with multiple industry leaders who are determined to stay ahead of the competition by embracing state-of-the-art digitization. They understand that implementing digital inspectors will help close the skills gap as a long term solution.

## Is your company a part of the next step in AI for the rail industry?

The rail industry is ready for the next step in AI solutions. Not just because of their customer (end-users) needs, but because digital inspectors are significant contributors to closing the skills gap. "Sharing domain knowledge quickly and effectively is crucial to developing reliable, intelligent digital inspectors," think Brouwer. "Our BrainMatter platform enables us to quickly create digital inspectors with our domain partners. Therefore we are now looking for new domain partnerships within the Rail sector."



WE ARE LOOKING FOR

# DOMAIN PARTNERS

TO FURTHER DEVELOP AND APPLY AUTOMATED SOLUTIONS FOR THE RAILWAY INDUSTRY

- SMART SYSTEMS FOR PASSENGER INFORMATION
- IN-TRAIN SURVEILLANCE AND VEHICLE MONITORING
- IN-TRAIN AND ON-TRACK AUTOMATED ASSET INSPECTIONS
- ACTIONABLE INSIGHTS FOR REMOTE OPERATIONS AND EMERGENCY RESPONSES

BRAIN CREATORS
digital inspectors

**Instead of cloning people, we clone digital employees.**

BRAINCREATORS.com

BrainCreators developed a special partner ecosystem that is offered through a B2B2B mode. The end-users pay volume-based inspection fees to domain partners. The domain partners, in turn, pay a license fee to use the AI-platform BrainMatter and a volume-based inspection fee ( when required, knowledge transfer support or additional services fees are added). In return, the domain partners receive an incentive fee from BrainCreators for new users coming via additional franchise partnerships.

→ This way, partners can benefit by combining domain knowledge and technology, enabling them to work more consistently, faster, safer and less labour-intensive.

→ The second advantage is that the digital inspector can then be offered through a SaaS model to end-users. Ecosystem partners can offer digital inspectors as an added value service to their customers.

→ The third advantage of the B2B2B model is that the jointly developed digital inspector can also be marketed through a «Franchise Domain Partnership» model.

What BrainCreators does with this model is that the partners with specialized domain knowledge can apply the AI technology without needing a data scientist. The data scientific tasks are performed on the BrainMatter platform. "What we see with a lot of AI implementations that fail, is lack of either AI competence or domain knowledge, or both," says Brouwer. "We offer outstanding SaaS solutions for visual inspection in the form of 'Digital Inspectors as a Service', performing as super-powered employees, enabling the business to scale more effectively and cost-efficiently. At BrainCreators we augment human rail experts with intelligent technology."

## Why you need this

The future-proof technology of BrainCreators can help organizations all across the rail industry scale and enhance their productivity. They can share their knowledge and data for leadership insights and free up their experts to do higher-value activities.

Instead of cloning people, BrainCreators is cloning digital employees. By doing so BrainCreators is contributing to closing the skills gap in the rail industry. Simply by adding a digital clone to human experts.

## About BrainCreators

Faster, more consistent and cost-efficient inspections make a big impact on sustainability, maintainability and public safety by efficiently monitoring our environment and effectively alerting us to issues.

Moreover, BrainCreators directly impacts the future of work by offering intelligent automation solutions to solve the growing problem of human domain expert scarcity.

### Mission

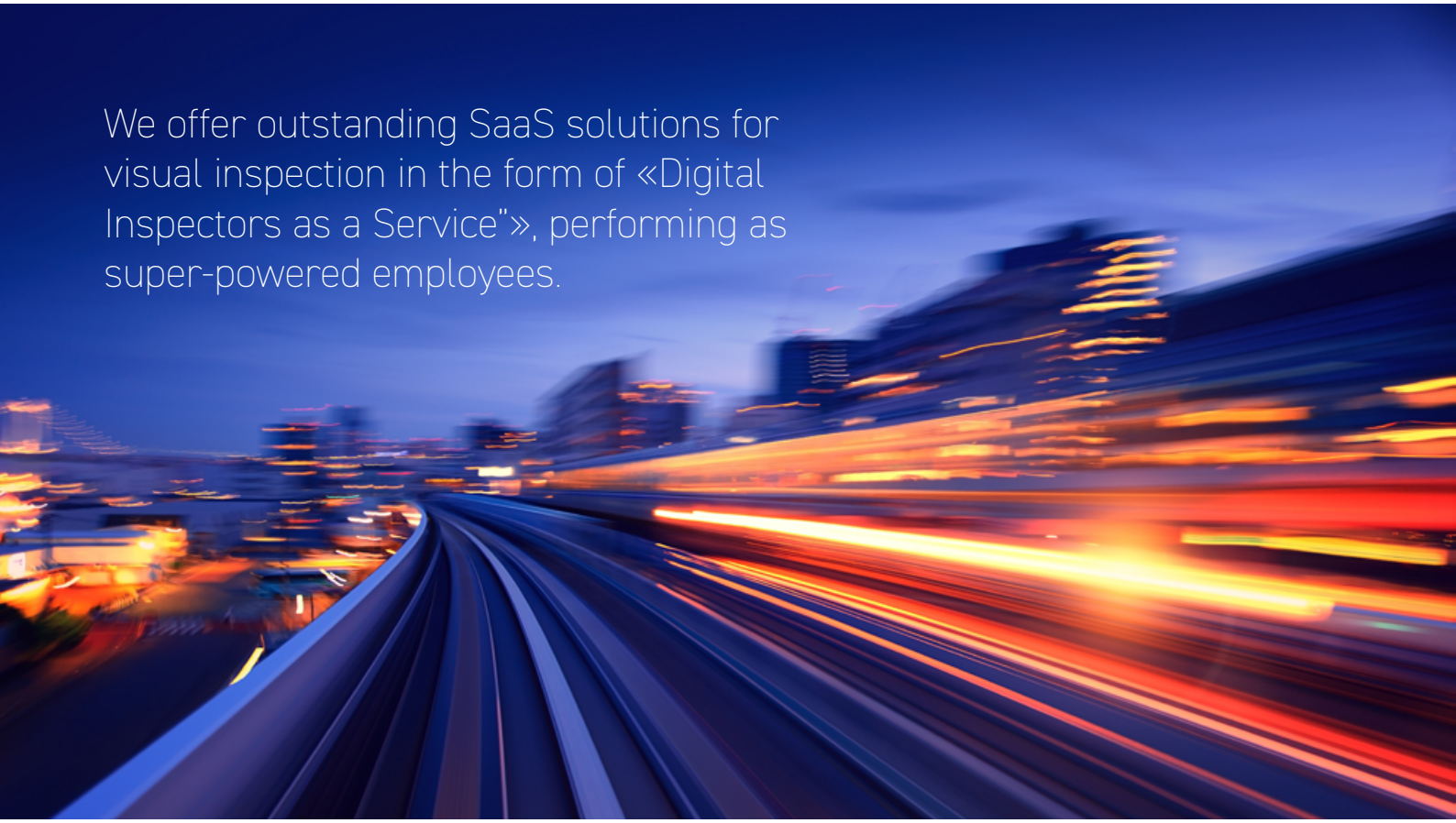
We are here to automate repetitive inspection work and present the results as actionable insights in cutting edge user experiences to empower the industries that make the most positive impact on our common future and contribute in closing the skills gap.

We allow expert human inspectors to clone their knowledge in a digital counterpart and share the resulting digital inspector with others as a software service.

### What future do we want to help create?

A future where human beings focus on drawing conclusions from consistent inspection results and turn their interpretation into concrete action to eliminate waste, reduce cost and accelerate innovation.

www.braincreators.com



# CONTRIBUTING TO THE FUTURE WITH SMART-E-POWER®

BÄCHLI AG

## MAKING A POSITIVE CONTRIBUTION TO CLIMATE CHANGE THROUGH MINIMAL POWER LOSS, HIGH ENERGY EFFICIENCY, LESS $CO^2$ PRODUCTION, LONG PRODUCT LIFE EXPECTANCY AND MINIMAL MAINTENANCE. THESE ARE THE STRENGTHS OF BÄCHLI AG.

One of the major challenges is to design the right transformer for a specific application. Legislation, technical standards, electrical and mechanical requirements, design preferences, efficiency, space requirements, weight, etc. are just some of the many considerations needed to find the optimal solution. Thus, the prioritisation of these criterias is an important part of the design process. The weighting of the individual parameters strongly influences the product design and is therefore a fundamental decision Bächli AG is the expert when it comes to developing these solutions for your needs (energy-efficient, compact, light, cool, inexpensive). We would like to emphasize that energy efficiency and cost-effectiveness are by no means mutually exclusive!

### Utilisation of energy-efficient winding goods

The efficiency of a transformer can be influenced by various aspects, such as the choice of material, the method of the calculation/simulation or the accuracy of the manufacture. In general, inductive components have a high efficiency. Nevertheless, there are still design options to increase the energy efficiency of a product.

Our engineers are very competent in this field and help you to design the product optimally according to a wide variety of criteria. But also in a very sustainable and resource-saving way.

Bächli has its own Smart-E-Power® product line for this purpose. It stands for the highest possible efficiency. These products are characterised by the smallest possible efficiency losses. Consequently, operating costs are reduced to a minimum and CO2 emissions are lowered substantially.

We would like to show you the benefits of the Smart-E-Power® product line with an example. In the following, the standard variant and the Smart-E-Power series are compared using a 70kV auxiliary converter transformer. The basic condition for both variants was limited space capacity with limited heat generation.

SMART-E-POWER®

COMPACT

LOWEST LOSS

BEST LIFE CYCLE COST

| | Smart-E-Power ® | Standard |
|---|---|---|
| **Efficiency** | 98.48 % | 97.76 % |
| **energy losses in a year (18h/day Operating hours)** | 6964 kWh | 10295 kWh |
| **Energy costs in 1 year (CHF 0.12 / kWh)** | CHF 836 | CHF 1235 |

Table 1: Comparison of the standard and Smart-E-Power variant in case of a auxiliary converter transformer

No-load losses occur in the transformer even if no electrical energy is drawn from the connected loads. It is said that the transformer runs or works in no-load operation. The no-load losses are effective 24 hours a day, 365 days a year, and only 1W less results in a saving of approx 8.7kWh. The table clearly shows that the Smart-E-Power® variant has significantly lower no-load losses. As a result, there are 40% lower no-load losses per year, This means that much less energy is consumed per year by the Smart-E-Power® variant.

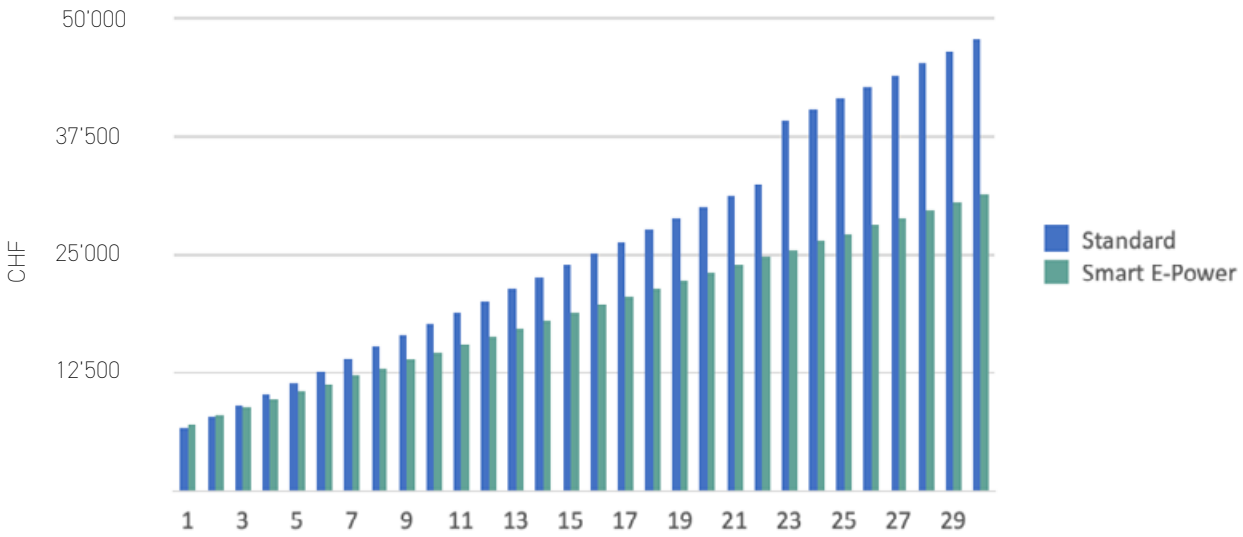
It is observable, that the efficiency of the Smart-E-Power® products has one percent higher efficiency than the standard variant. Hence, there are less energy losses, since in total the standard product generates approx. 3'300 kWh more energy losses per year. Since the lower energy demand means that the annual energy costs are lower. Based on the Swiss energy price of CHF 0.12 per kWh, you can save CHF 400 per year when using the Smart-E-Power product. Due to the high-quality materials in the Smart-E-Power range, the load on the component is lower. This significantly increases the service life. In our example case, the service life can be doubled. The sustainable transformer operates on average for more than 40 years. Added up over 30 years, this results in a cost saving of CHF 25,080 for the Smart-E-Power® product. In addition, the life cycle is twice as long. Both result in a far more attractive life cost calculation than with the standard product.

As you can see in the following graph, the Smart-E-Power® product already shows a positive cost balance after the third year. The somewhat higher procurement costs of the Smart-E-Power® product due to the use of high-quality materials pay for themselves after a short time.

Since the life cycle of the standard product is theoretically much shorter than that of an energy-efficient product, it must also be replaced sooner. This means, therefore, that after 22 years we have included the procurement of a new auxiliary power transformer. The disposal costs of the products were not included in this calculation.

## $CO^2$ savings

The $CO^2$ equivalent provides information on the amount of emission gases produced during the production of energy. According to IWR/2013, one kilowatt hour of electricity (1 kWh) in Switzerland, Northern and Western Europe is equivalent to 590g of carbon dioxide. Losses in form of thermal heating occur in all electrical components - including transformers. Although they have an efficiency of up to > 99% today, the losses of all active transformers in Central and Northern Europe correspond to about 5.7%. The additional energy requirement also means the use of more natural resources, which can lead to higher greenhouse gas emissions and thus damage the climate.




Calculations were made using the example of the 70kV auxiliary converter in the standard output in the Smart-E-Power® variant.

Therefore, better energy efficiency leads to a more sustainable use of natural resources.

As the name suggests, Smart-E-Power® stands for minimum power losses and high energy efficiency, resulting in a reduction of $CO^2$ emissions. The calculated $CO^2$ equivalent of the compact Smart-E-Power® auxiliary converter transformer is 6964 kWh, around 2t less than the compact standard version. The savings correspond to a yearly return flight from Zurich to New York (/co².myclimate.org).

If a life cycle of 30 years is assumed on average, this results in a possible total savings of 99'930t $CO^2$. To put the savings in to perspective, approximately 13800 hot air balloons can be filled with the $CO^2$ saved.

The opportunity to make your product more sustainable and energy-efficient is not at odds with economic efficiency. Take advantage of this opportunity and work out the optimum variant of the Smart-E-Power® product for you together with our engineers. We will be glad to be your competent partner from the development to the installation of the product.

It is important to us to make an active contribution to sustainability. We would be happy to support you in this process - let us work together to drive forward an implementation and application of sustainability for the future.

Source:

https://www.google.ch/maps/dir/Zürich/New+York+-City,+New+York,+USA/@42.6259962,-68.5616723,3z/data=!4m13!4m12!1m5!1m1!1s0x47900b9749bea219:0xe66e-8df1e71fdc03!2m2!1d8.54169!2d47.37688661!1m5!1m1!1s0x89c24fa5d33f083b:0xc80b8f06e177fe62!2m2!1d-74.0059728!2d40.7127753)

# SHIFTING TO EUROPE'S RAIL

EUROPE'S RAIL JOINT UNDERTAKING

FUNDED THROUGH THE EU RESEARCH PROGRAMME HORIZON EUROPE, SHIFT2RAIL, THE JOINT UNDERTAKING FOR RAIL RESEARCH AND INNOVATION GETS A VOTE OF CONFIDENCE FROM BOTH THE EU AND THE RAIL SECTOR WITH A DECISION BY THE EUROPEAN MEMBER STATES ON A NEW PROGRAMMING CYCLE UNDER THE NAME OF EUROPE'S RAIL

Shift2Rail was created in 2016 in the frame of the Horizon2020 research programme, implemented through DGRTD, to improve railway systems in Europe through cutting-edge research and innovation, co-funded by the sector. The launch of Europe's Rail is the proof of the engagement of the EU and the rail sector to renew this partnership and continue to work actively on removing existing barriers to the creation of the Single European Railway Area.

Europe's Rail JU will be one of 10 European Partnerships under the Horizon Europe research initiative between the European Union and industry with an objective to accelerate the green and digital transition.

The objective of Europe's Rail is to deliver a high-capacity integrated European railway network by eliminating blockers to interoperability and providing solutions for full integration, covering traffic management, vehicles, infrastructure and services, aiming at faster uptake and deployment of projects and innovations.

**Europe's Rail will build on the legacy of its predecessor, Shift2Rail**

The Shift2Rail Programme is gradually phasing out with projects still running until 2023. While the focus remains on delivering the Programme and its key results, the European rail community is looking to deliver, with Europe's Rail Joint Undertaking (EU-Rail), even more ambitious objectives. S2R has supported an unprecedented convergence of the rail sector and Europe's Rail will build upon its legacy and the need to speed up the shift to carbon neutral mobility and transport, to deliver the next-generation of railway, for passengers and freight in Europe and beyond.

The recognised work achieved by Shift2Rail so far is shown through the different technological results from the Innovation Programmes (IPs). For example, the IP1 has made progress in traction elements that reduced the consumption of energy. In IP2, the ATO GOA2, and adaptable train communications are only a few of the results that once deployed will have a major impact on the sector. On the infrastructure side, results have been achieved in the areas of asset management, and condition-based maintenance. New ideas in terms of robotics, and maintenance machines are all key elements that increase the reliability of the infrastructure and reduce life cycle costs while extending the life cycle. Additionally, on the freight side, the Digital Automatic Coupler (DAC) is a key result and a great example of how important Research and Innovation is for the railway sector. DAC is considered as an enabler of a fully digital rail freight system in the future.

**Europe's Rail will accompany the rail transformation process**

Europe's Rail will focus on developing the new technological and operational solutions to deliver the railway system meeting

**Carlo Borghini**
Executive Director


the expectations of the Sustainable and Smart Mobility Strategy. The Strategy aims to double highspeed rail traffic by 2030 and, double rail freight traffic by 2050. For this to become a reality, rail needs to transform itself, re-invent itself, leverage its strengths – rail being a land guided system, iron on iron – and cost effectiveness. This transformation process shall be driven by the rail sector with an integrated system approach, involving technologies, operations but also the staff working in the rail system and its training to new functions and roles. Digitalisation and automation are key enablers of such transformation and are at the heart of EU-Rail as they are expected to contribute to substantially increasing the performance of rail and creating opportunities for the deployment of future proof technologies. This transformation aims to deliver new rail services to its clients – passengers and business – while attracting new ones.

**Europe's Rail will operate in five key areas and three main pillars**

To deliver on its objectives, Europe's Rail has identified five key areas. Starting with a European Traffic management layer, to set the ground for dynamic capacity and traffic management, to operate the European network with seamless operations. Secondly, operating on a performing network, EU-Rail will support projects that will improve the digitalisation and automation of train operations building upon the necessary evolution of the relevant systems, starting from radio-based ERTMS as a baseline and considering the named CCS+, next-generation ATC, and another number of key technologies. The third key area will finance research on improving sustainable assets, a holistic approach to energy management, alternative energy solutions for diesel rolling stock, sustainability and resilience of the rail system in a global approach to asset management, delivering more value. This area also focuses on the improvement of electro-mechanical components and sub-systems for the rolling stock, contributing to the overall attractiveness of the rail system for passengers.

Crucial to the green transition, rail freight will be a key focus area of EU-Rail. This fourth key area will contribute to delivering a seamless rail freight system, integrating information and data for all the actors involved, and pushing for fully digital rail freight operations, breaking down existing barriers that undermine the performance of rail freight, such as coupling, brake controls, language issues, and other technologies or operational processes. Successful stories such as the DAC (Digital Automated Coupler) technology, to be adopted as an EU standard by all Member States show the added value of the integrated system approach to make efficient use of the new technologies.

Lastly, a fifth key area will contribute to connecting remote regions in Europe, with an integrated system of solutions to revitalize capillary lines and regional lines, addressing aspects related to operations, vehicle, energy solutions for a sustainable capillary network.

In order to achieve its ambitious targets and work on the aforementioned key areas, Europe's Rail is structured around three main pillars: The System Pillar, the Innovation Pillar and the Deployment Pillar.

The System Pillar will look to deliver the future concepts of operations and the underpinning system architecture, the Innovation Pillar to research, design, create, test and demonstrate at large scale innovative technological and operational solutions, and the Deployment Coordination Group to ensure that future solutions are deployed in a coordinated and consistent process at European level. With these three pillars, the innovation programmes of Shift2Rail will be re-organised in a more integrated approach within EU-Rail.

**Europe's Rail will benefit from a substantial budget increase**

With a significant increase comparing to Shift2Rail's budget, estimated at almost 50% excluding the funding absorbed by UK entities under the previous programme, EU-Rail started officially on 30 November*, for a period of ten years, with a total amount of activities of EUR 1.2 billion to be delivered by its Members and other stakeholders under Open Calls, funded by EU-Rail with the resources provided by Horizon Europe up to EUR 600 million.

This should exploit the huge potential for digitalisation and automation to reduce rail's costs, increase capacity, and enhance its flexibility and reliability, based on a solid reference functional system architecture shared by the sector, in coordination with the European Union Agency for Railways (ERA). By improving competitiveness, it will support Europe's technological leadership in rail, with a leverage effect of each 1EUR invested by the Union, creating more than 2EUR of Research and Innovation added value.

In addition to the European Union, represented by the European Commission, the new partnership consists of 25 industry Members, selected through a transparent process started by the European Commission in August 2020, ensuring a balanced representation of the rail sector, including the operating community, rail and infrastructure managers, the supply industry, research centres and small medium enterprises, creating an opportunity for the sector to join forces and work together.

Lastly, the previous eligibility criteria to access to the calls are now eliminated under Europe's Rail, which will build upon the concept of Open Calls fostering sector integration with a shared vision.

Europe's Rail's project cycle will begin at the end of the first quarter 2022, with projects kicking off in the last quarter of 2022; a second wave of calls for proposals is estimated in 2025 and a final call in 2027-2028. In addition, it is expected that on a yearly/regular basis calls for proposals will be published to complement ongoing projects, to explore new areas of interest, and perform studies and/or, for example, to fund PhDs. The phasing out of Shift2Rail projects largely in 2023 will create an optimal transition

* Council Regulation published in the Official Journal https://eur-lex.europa.eu/eli/reg/2021/2085

with the phasing in of the new EU-Rail projects, preventing existing research teams to have to integrate new partnerships and/or ensure the necessary handover to the new structures. For instance, the transition between the results achieved in S2R on ATO GoA2 and the activities of EU-Rail to reach demonstrators for GoA4 with a short-term market uptake ensure a seamless transition.

Many innovations and technologies have already seen the light through Shift2Rail. To encourage their market up-take, there need to be solid and convincing business cases designed since the beginning to demonstrate how the investment brings a clear return on investment socially and economically.

The success of the rail system convergence towards a seamless, safe, interoperable, sustainable and efficient network will depend on the capacity of the sector to reinvent itself, and on adequate policy decision to phase out obsolete systems, currently hindering the growth of rail market share. The competitiveness of the European rail industry and its excellence remain a key objective too.

**The European year of Rail, and its flagship initiative the Connecting Europe Express brought the rail sector to the heart of EU transport policies**

The Connecting Europe Express – a dedicated train that travelled across Europe in September and October, visiting 26 countries in 36 days – has been one of the major highlights of the Year. It truly lived up to its name, as it brought together national, regional and local authorities, society at large and the rail sector. It pushed more than 40 partners from the sector to join forces to set-up an unprecedented pan-European rail service – clearly showing that Europe is stronger together.

As quoted by European Commissioner for Transport, Adina Vălean, "the Connecting Europe Express illustrated very well the many obstacles that rail still needs to overcome to become the preferred mode of transport. The launch of Shift2Rail's successor – Europe's Rail – is therefore another major success story of the European Year of Rail. The new partnership will transform European railways into one system, which will enable faster and cheaper deployment of new technical and operational solutions. This should make rail services more flexible, more affordable, more reliable and very safe. At the same time, it will ensure rail is more environmentally friendly and more climate resilient.

It is a good sign that many new connections and services have been launched or announced this year, bringing more choice and travel options for passengers. To name just one example, a new trans-European night train now links Stockholm, Copenhagen and Berlin. In a similar vein, we have seen campaigns to boost rail freight kick-off across Europe. For example, in Germany, DB Cargo launched awareness campaign for rail freight, setting up green European Year of Rail-branded containers to promote rail freight in seven major German cities".

The Executive Director of Europe's Rail, Carlo Borghini, concludes: "the European Year of Rail has boosted the attention to the rail sector, and it is now the moment to capitalise on this momentum to deliver and make rail the mobility lifestyle of passengers, the transport choice of logistic".

FERROCAMPUS
NOUVELLE-AQUITAINE

# FERROCAMPUS OF THE NOUVELLE-AQUITAINE REGION, DEMONSTRATION TERRITORY FOR EUROPE'S RAIL

**FERROCAMPUS**

## THE KEY ISSUE? PROPOSE FINANCIALLY ACCEPTABLE SOLUTIONS TO PROMOTE THE DEVELOPMENT OF RAIL MOBILITY, PARTICULARLY FOR LOW-DENSITY LINES, BY IMPROVING THE QUALITY OF SERVICES EXPECTED BY CUSTOMERS SUCH AS CONNECTIVITY, SAFETY AND REGULARITY.

By 2030-2050, the modes of transport that can accommodate a significant increase of users and goods traffic must reinvent themselves more than ever, both ecologically and therefore energetically, as well as technologically. The rail sector is constantly being called upon to reinvent itself in order to meet the needs of new mobility services. Within the framework of their competences, the European regions must participate in the rail Europe of tomorrow. This requires the creation of synergies between local, regional but also European actors. SMEs, engineering schools, training centers, industrial groups in the sector are thus called upon to collaborate and address the issues surrounding trades and training, new perspectives of mobility, construction and maintenance.

In this context, the Nouvelle-Aquitaine region has created a green and digital transition acceleration program for low-density regional lines called FERROCAMPUS.

Through a strategy of global demonstration on real trains, lines and shared data platform, FERROCAMPUS is preparing the future of regional rail mobility in Nouvelle-Aquitaine with the possibility of rethinking the entire regional rail system covering traffic management, vehicles, infrastructure and services. The technical means of demonstration made available represent an investment of €45 million.

FERROCAMPUS focuses on innovation projects such as the greening of rolling stock, safety and on-board connectivity, remote signage and maintenance, the «intelligent transport of the future» that will have to be able to deploy emerging technologies with the integration of digital solutions, artificial intelligence as well as the promotion of innovation within its deployment program.

At the French level, FERROCAMPUS is already working with Alstom, SNCF, THALES, WABTEC and CAF on new solutions for regional lines through demonstrations on its territory. The objective is now to participate in the European dynamic through Europe's Rail.

The success of revitalizing and regenerating low density traffic lines, making them economically, socially and environmentally sustainable, creating seamless links across the whole transport infrastructure and, by all this, supporting the competitiveness of the whole sector.

Welcome to experience the future of regional lines with FERROCAMPUS !

Site FERROCAMPUS, Saintes, France

# ABOUT HENSOLDT NEXEYA FRANCE

NEXEYA

PART OF THE HENSOLDT GROUP, MARKET LEADER IN CIVIL AND MILITARY SENSOR SOLUTIONS, HENSOLDT NEXEYA FRANCE SPECIALISES IN ENGINEERING AND CRITICAL ELECTRONIC SYSTEMS. FOR MORE THAN 30 YEARS, HENSOLDT NEXEYA FRANCE HAS BEEN PROVIDING THE RAILWAY INDUSTRY WITH ADVANCED ELECTRONIC SOLUTIONS FOR TESTING, SIMULATION AND INTEGRATION OF RAILWAY SYSTEMS AS WELL AS ON-BOARD AND GROUND POWER SOLUTIONS TO SECURE AND MAINTAIN INSTALLATIONS.


HENSOLDT NEXEYA's technical teams have a strong background in safety-critical systems, and offer railway integrators and operators all the guarantees of safety, reliability and durability expected for operational systems.

HENSOLDT NEXEYA FRANCE has a long-term commitment to its customers and provides local, responsive and quality support throughout the product life cycle.

## ALYSA® Solution

Test System for Simulation, Incremental Integration, Validation and Certification

The development of new signalling systems is a real challenge in the Railway sector. These systems, like CBTC or ERTMS for example, have become more sophisticated by connecting on-board computers and ground equipment. In addition, increase system quality and safety while reducing commissioning times and associated costs is now an imperative.

To successfully build such demanding systems, performance must be specified at the design stage and all functional and safety aspects must be validated as early as possible to save time in the on-site testing phase.

ALYSA has been designed to meet this need: modelling the functionalities of a complete signalling system, performing all integration and validation tests for a fast, safe and secure commissioning.

### Alysa Presentation

ALYSA is a family of highly integrated and versatile platforms for simulating safety-critical systems and for creating generic or specific test systems throughout the development process.

ALYSA simulates on-board or ground equipment (Model in The Loop) and interfaces with real equipment (Hardware In The Loop) to validate the complete operation of a transport line.

With ALYSA, the behaviour, performance and most problems related to the security of transport systems can be tested in laboratory. ALYSA thus considerably reduces time and cost of modifying existing rail lines or deploying new ones.

### Alysa Main Applications

ALYSA suits system integration and testing throughout the development cycle:

- Design phase: use of equipment models (MIL)
- Development phase: use of real equipment software (SIL)
- From integration to certification: use of real hardware (HIL) stimulated as required
- Final Assembly Lines
- Training centres

## Convergy® Solutions

Railway Power Supply & Conversion from few watts to hundreds kilowatts

HENSOLDT NEXEYA provide the railway industry with a wide range of catalog power supply products intended for being embedded in rolling stock or to power ground equipment:

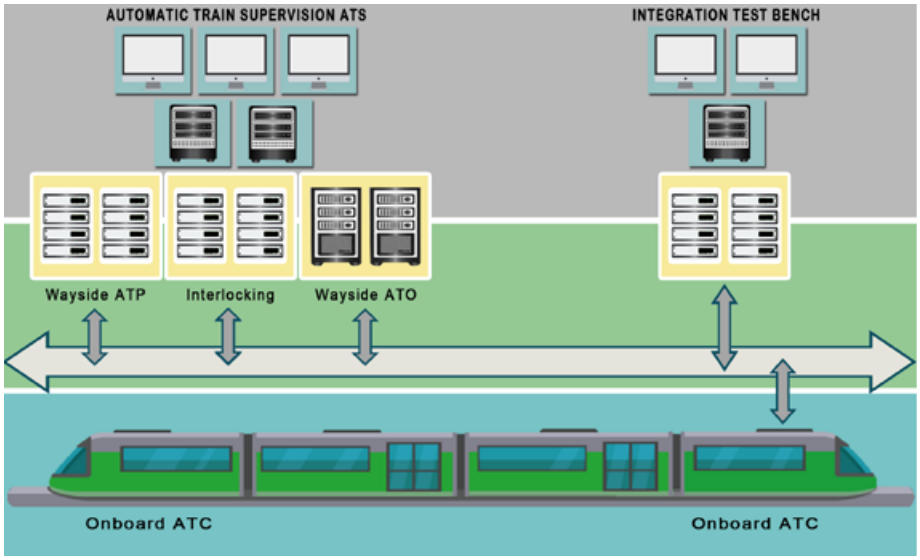
- Converters for printed circuit board
- Power converters: DC/DC, AC/DC and DC/AC
- Rectifiers
- Battery chargers
- Energy Systems

All our products are designed and manufactured with an objective of energy performance, reliability and durability and in compliance with rail safety standards.

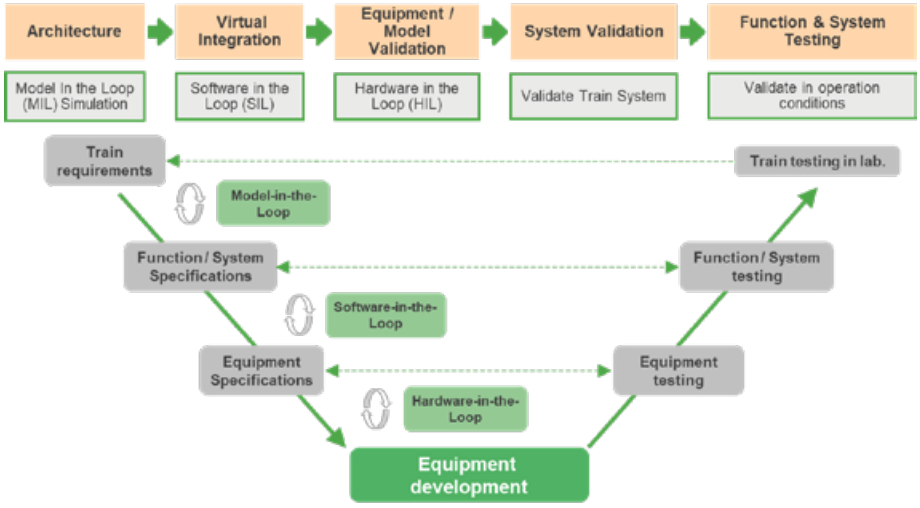
Constantly staying abreast of market requirements and technological evolutions, HENSOLDT NEXEYA FRANCE also offers rapid reaction times with regard to products customization or innovative product development.

### Our strengths

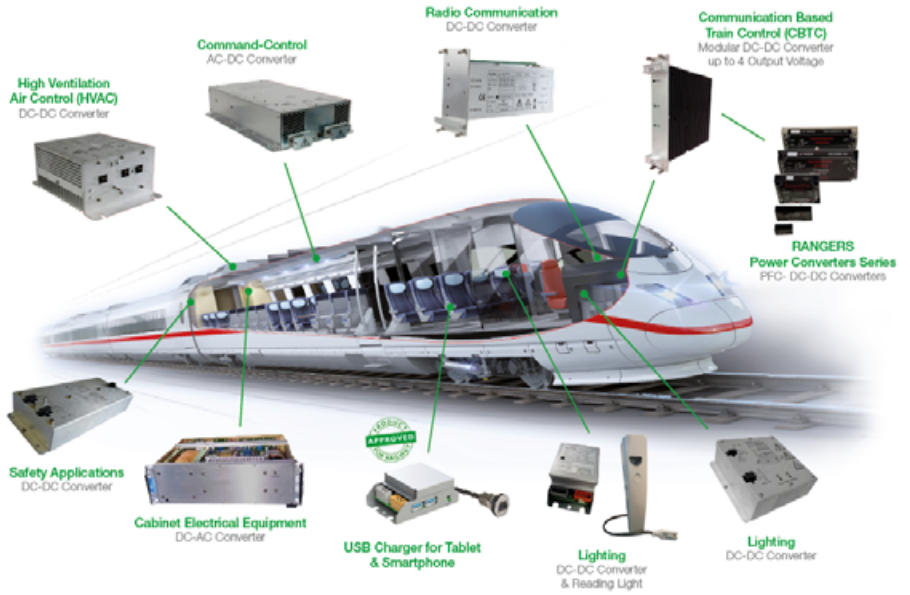
- COTS and customised products
- A wide variety of mechanical designs adapted to each need
- Total control of our products: design, development, production and qualification
- Specific products based on our technological bricks enabling low costs and high reactivity
- Expertise and innovation




Signalling System integration and testing




ALYSA - Full V cycle coverage




Convergy® Embedded Power Supply and Conversion Solutions

## We built Tomorrow Transportation - HENSOLDT NEXEYA FRANCE participates in the European project OPTIMA

Communication Platform for Traffic Management Demonstrator

### Project Overview

Over the last decades, Infrastructure Managers (IMs) have deployed Traffic Management Systems (TMS), which have been used in the operation of the railway system. However, these have often been developed in isolation, without compatibility or commonality with the TMS of other IMs. Moreover the interfaces of current systems were not developed considering their scalability and main benefits of standardisation.

Therefore, the integration of new interfaces will require a duplication of Information and Communication technology resources and significant recurrent costs. The Communication Platform demonstrator developed within the OPTIMA project will overcome all these disadvantages and bring additional benefits to the system throughout the implementation of standardised and scalable data structures and processes to manage current and future interfaces.

An integrated and standardised TMS will significantly reduce the equipment and engineering costs during the deployment and replacement processes. The modularity of the Integration Layer will bring an important reduction of the costs derived not only from the disruption of the system, but also from its total replacement. This cost reduction will be significant not only due to its integration and standardization but also to the improvement of market competitiveness.

### Ambition & Objectives

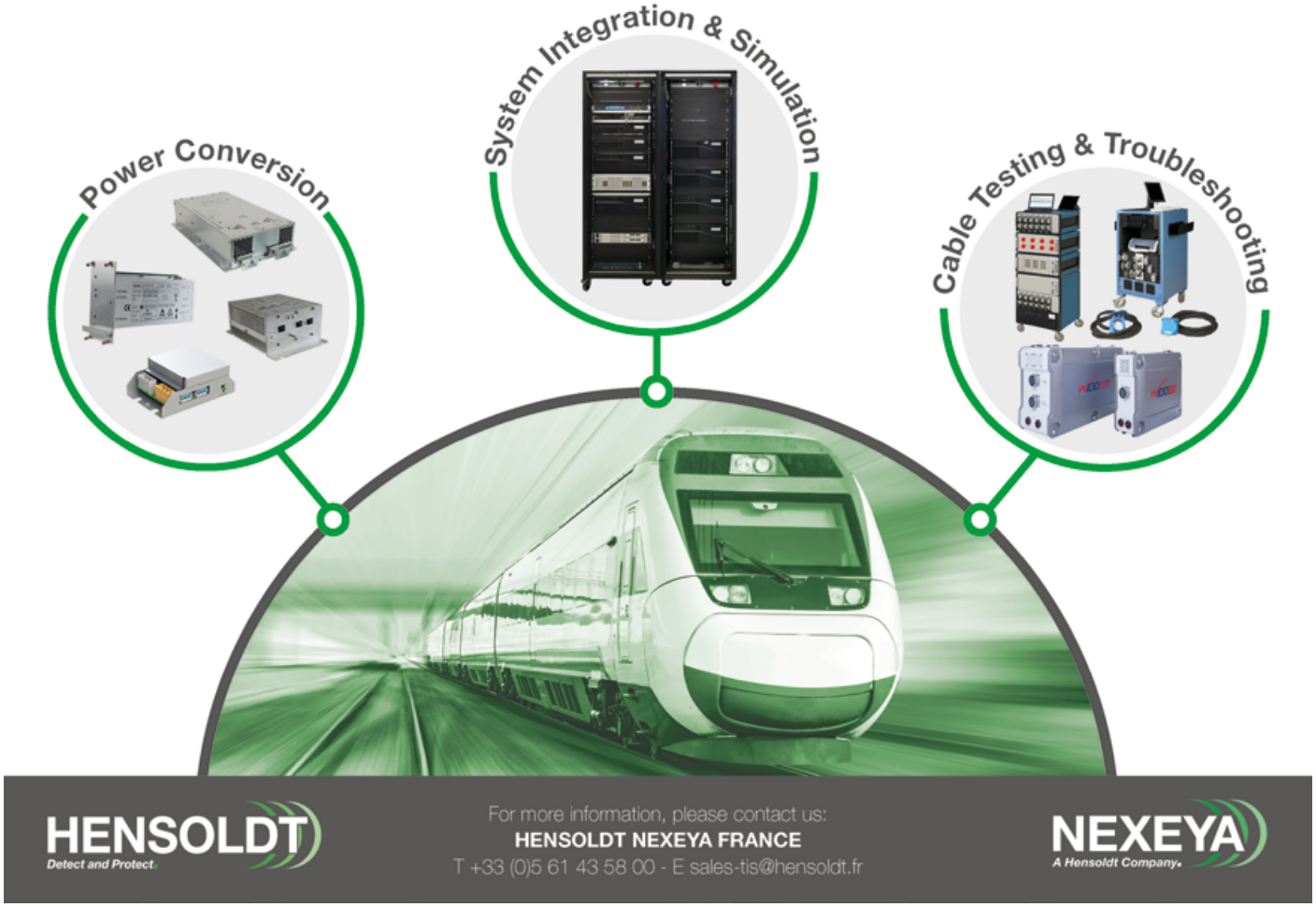
OPTIMA envisage the design and development of a Communication Platform to manage the link with different services (multimodal operational systems), supporting TMS applications. OPTIMA will contribute to a significant improvement of the efficiency of TMS. This improvement will rely on the interconnection of different types of systems, belonging to different IMs, through a standard platform and harmonised data structures, enabling smart TMS with automated decision making based on a wide range of disparate data sources. The interconnection will also employ standard interfaces external to the railway system, but accessible for the platform.

### HENSOLDT NEXEYA FRANCE and OPTIMA

HENSOLDT NEXEYA FRANCE contribute in OPTIMA as work package leader in charge of the design and the development of the Integration Layer solution. Hensoldt Nexeya provide its experience in IT and datacentric middleware expertise acquired during 30 years in the development of System Simulation and Integration Platforms.

Find more information and publications on OPTIMA project website: www.optima-project.eu/home.aspx

OPTIMA have received funding from the European Union's Horizon 2020 research innovation programme under grant agreement No 101015405 and No 881777



CONNECT AND PROTECT

# Railway Certified Subracks, Cabinets and Enclosures

Electronics Packaging for Stuttgart 21

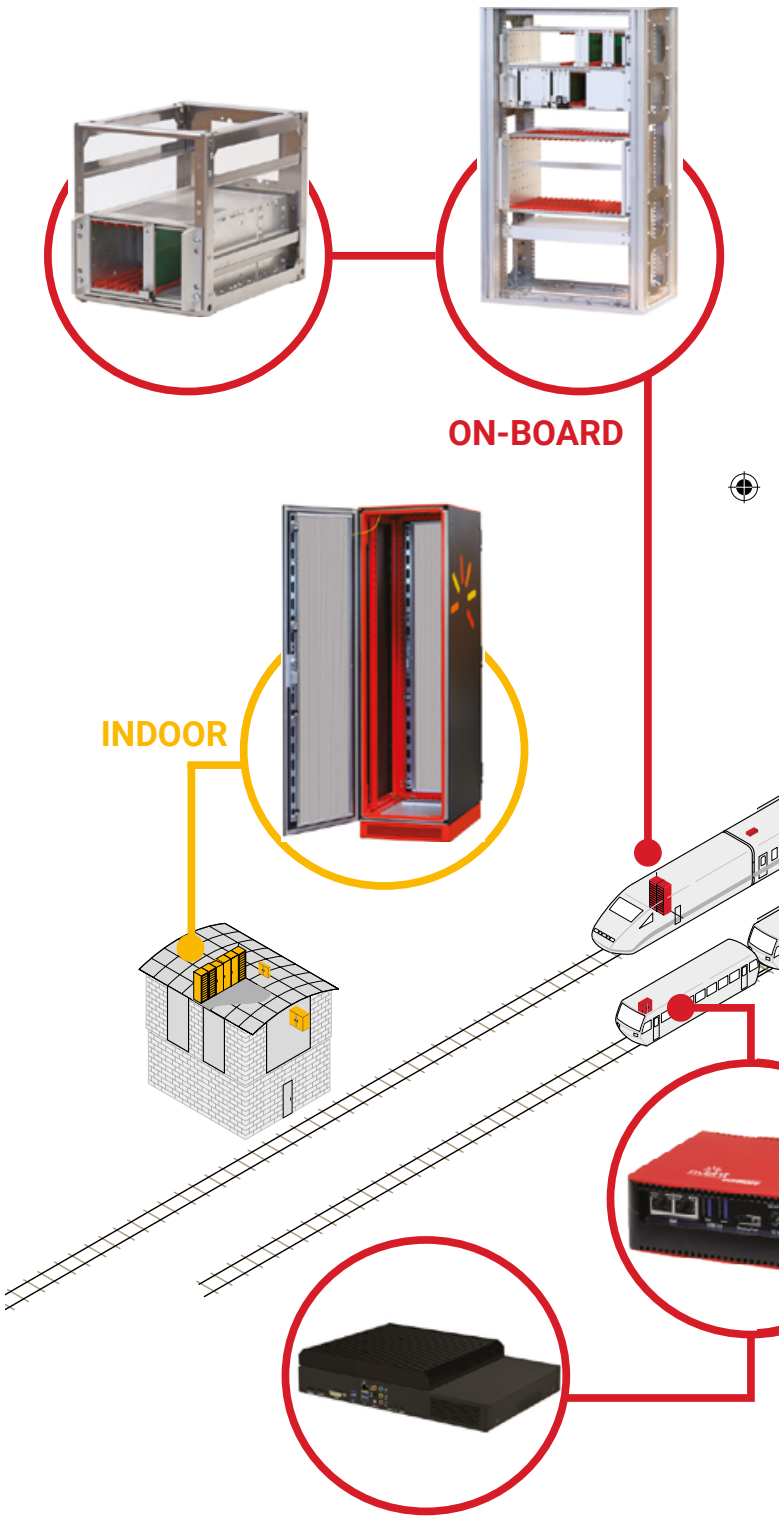
nVent

SCHROFF

# Shaping the Future of Mobility

## DIGITALIZATION, AUTOMATION AND INTERNET OF TRAINS

Railway communication equipment and systems are the foundation of railway signaling and communication. nVent SCHROFF supports digitalization and IoT by providing essential system platforms, including small form factor cases and Embedded COM systems, as well as a range of enclosure solutions that connect and protect sensitive electronics and infrastructure.




nVent offers a comprehensive range of niche electrical solutions that are critical to railway networks. With our powerful portfolio of brands that includes nVent ERICO, ERIFLEX, HOFFMAN, RAYCHEM and SCHROFF, railways throughout the world have come to rely on our expertise, and high quality products that meet strict global rail standards such as AREMA and CENELEC.

Our wide ranging portfolio includes electrical protection for rail infrastructure and equipment, connection solutions for trackside and on-board electrical infrastructure, enclosures for all types of railway signaling applications, and heating solutions that help railways operate in harsh winter conditions. Together, nVent makes an important contribution to safer, more reliable railway networks.

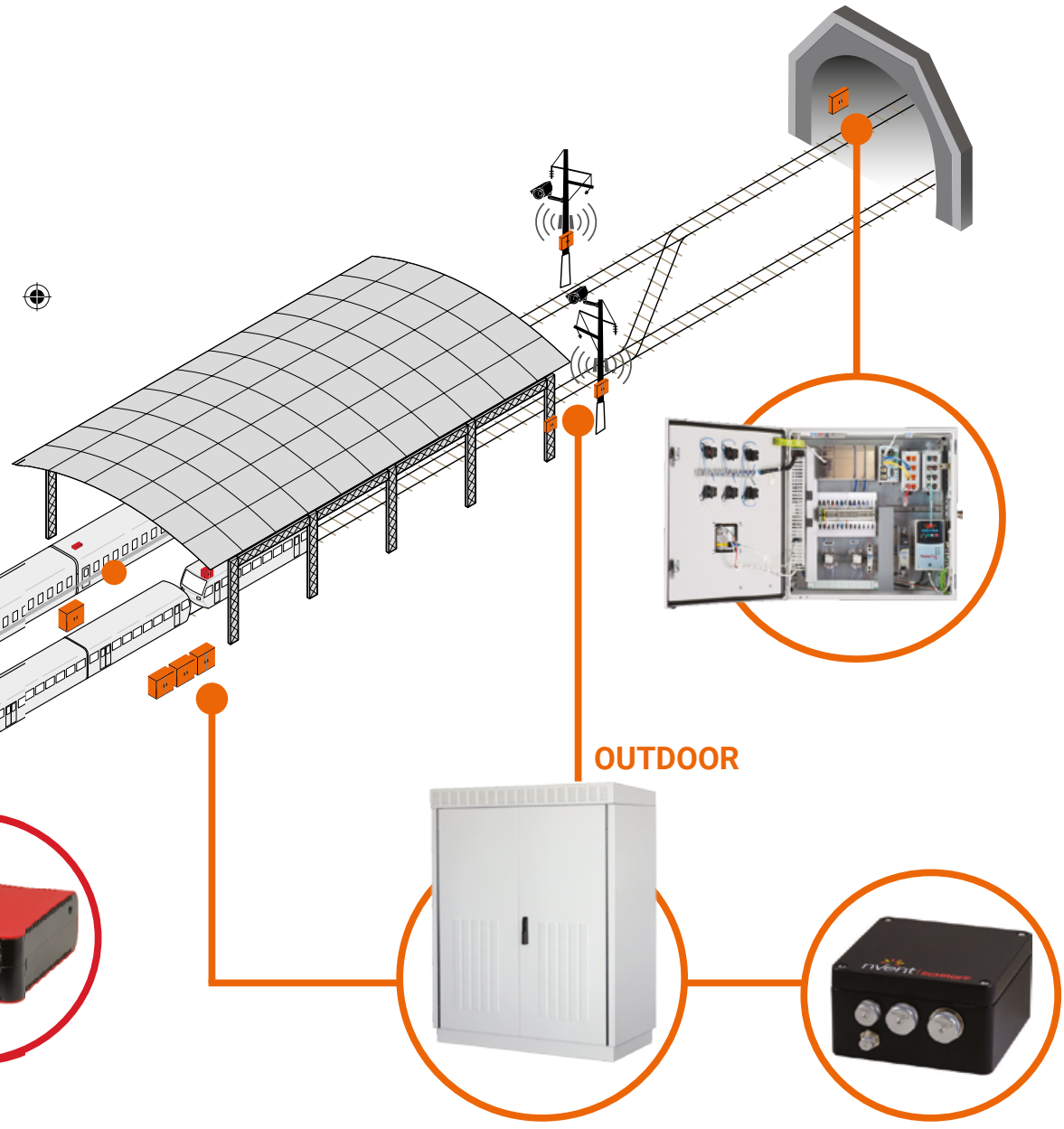
At nVent, we believe that safer systems make the world a safer place.
We connect and protect our customers with innovative solutions.

# Ensuring Efficiency, Reliability and Safety.

## NEXT-GENERATION RAILWAY SYSTEMS

Implementing next-generation railway systems, such as communication based train control (CBTC) and 5G, require integrating advanced hardware and systems into new and existing equipment.

With many products specifically designed and certified for the railway and transportation industry, nVent offers solutions for indoor, on-board and outdoor trackside signaling and communication equipment.




PROTECTED AGAINST ENVIRONMENTAL CONDITIONS

SECURITY & INTRUSION PREVENTION

SCALABILITY & FLEXIBILITY

OPTIMAL THERMAL PERFORMANCE

INTEGRATION SERVICES

RAILWAY CERTIFICATIONS

GLOBAL AVAILABILITY & SUPPORT

# Robust On-Board Solutions

**For a precise and highly repeatable operation.**

## EUROPACPRO SUBRACK

nVent SCHROFF's EuropacPRO 19" subracks are easily configured and designed to house and protect your electronic equipment. With a modular platform and a wide range of standard, modified and also customized solutions, EuropacPRO subracks are ideal for a variety of requirements ranging from cost-saving up to ruggedized shock and vibration resistant options.

- Shock and vibration resistance per EN 50155, MIL-STD-167, IEC 61587 DL 3, MIL-STD-810G, MIL-STD-901D, NF F 60-002
- EMC shielding with stainless steel or textile gaskets
- Modular subrack with a wide portfolio of compatible standard components
- Broad portfolio of compatible front panels, plug-in units and accessories

**Standard EuropacPRO Subrack**

**Custom EuropacPRO Subrack**

### DIGITAL EMPOWERMENT FOR FASTER RESULTS

Check out our Online Subrack and Front Panel Configurators

- Intuitive Design with a 3D drag and drop functionality
- Automated error checking logic
- Free instant CAD and BOM documentation
- Instant price and 24/7 stock availability

IEC 60297-3/-100.x
and IEEE 1101.x

VG 95373

up to 25g

EN 50155,
NF F 60-002,
MIL 810G,
MIL 901D,
IEC 61587 DL3

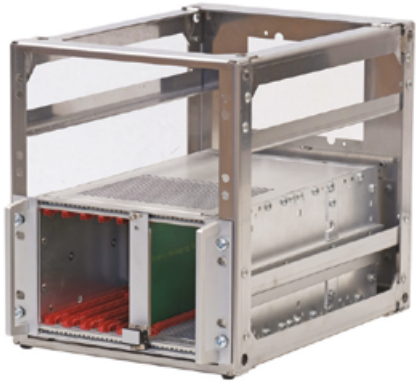
# Overcoming Spatial Limitations

**Ensuring accessibility to electronics without obstruction.**

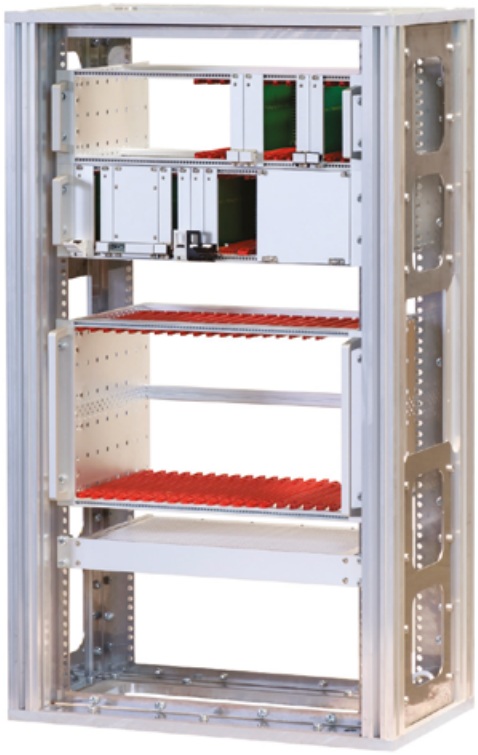
## ON-BOARD RACKS

Innovative On-Board Racks (OBR) from nVent SCHROFF bring space-saving efficiency to on-board electronics and can also reduce transportation costs.

- Suitable for 3 or 6 U SNCF and DB subracks (NF F61-005, NF F60-002), (BN 411002, BN 411003)
- Suitable for ongoing vibrations, shock, high temperatures, and high humidity
- Height 3, 6, and 9 U, width 36 and 84 HP, depth 341.8 mm
- Welded to EN 15085 (CL2) and AWS standards
- Rear side is equipped for standard connectors; crossbar can be custom-coded for the SNCF coding pins



**Lightweight OBR with a welded frame**



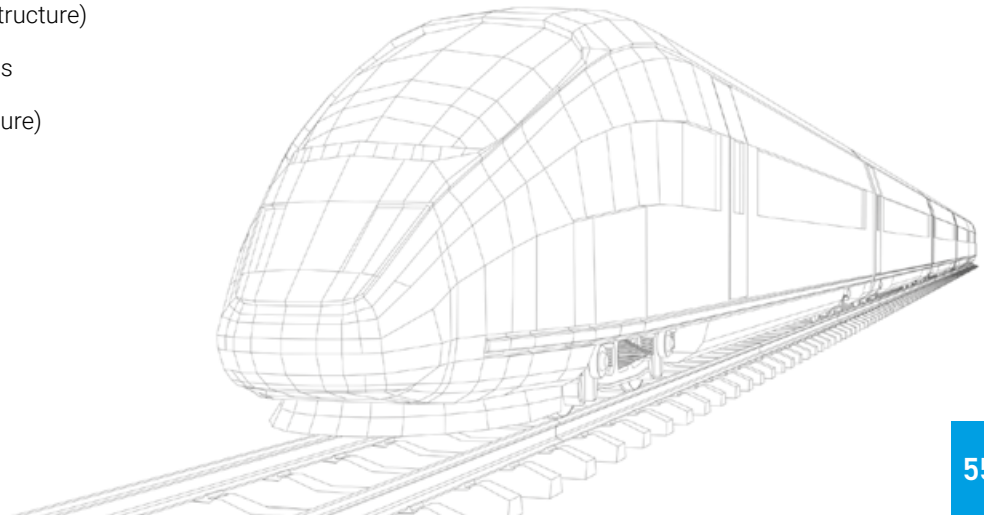
**Vehicle OBR with a bolted frame**

## VEHICLE ON-BOARD COMPUTER FOR SIGNALING APPLICATIONS

The VOBC by nVent SCHROFF is unique, because it is bolted together instead of being welded. The bolted design provides a compact solution that can be shipped via flat pack saving on shipping and storage costs globally. The rack can then be assembled on site, making the installation easier and faster on the train in confined spaces.

- AREMA 11.5.1 for equipment class 1
- CENELEC EN 61373 (Category 1, Class A-B)
- EN 15085 (CL2)
- EN 45545 (Product Class A1 according to EN 13501-1)
- Shock: 5g in all axes (when part of train structure)
- Shock: 5g in one axes / 3g in all other axes

  (when not fully integrated into train structure)



# Reliable Signaling & Track Control

**Optimized for predictive maintenance.**

## OUTDOOR MODULAR TRACKSIDE CABINET

The nVent SCHROFF Outdoor Modular Cabinet ensures a smooth and dependable functioning of sensitive electronics in outdoor trackside environments and is specifically tested and certified for outdoor trackside railway applications.

**Digital Interlocking**

**Level Crossings**

**Axle Counting**

## Robust and highly functional

- IEC 61969-3 and EN 50125-3 for protection against environmental conditions
- EN 50125-3 for shock & vibration (1-3 m from the rail)
- EN 60529 for ingress protection up to IP55
- IEC 61587-2 and IEC 61969-3 for Seismic Bellcore Zone 4
- EN 50125-3 for wind resistance (180 km/h)
- EN 1627 and EN 1630 for vandalism protection
- EN 50121 for electromagnetic compatibility ( On request)
- IEC 61969-2 for coordination dimensions
- IEC 60068-2-75, IEC 62262 and IK 10 for impact/hammer test

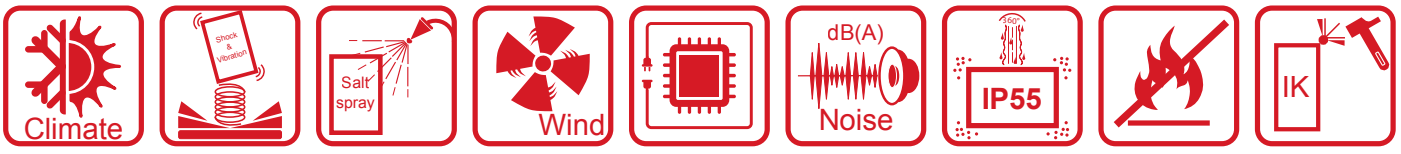
# Certified for Railway Telecoms

**Supporting real-time communications.**

## OUTDOOR MODULAR TELECOMMUNICATION CABINET

The nVent SCHROFF Outdoor Modular Cabinet platform helps Telecom industry leaders deploy best-in-class fixed line broadband projects (FTTC to FTTH), Wireless Network projects (WLAN's to WWAN's) and Mobile Communications Network projects (4G-LTE and 5G).

- Double wall design
- Vandalism, corrosion and grafitti proof
- Advanced thermal management with active and passive cooling
- RC0 & RC2 (RC3 on demand) certified
- Patented door hinges for high stiffness
- Steel or aluminium cladding
- Easy maintenance and replacements
- Multiple cable entry options
- Level 3 integration
- High grade locking with vandal proof handles




## COMPLETE LIGHTNING PROTECTION KIT FOR RAIL ENCLOSURES

The nVent ERICO Modular Lightning Protection kit for outdoor railway enclosures is a comprehensive solution used to **PROTECT CRITICAL ASSETS** and **PERSONNEL.**

# Station Control & Train Monitoring

**Vibration and shock resistant.**

## MULTI-PURPOSE ELECTRONICS CABINETS

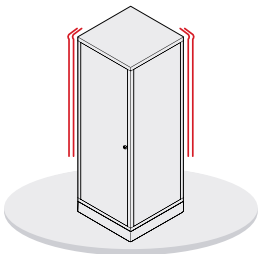
nVent SCHROFF offers steel and aluminum frame cabinet platforms with a wide range of dimensions and cover parts. Choose from different IP / NEMA protection levels, as well as options such as perforated doors, fan units and air-to water heat exchangers. A RFI shielding option for up to 60 dB at 1 GHz / 40 dB at 3 GHz or earthquake resistance up to Bellcore Zone 4 is also available to withstand extreme environments while meeting the strictest safety requirements.

## VARISTAR EMC – INDOOR ELECTRONICS PROTECTION

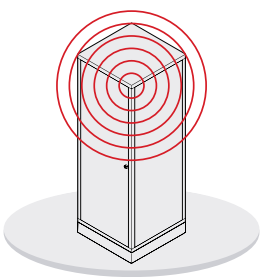
The nVent SCHROFF Varistar EMC is one of the very few electronic cabinets which has been tested successfully according to **EN 61000-5-7 up to 18 GHz** in addition to **IEC 61587–3** and offers best-in-class shielding protection: Attenuation of 40 dB at 3 GHz and 30 dB at 10 GHz with a solid door.

**The nVent SCHROFF Varistar EMC cabinet has a robust, welded, heavy-duty frame and is specifically tested and certified for railway trackside indoor applications:**

- IEC 61 587-1 for robust mechanical structure & physical performance
- EN 61000-5-7 and IEC 61587-3 for advanced EMC shielding up to 18 GHz
- IEC 60529 for ingress protection up to IP55
- EN 45545-2 for Low Smoke Zero Halogen compliance
- CENELEC EN 50125-3 certification for smooth performance against shock & vibration for trackside use (1-3 m from the track)
- AREMA 11.5.1 class C (designed to meet US railway standards for trackside use in bungalows)



Shock & Vibration



EMC Protection


Ingress Protection


RoHS Compliance

# Ready for Stuttgart 21

**We accompany you - for the entire life of the product.**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## WHATEVER CHALLENGES YOU HAVE TO OVERCOME – TOGETHER WE CAN FIND THE RIGHT SOLUTION.

For almost six decades, nVent SCHROFF has been a world leader among developers and manufacturers of electronics packaging components and systems. Our products and complete solutions combine the know-how of our specialists in the integration of mechanics, electronics and climate control together with many years of experience with the most diverse application requirements. They are based on globally standardized product platforms that support rapid, future-proof and cost-effective development.

nVent ERICO

nVent ERICO is your reliable source for grounding, bonding, lightning protection solutions.

nVent ERIFLEX

nVent ERIFLEX provides low voltage power distribution solutions that reduce total installation cost and increase design flexibility.

nVent HOFFMAN

nVent HOFFMAN stands for protection manufactured for the highest standards.

nVent RAYCHEM

nVent RAYCHEM is a provider of electrical heat tracing solutions to protect people, processes and infrastructure.

nVent SCHROFF

nVent SCHROFF is known for more than 50 years of experience in electronics packaging solutions: for 19" and beyond.

**Helpful Resources**

**Web** - SCHROFF.nVent.com

**Downloads** - go.nVent.com/rail-downloads

**Blog** - blog.nVent.com/rail

**Customer Service** - SCHROFF.de@nVent.com

# We Connect and Protect

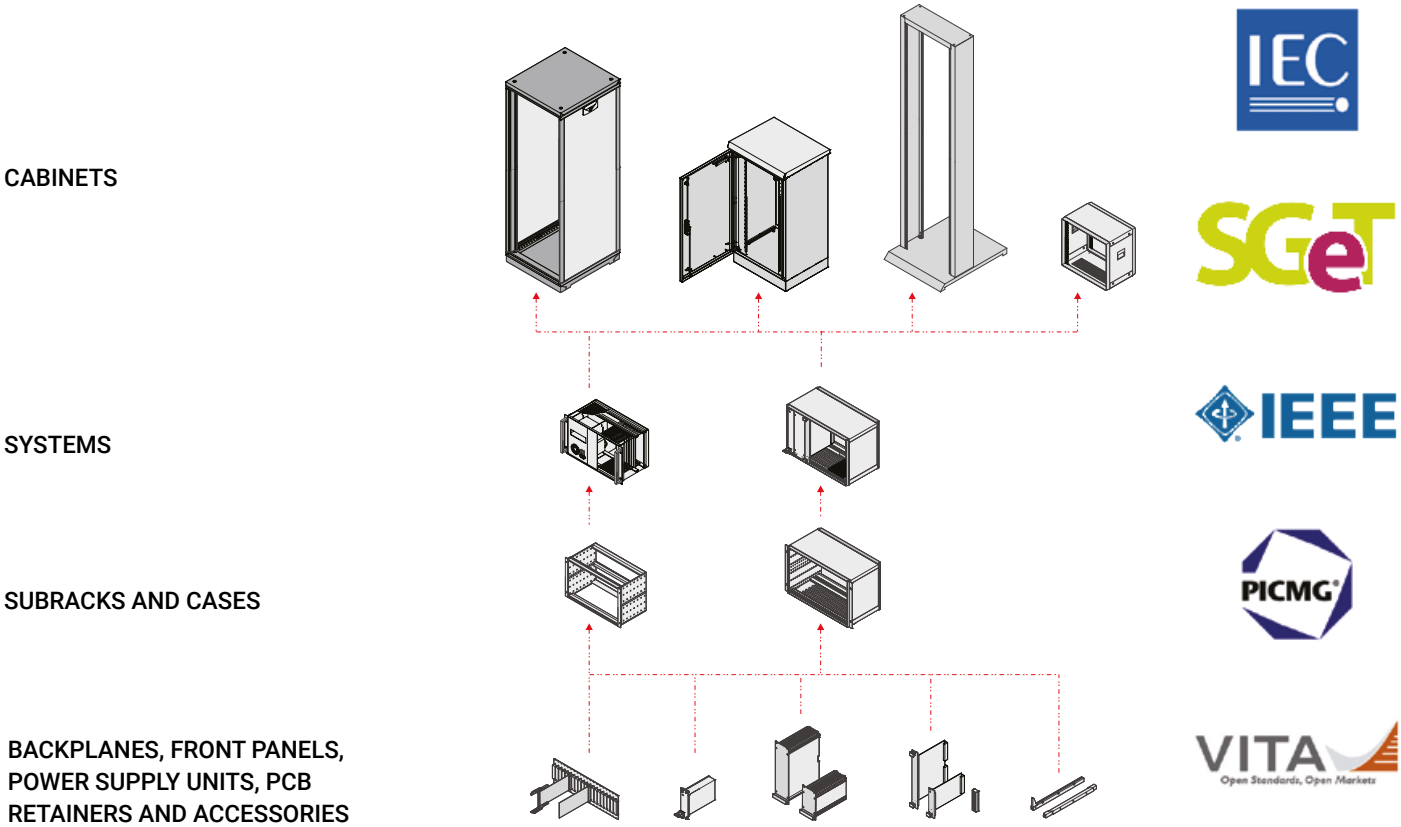
**We accompany you - for the entire life of the product.**

## ABOUT NVENT

nVent Electric is a leading global provider of electrical connection and protection solutions. We believe that safer systems ensure a more secure world. We design, manufacture, market, install and service high-performance products and solutions that connect and protect some of the world's most sensitive equipment, buildings and critical processes. We operate three business segments: Electrical & Fastening Solutions, Thermal Management, and Enclosures.

## ABOUT NVENT SCHROFF

The SCHROFF brand is nestled within the Enclosures business segment of nVent. nVent SCHROFF contains a broad portfolio of products from printed circuit board (PCB) accessories, such as card retainers, conduction cooled frames, front panels and handles to subracks, cases, backplanes, power supplies, cabinets and pre-assembled chassis for embedded computing systems.




## NVENT SCHROFF PROTECTS ELECTRONICS: IN 19" AND BEYOND.

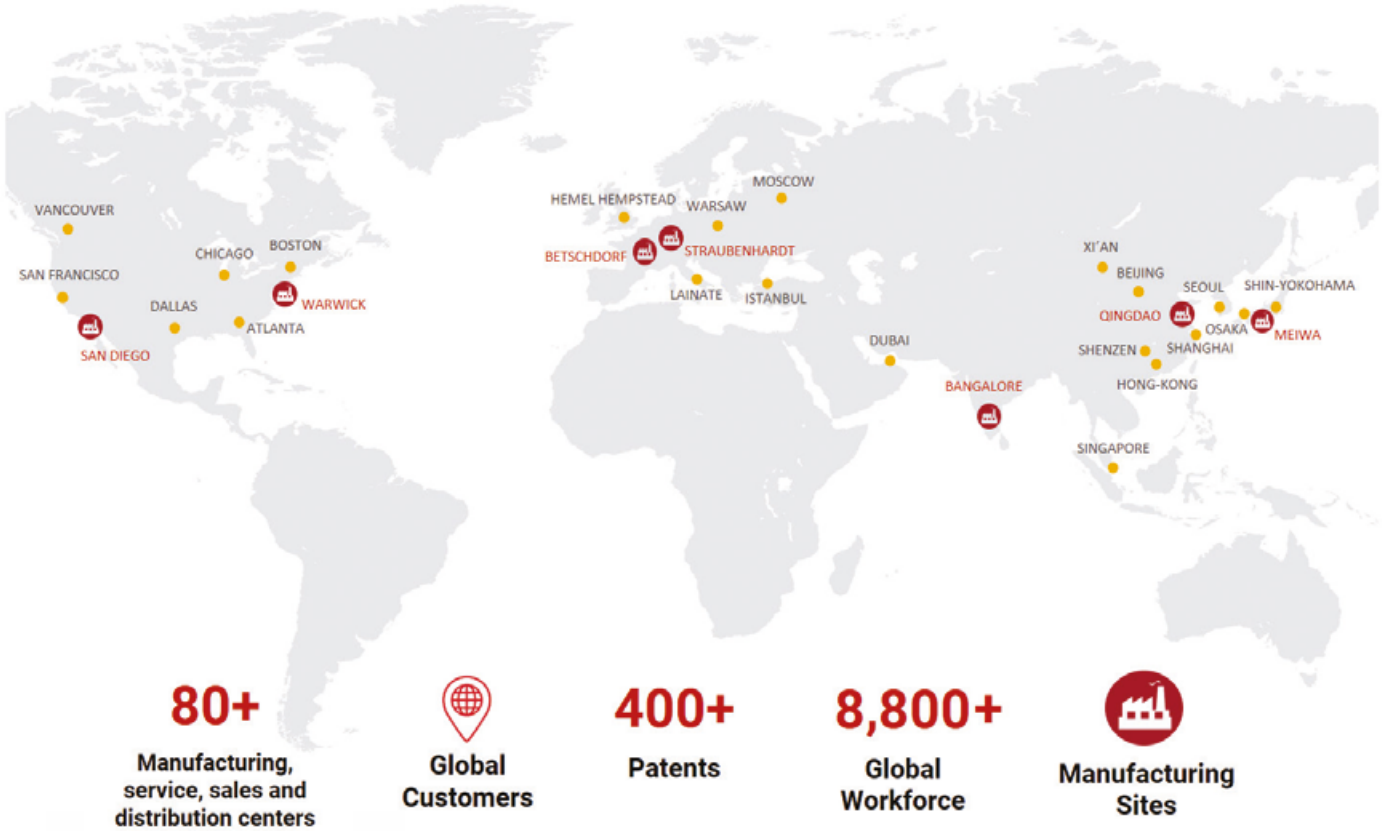
As one of the leading innovators in 19", nVent is expanding its product range to other small form factor solutions beyond the classic 19" technology. nVent's SCHROFF branded Interscale product family reduces integration time with its innovative case design and accessories, and can be tailored to meet individual requirements. It's our way of offering flexibility for small and non-standard PCBs, and to deliver exactly what you need, when you need it.

## STANDARDIZATION

Since 1978, we have been actively involved with standardization committees pertaining to mechanical, electrical and communication interfaces for electronics equipment.

# One nVent

**Explore nVent – backed by more than 100 years of excellence.**




**80+**
**Manufacturing, service, sales and distribution centers**

**Global Customers**

**400+**
**Patents**

**8,800+**
**Global Workforce**

**Manufacturing Sites**

As nVent, established electrical brands that previously were part of the diverse Pentair offerings joined forces in 2018 under a single mission: At nVent, we believe that safer sysstem ensure a more secure world. We connect and protect our customers with inventive electrical solutions.

The nVent name reflects the collective legacy of its trusted brands, which have helped set the global standard for innovative electrical components and systems for more than a century.

Maximize your productivity.
Minimize downtime.
Reduce operating costs.

Trust nVent to connect and protect your electrical infrastructure.

## Europe

**Germany**
Tel.: +49.7082.794.0

**France**
Tel.: +33.3.88.90.64.90

**Poland**
Tel.: +48.22.209.98.35

**Italy**
Tel.: +39.02.932.714.1

## North America

**All locations**
Tel.: +1.800.525.4682

## Middle East & India

**United Arab Emirates**
Tel.: +971.4.823.8666

**India**
Tel.: +91.80.6715.2001

**Turkey**
Tel.: +90.541.3680941

## Asia/Pacific

**PR China**
Tel.: +86.21.2412.6943

**Singapore**
Tel.: +65.6768.5800

**Japan**
Tel.: +81.45.476.0271

Our powerful portfolio of brands:

CADDY ERICO HOFFMAN RAYCHEM SCHROFF TRACER

nVent

SCHROFF.nVent.com



SCHROFF-SB-H86856-Stuttgart21-EN-2105

# ECM: OPPORTUNITIES FOR RAIL VEHICLE OWNERS AND THE EUROPEAN RAIL NETWORK

## RAILWAY SAFETY AND INTEROPERABILITY IN RAIL TRANSPORT

THE IMPLEMENTING REGULATION (EU) 2019/779 - ALSO KNOWN AS THE ECM REGULATION - HAS PLAYED AN IMPORTANT ROLE FOR THE MAJORITY OF RAIL VEHICLE OWNERS AND WORKSHOPS FOR RAIL VEHICLES SINCE 2019 AT THE LATEST. IN FAVOUR OF RAIL SAFETY, THE PURPOSE OF THE REGULATION IS TO ENSURE REGULATED STANDARDS AND TRANSPARENCY FOR ENTITIES IN CHARGE OF MAINTENANCE (ECM). THUS, THE NEW DIRECTIVE CREATES NEW OPPORTUNITIES FOR EUROPE'S CROSS-BORDER RAIL TRAFFIC BUT ALSO FOR INDIVIDUAL ECM'S.

**Challenges for agents acting in the European rail traffic sector**

The requirements of the ECM Regulation are implemented at four levels and thus apply to all levels of asset and maintenance management for rail vehicles:

1. Requirements and evaluation criteria for the management function
2. Requirements and evaluation criteria for the maintenance development function
3. Requirements and evaluation criteria for the rolling stock maintenance management function
4. Requirements and evaluation criteria for the maintenance provision function

The ECM being responsible for level 1 can delegate the other three maintenance functions. In order to obtain certification according to ECM standards, this ECM is responsible for the implementation of a maintenance management system. Operational safety of the rail vehicles needs to be ensured in a documented manner and a permanent condition monitoring of the vehicles needs to be done.

**Opportunities for operators and maintainers**

The first challenge owners and maintainers of freight wagons and locomotives are confronted with is to implement the maintenance management system required by the regulation. This obligation leads to a large number of opportunities for the parties concerned as modern asset management systems for rail vehicles include many functions for the maintenance organization. This means that not only evidence required for ECM certification can be provided, but also higher-ranking maintenance objectives can be achieved.

Examples for such objectives would be:

- Increased reliability of vehicles
- Higher fleet availability
- Reduction of default risks
- Process transparency
- Automated and consequently faster and improved communication

The digitization of maintenance provides the optimal basis for implementing corrective, preventive and predictive maintenance strategies. A digital vehicle history file and detailed component tracking are only possible with the right IT system. The same applies to checklist-based, mobile work on the train or the traceability of maintenance measures. The data in the system is available to authorized personnel at all times, considerably reducing the need for communication by phone and/or e-mail.

Predictive maintenance in particular would be inconceivable without using intelligent IT solutions. Only thanks to such solutions it is possible, for example, to forecast the wear of components (e.g., wheel sets) - and thus to prevent a sudden failure of the according vehicle. True to the motto «forewarned is forearmed».

**Maintenance documentation with zedas® asset**

zedas®asset is the integrated solution for the efficient management and maintenance of rail vehicle fleets. The

ECM modul of the software enables extended support in providing evidence of ECM-compliant workshop documentation. Thanks to this module, departments responsible for maintenance are optimally equipped for the planning and execution of maintenance measures.

**Example: This is how the documentation of work orders in zedas®asset works**

To ensure complete documentation of maintenance work done in the workshop (ECM 4), first of all information on personnel and equipment are managed in the system. Specific time-limited certificates and qualifications can be assigned to personnel. For operating equipment (e.g. measuring devices), clearly identifiable units (e.g. wheelset measuring device, serial number 2483) are created, to which a certificate/proof (e.g. last calibration) can be assigned. Validity and deadlines of certificates can be monitored.

If a workshop employee processes a work order, the equipment used and the personnel performing the work are entered in the job order completion in an audit-proof manner. This documents that the job order was executed by an authorized employee and that valid equipment was used.

**Railroad safety and interoperability**

The Implementing Regulation (EU) 2019/779 pursues two major objectives with its requirements for management and maintenance of rail vehicles:

1. Safety in rail traffic thanks to compliance with standards and legal requirements
2. Interoperability thanks to a uniform directive valid throughout the EU

Rail vehicle owners and rail workshops contribute to these goals by the implementation of a maintenance management system for their processes, which automatically meet the requirements of the ECM regulation.


## AUTHOR:

**Ulrike Gollasch, Vice President Marketing, ZEDAS GmbH**

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Ulrike Gollasch studied business administration with focus on marketing and started her career at ZEDAS as a marketing assistant in the business unit asset management. Today she is in charge of the entire corporate marketing of the company and supports the conception for international growth.

# Railway-specific software for maintenance & logistics

**Rail vehicles and railway infrastructure should always be available - because every standstill costs money. In addition, there are high requirements for ECM-compliant documentation in maintenance. In rail logistics, the focus is on profitable freight transport and an efficiently organised „last mile“.**

ZEDAS offers field-tested solutions for the challenges of railway and transport companies. Even in its standard version, the software for technical asset management and logistics management digitally maps all relevant railway processes. The four specialised software products can be used independently and are ready for use comparatively quickly. The use of several products also offers unique synergy effects.

## Maintenance of vehicles and infrastructure

All maintenance activities can be organised, planned, tracked and documented in zedas®asset. The appropriate maintenance strategy for each object - whether corrective, preventive/ condition-based or predictive - can be mapped in the system. The solution for efficient fleet management of light rail verhicles and standard-gauge railways digitalises and simplifies the processes in the workshop. zedas®asset for railway infrastructure supports infrastructure operators in ensuring the reliability and safety of their assets. The graphical visualisation of linear asset networks provides the full overview.

## Highlights in zedas®asset

- Condition monitoring and digital life cycle file
- Detect weak points and forecast plant condition
- Integrated, forward-looking resource management and planning
- ECM-compliant documentation
- Integration of all measurement data
- Apps for mobile maintenance on the train or on the track
- Key figures for well-founded decisions and investment planning

## Continuous processes in rail logistics

zedas®cargo for mainline traffic in rail freight transport enables international rail transport undertakings to plan, monitor and bill international transports efficiently and transparently. With zedas®cargo for shunting traffic, connecting, factory and port railways easily handle daily processes such as dispatching, train arrivals and departures and shunting itself.

## Highlights in zedas®cargo

- Integrated resource and order management
- Customer portal for seamless collaboration (with ETA)
- Transparent, complete documentation and billing
- Standard interfaces (TAF TSI)
- Digital processing of all wagon and load data
- Modern apps, e.g. for wagon management and train control
- Comprehensive Management information

## ASSET MANAGEMENT

FOR RAIL VEHICLES AND RAIL INFRASTRUCTURE

## LOGISTICS MANAGEMENT

FOR SHUNTING TRAFFIC AND RAIL FREIGHT TRANSPORT

**More information:**
www.zedas.com

zedas Digitization of railway processes

**Meet us at InnoTrans 2022**

# ACTIA'S PLACE IN THE ON-BOARD RAILWAY EQUIPMENT MARKET

NEXEYA

THE WORLD RAILWAY MARKET IS ORGANISED AROUND THREE MAIN SEGMENTS: ROLLING STOCK, SIGNALLING AND INFRASTRUCTURE. THIS SECTOR IS PARTICULARLY DYNAMIC IN EUROPE. ON THE OLD CONTINENT, URBAN AREAS AND REGIONS PRIORITISE THE MODERNISATION OF EXISTING NETWORKS, INFRASTRUCTURE (ROADS, DOCKS, HIGHWAY STRUCTURES, ETC.) AND SIGNALLING (ON BOARD AND/OR ON THE GROUND), AS WELL AS REJUVENATION OF THE ROLLING STOCK.

This trend presents development opportunities for the ACTIA group, which provides major players in the railway sector with passenger information and video surveillance solutions, trackside safety announcement systems and electrification solutions. From technological requirements to passenger experience, digitalisation of transport to safety, two ACTIA experts shed light on ACTIA's place in this highly competitive market for on-board railway equipment.

**Damien REDONDO,**
**Vice President of ACTIA Railway activity**

"ACTIA continues to expand its rail activity on an international scale. We are competing for large bids from major manufacturers and PTAs around the world. For a long time, ACTIA has been a challenger and has gained the trust of some major customers. Today, it is certainly identified as a major player in the sector."

**Pascal PIN,**
**RAIL ACTIA Telecom Business Manager.**

"ACTIA has gained its reputation in this market through its long-standing partnership with train manufacturers. This reputation is gaining prominence in the transport operators sector with a comprehensive, complete and unique offer for public transport: buses, trains and trams. Which other equipment manufacturer is able to offer operators and manufacturers such a broad and interconnected system?"

## What are the requirements for on-board railway equipment?

### Damien redondo

"Actia operates in many markets, such as the automotive and aircraft markets, so the group has sufficient past experience and perspective to confirm that the rail market has particularly demanding technical requirements. The normative context is, as such, very binding. This is all the more true since we cannot apply certain automotive processes due to the small quantities of products required.

In this market, as electronics specialists, we are also confronted with the problem of components becoming obsolete. The equipment is not renewed often: the lifespan of a train can be more than 30 years. From a technological perspective, it is a real challenge to keep systems functioning for such a long period of time. This is all the more true because the components are constantly being improved and are replaced regularly. This is particularly the case in our passenger information and safety domain.

Finally, the third issue, which i believe is common to all automotive markets, is cybersecurity. Like all forms of transport, trains are becoming increasingly connected, and thus increasingly connected to their environment, infrastructure, etc. Data security is therefore a major technological focus for actia, especially given that we offer solutions that generate large data flows."

### Pascal pin

"Actia must take into account the changes in usage and inter-modal mobility. The aim is to provide solutions for passengers that integrate real-time information and features that are increasingly based on digital data. The market requires increasing availability and therefore technically sound solutions that ensure the reliability, security and availability of the service.

In addition to the technological, cybersecurity and operational maintenance issues that damien mentioned, i would add budget constraints. Manufacturers work to optimise operating costs on an ongoing basis. These include: the cost of acquisition, the impact of product reliability and the maintenance system, and the cost of replacement and repair.

Finally, in the process of modernising and renewing networks, the rail sector must take into account the policies aiming to decarbonise trains, by working on projects for electric motor trains. In this sense, actia is the ideal partner, as the group has expertise in the electrification of vehicles and equipment. It even offers battery and bms (battery management system) solutions for trains. This rounds out actia's offer as an equipment manufacturer."

## Can you describe actia's flagship products and solutions for trains?

### Pascal pin

"Actia solutions are there to ensure passenger comfort and safety. They improve the passenger experience. Actia develops and produces pa-pis (public address and passenger information system) audio and visual passenger information solutions suitable for all train configurations.

In terms of safety, actia offers high-performance train-to-ground rear-view and video-protection systems. This way, video surveillance can be used to look at real-time images of rolling stock from the ground, to search for footage recorded on board, or to receive alarms that focus controllers' attention. Finally, actia's safety offer is completed by trackside announcement systems used for securing track maintenance sites."

### Damien redondo

"We have a complete offer on these families of products. Our solutions panel is sturdy and adapted to the specific needs of each client. One of the advantages of our offer is flexibility. Actia develops customised products from a single platform. This is a major advantage on the passenger information screens market.

It should be noted that screens can account for up to 50% of the price of the passenger information solution (pa-pis). They are processing more and more information with ever more demanding requirements for image quality. The definition is the same as that of mass-market screens, with a definition of up to 4k, for example.

The position of screens from a physical, integration and budget point of view is therefore very important for our customers. Actia meets these requirements, which can sometimes pose surprising technical challenges, such as the design of a screen 2m in length and 25/30 cm in height!"

## What do you think are the key success factors for actia in this highly competitive on-board railway equipment sector?

### Damien redondo

"Actia has strong technical expertise in the rail market. This skill has been acquired from experience. Actia's multidisciplinary team is particularly familiar with the constraints of this market. Today, about 1000 trains worldwide are equipped with actia solutions.

Our competitiveness is also a great advantage. We use the 'design to cost' technique inherited from the historic automotive market. Our approach is part of the ongoing assessment of prices, pcbs and adapted solutions. This entails a great synergy within actia between the different assemblies used in the different markets addressed."

### Pascal pin

"We also owe our competitive position on the market to our ability to combine the flexibility of the solutions we offer with the rigour of the market. This balance makes actia a leading player in this market.

The size of actia plays a big role in this difficult balance. The way we organise ourselves allows for rapid decision-making in the face of frequent requests for adaptations or variations in products. Finding solutions within a rigorous regulatory framework is an important element of our corporate culture that shines through in all markets: the bus, truck or special equipment markets, for example."

## What is the group's position on this on-board railway equipment activity?

### Pascal pin

"It is essential. Actia's collaborative aspect is particularly pronounced in our rail activities, with a strong sharing of skills between the entities and a synergy of expertise. For example, there are strong synergies within the group, among the french and spanish, european and/or american entities.

We are thus able to address global markets by leveraging our local presence. Local industrial power is therefore certainly one of the key success factors that we owe to actia's organisation and intermediate size."

### Damien redondo

"Actia effectively ensures a local presence, as close as possible to its customers. Its subsidiaries are autonomous and flexible

enough to be able to respond quickly to customer requirements and provide solutions adapted to local constraints, whether they are fiscal (depending on location) or political.

In this way, actia equips trains, subways and trams from australia and south america. For example, we can take the metro in medellín, or the tram in sydney. But among the group's customers we also have large european public transport and rail companies, which represent a large market in the midst of change."

## How does actia track market developments?

### Pascal pin

"Actia meets market needs as precisely as possible and integrates technological building blocks that help optimise costs and improve user experience and safety into its innovation approach. The group is working and innovating towards more environmentally responsible mobility and decarbonised rail transport."

### Damien redondo

"Actia also offers an active approach to the evolution of the passenger information sector, involving the management of the increasing flow of information in an environment that integrates more intermodality and safety. Future solutions will integrate real-time video processing and analysis technologies using ai, augmented reality, and algorithms of an increasingly high quality. The innovation is also focused on data transmission and data security technologies. Safety and service to users remain the driving forces behind innovation in this market."

## About actia

Founded in 1986, the actia group is a family-owned, medium-sized international company with its head office in france. This family aspect guarantees the group's sustainability and independence, with a constantly renewed entrepreneurial drive. Actia designs, manufactures and operates electronics for system management in the highly demanding automotive, rail, aeronautics, space, defence, energy, and telecommunications sectors.

Actia's commitments are reflected in the group's ambitious work on key issues affecting the world today, such as mobility, connectivity, safety, and the environment. Actia's high level of expertise in the production and design of its products guarantees top quality. All of the group's employees uphold this high standard of quality within a fully certified environment.

### Key figures

- 2020 Consolidated turnover: €438.6 Million.
- Approximately 3,720 employees worldwide.
- 24 Sites in 16 countries.
- 14 To 17 % of turnover invested in r&d each year.

### About actia telecom

Telecom division of actia group, actia telecom is recognized in professional telecom markets for its expertise in satellite communications, scada systems, smartgrids and energy automation, in telecom networks infrastructure and in railway industry.

Actia telecom it's more than 300 employees on 4 sites in france and a dedicated production plan :

- Dinard (35) : satcom
- Millau (12) : railway and production
- Puy sainte réparade (13) : energy
- Vendargues (34) : hypervision

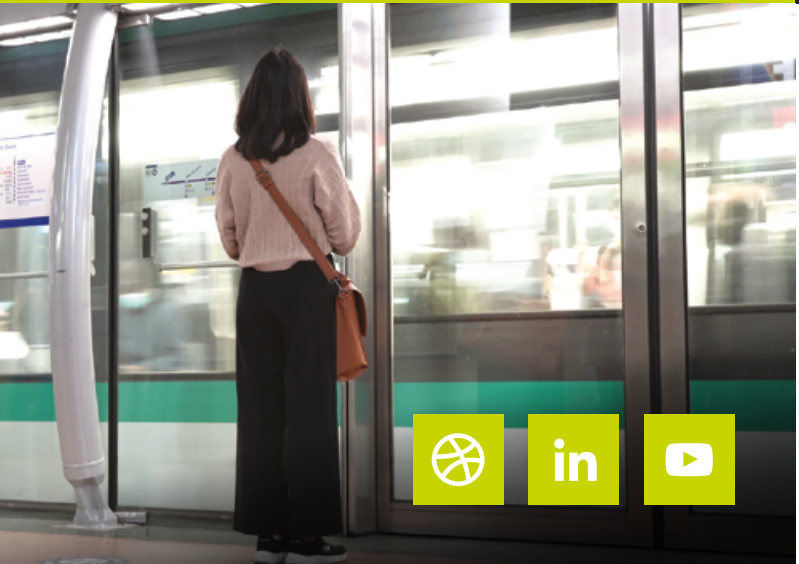
Press contact

Helene.Bro@actiatelecom.Com

www.railway.Actia.Com

# L'EXPERTISE ACTIA, POUR UNE MOBILITE INTELLIGENTE, SÛRE & CONNECTÉE


L'innovation, au coeur des défis de l'**information voyageurs** et de la **vidéo protection** embarquée & connectée en temps réel.

## CONTACT

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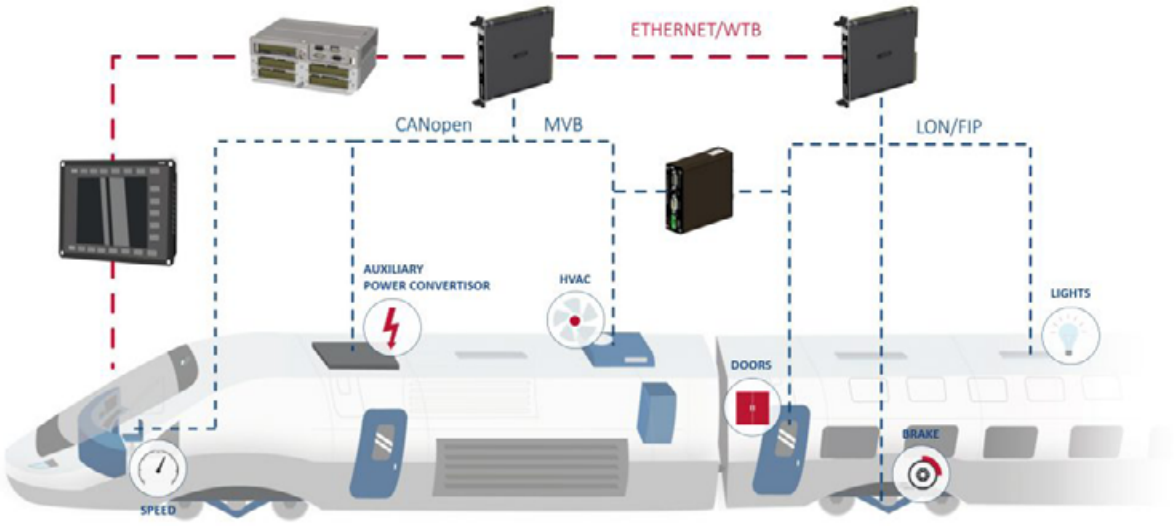
**https://railway.actia.com**

# ROLLING STOCK TECHNOLOGY ACCELERATED BY IEC 61131-3 STRATON PLC

## ON-BOARD TRAIN CONTROL AND MONITORING SYSTEMS (TCMS) APPLICATIONS

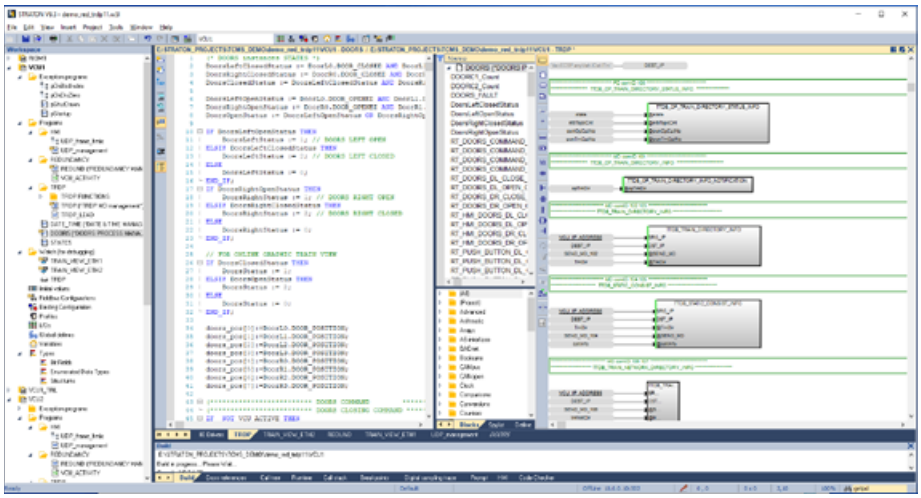
LEROY AUTOMATION

LEROY AUTOMATION, A GLOBAL LEADER AND MANUFACTURER OF RELIABLE RAIL AUTOMATION COMPONENTS AND ON-BOARD TRAIN CONTROL AND MONITORING SYSTEMS (TCMS) ARCHITECT, EXTENDS ITS SOFTWARE STRATEGY WITH THE IEC 61131-3 STRATON SOLUTION.




As the preferred automation partner for international rolling stock manufacturers and railway subsystem integrators, Leroy Automation's engineering teams support the railway industry and its operators for new built vehicles, as well as for mid-life train overhaul or modernization projects, with innovative on-board TCMS and rail automation solutions.

Compliant with the highest criteria of the EN 50155 standard, Leroy Automation's advanced TCMS portfolio of solutions features high-performance, modular and extremely reliable components such as multi-purpose on-board vehicle control units (VCU), smart remote I/O modules (RIOM), and adaptable field communication gateways (SLG). Such components are programmable and configurable to meet the requirements of a wide variety of on-board train control applications: traction, energy management, HVAC, lighting, selective/emergency door, brakes, vigilance device, condition-based train monitoring...

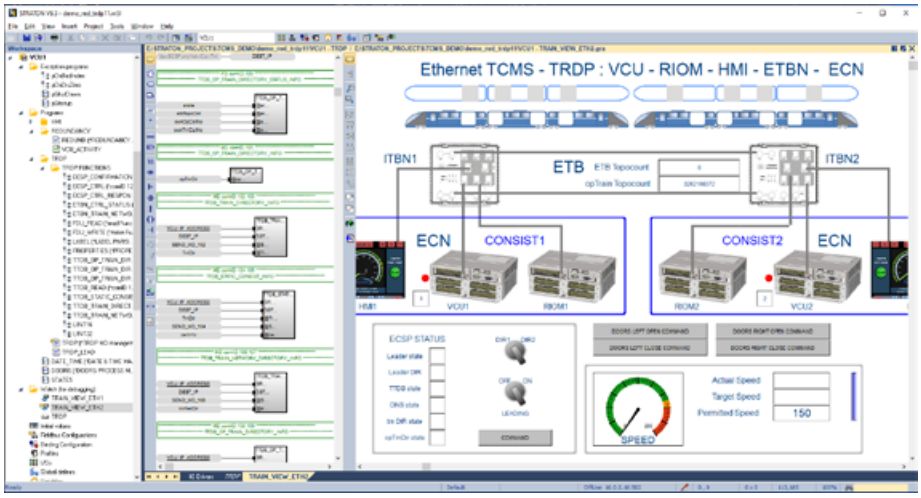


In order to facilitate our customers' software development and system integration tasks, Leroy Automation has decided to trust the software editor company COPA-DATA, and its STRATON editor, debugging, monitoring tool chain to implement train subsystem automation projects. "Based on the optimized commercial-off-the-shelf (COTS) IEC 61131-3 STRATON software development workbench, Leroy Automation's software application development strategy accelerates time-to-market and facilitates further enhancement software evolutions thanks to its PLCopen features", commented Jean RUFFIE, Train System Applications Expert.

Choosing STRATON is the most appropriate choice to deploy a common software strategy across Leroy Automation's railway products and TCMS platforms for light rail vehicles, metro cars, transit rail vehicles, high-speed rail and even passenger and freight locomotives.

The STRATON PLC automation development environment also integrates all main industrial network protocols, which are already implemented and available as a library of communication stacks for MODBUS, CAN 2.0, CANopen, J1939, EtherNet/IP, Powerlink, Profinet, SNMP, etc. In addition to the IEC 61131-3 STRATON workbench, Leroy Automation's proprietary libraries and software drivers facilitate the integration for its TCMS product lines: RIOM and BRIO. Our programmable control units and remote I/O modules are pre-configured to address and map the end users' I/O interfaces and communication ports to the target hardware.

User-friendly graphical interfaces are also available to set all the necessary parameters of the train-specific communication protocols such as MVB (multifunction vehicle bus) for traditional train communication networks, and even IEC 61375-2-3 TRDP (Train Real-time Data Protocol) message data for the latest train system architectures based on Ethernet train communication networks.




Thanks to such features, train system integrators and development engineers can focus on their core software algorithms and distributed process control applications using structured text (ST), ladder diagram (LD), sequential function chart (SFC), function block diagram (FBD), continuous function chart (CFC), or instruction list (IL).

In order to support train system engineers, Leroy Automation has also developed a complete train control and monitoring system (TCMS) testbed based on IEC 61131-3 STRATON software IDE. This test bench features the main hardware components of TCMS architectures: vehicle control units (VCU), remote I/O modules (RIOM), and driver display units, which are all interconnected using MVB nodes, fast Ethernet integrated train backbone nodes and multi-port Ethernet consist switches. Delivered with software application notes and STRATON project samples, integration engineers keep full control to lead train innovation thanks to interoperable hardware and independent software solutions.

**For more information, visit www.LEROY-AUTOMATION.com**

## ABOUT LEROY AUTOMATION

LEROY AUTOMATION is a company headquartered in Toulouse with a North American subsidiary located in Montreal. For nearly 40 years, LEROY AUTOMATION has been designing, manufacturing and marketing automation products and embedded electronic equipment for on-board rolling stock vehicles, automation solutions for electrification networks, and railway control systems. Especially designed for harsh conditions, the company's products are suited for demanding electromagnetic and extreme thermal, as well as for high vibration operating environments. From feasibility studies, detailed engineering and design, to maintenance and repair services, LEROY AUTOMATION collaborates with its worldwide customers during the complete life cycle of their products and systems. For several decades, LEROY AUTOMATION has cooperated with ALSTOM, BOMBARDIER, CRRC, SIEMENS, THALES, and others in international project and product developments along with railway and mass transit authorities, industrial and military customers, system integrators and OEMs worldwide.



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H2Y 1V9 Montreal - Quebec (Canada)
sales@leroy-autom.com
Find us on LinkedIn!

# PALC

PROGRAMMABLE ADVANCED LOGIC CONTROLLER
EN 50155 RAILWAY PLATFORM
SCALEABLE AND MODULAR SYSTEM

## Cybersecurity

High-Speed Counter

Analogue I/Os

Digital I/Os

PWM

PSU 24-110 Vdc

ETHERNET, CAN, RS-485

## Safety

SIL

## Soft PLC

leroy AUTOMATION

www.leroy-automation.com

# AAA RAILWAY ACTIVITY

AAA RAILWAY

WITHIN AAA GROUP, A SERVICE PROVIDER SINCE 1990 AND SPECIALIZED IN SUBCONTRACTING ACTIVITIES ON CUSTOMERS' SITES, AAA RAILWAY HAS DEVELOPED SKILLS AND INDUSTRIAL ORGANIZATION SYSTEMS ADJUSTED TO THE RAILWAY ACTIVITY AND CAN PROVIDE THE NECESSARY FLEXIBILITY ESPECIALLY DURING LOAD PEAKS AT MANUFACTURERS' BUT ALSO THEIR SUPPLIERS, DURING SPECIFIC OR ENDURING MISSIONS.

Our services include the support to industrialization, production, maintenance, supply chain, quality inspection, organization and continuous improvement.

Our quality certification and our rigorous management of skills enable to guarantee the qualification of our operators and technicians and to meet our customers' quality requirements.

We intervene at all stages of customers' product life cycle, on industrial facilities in France where AAA owns 8 business units and plants and worldwide with the support of our 13 subsidiaries.

**Our products and customer references**

**Our jobs:** electricians, mechanics, welders, composite technicians, laminators, team leaders, quality inspectors, technical supports.

**Our customers:** ALSTOM, AVANTIS, COMPREFORM, NOMA...

**Focus on aaa railway news**

Positioning of personnel for floor retrofit activity and molding/projection laminated composite for covering and head of the train.

AAA RAILWAY

*PRESTATAIRE DE SERVICES* | *SERVICE PROVIDER*

***PARTENAIRE DE VOTRE SUCCÈS***

***YOUR PARTNER TO SUCCESS***

*AAA vous dédie des professionnels de différents métiers capables d'intervenir en toute autonomie sur vos sites industriels de fabrication de composants ou sur sites intégrateurs.*

## *NOS METIERS:*

*Mécaniciens, Electriciens, Soudeurs, Chaudronniers, Techniciens Composite, Stratifieurs, Chefs D'équipe, Inspecteurs Qualité, Supports Techniques, Techniciens/Ingenieurs méthode industriel.*

*AAA dedicates professionals to you from different trades able to intervene with complete autonomy on your component manufacturing sites or on your integrator sites.*

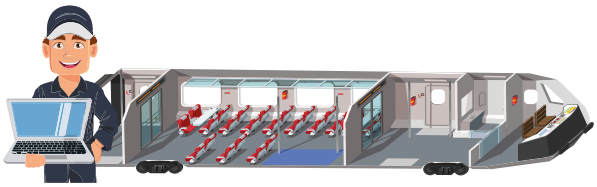
## *OUR PROFESSIONALS:*

*Mechanics, Electricians, Welders, Sheetmetal Workers, Composite Technicians, Laminators, Team Leaders, Quality Inspectors, Technical Support, Industrial Method Technicians/Engineers.*




## *NOUS INTERVENONS À TOUTES LES ÉTAPES DU CYCLE DE VIE DE VOTRE PRODUIT SUR VOS SITES INDUSTRIELS EN FRANCE ET À L'INTERNATIONAL*

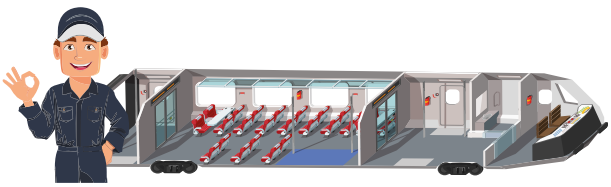
## *WE INTERVENE AT ALL STAGES OF THE LIFE CYCLE OF YOUR PRODUCT IN YOUR INDUSTRIAL FACILITIES IN FRANCE AND WORLDWIDE*



*INDUSTRIALISATION*
*SUPPORT LOGISTIQUE*
*COORDINATION DE LA SUPPLY CHAIN*
*PILOTAGE DE LA PERFORMANCE*

**1**

*INDUSTRIALIZATION*
*LOGISTIC SUPPORT*
*SUPPLY CHAIN COORDINATION*
*PERFORMANCE MANAGEMENT*



*FABRICATION*
*CONTROLE A LA SOURCE*
*CONTROLE RECEPTION*
*RECEPTION PREMIER ARTICLE*
*SUPPORT FOURNISSEUR ET EQUIPEMENTIER*

**2**

*MANUFACTURING*
*SOURCE INSPECTION*
*INCOMING INSPECTION*
*FIRST ARTICLE INSPECTION*
*OEM SUPPORT*

*ASSEMBLAGE & INTÉGRATION*
*INSPECTION*
*TRAITEMENT CORRECTIF NON QUALITÉ*
*BORD DE LIGNE*
*PERSONNALISATION*

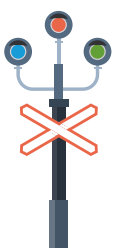
**3**

*ASSEMBLY & INTEGRATION*
*INSPECTION*
*NON-QUALITY CORRECTIVE TREATMENT*
*LINE SUPPORT*
*CUSTOMIZATION*

*PARACHÈVEMENT*
*TESTS*
*MISE EN CONDITION*

**4**

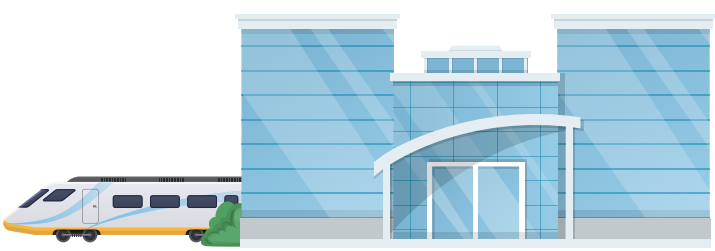
*COMPLETION*
*TESTS*
*CONDITIONING*



*INSTALLATION & MODIFICATION*
*SIGNALISATION*

**5**

*RAIL SIGNALLING*
*INSTALLATION & MODIFICATION*



*MAINTENANCE*
*RÉPARATION*
*RETROFIT*

**6**

*MAINTENANCE*
*REPAIR*
*RETROFIT*

## AXE SUR LA QUALITE

Chaque employé de notre entreprise est sélectionné et formé en permanence pour atteindre et maintenir le plus haut niveau de qualité pour la production et les services.

## FOCUSED ON QUALITY

Each employee of our company is selected and trained continuously to achieve and maintain the highest level of quality for production and services.

## PROJETS TRANSNATIONAUX

Avec l'aide de nos experts internationaux basés dans le monde entier, AAA gère les lots de travaux et fournit des services localement sur les lieux d'activités de nos clients.

## TRANSNATIONAL PROJECTS

With the help of our global experts around the world, AAA manages the work packages and provides services locally at our clients' business locations.

## GESTION DES LOTS DE TRAVAUX

Les lots de travaux sont contrôlés en fonction des situations opérationnelles, ce qui permet aux équipes et aux processus de s'adapter rapidement aux mutations industrielles.

## WORKLOAD MANAGEMENT

Work packages are controlled according to operational situations, allowing teams and processes to adapt quickly to industrial change.

## 30 ANS D'EXPERIENCE

Depuis 1990, afin de garantir à nos clients le meilleur produit final et service possible, AAA conçoit des projets sur mesure spécifiques au client et à son activité.

## 30 YEARS EXPERIENCE

Since 1990, in order to guarantee our customers the best possible final product and service, AAA designs tailor-made projects specific to the client and their activity.

## CERTIFIE ISO 9001

Notre système qualité nous permet d'intégrer et de retranscrire vos exigences

afaq ISO 9001 Qualité AFNOR CERTIFICATION

## CERTIFIED ISO 9001

Our quality system allows us to integrate and transcribe your requirements

Notre certification qualité et notre gestion rigoureuse des compétences nous permet de garantir la qualification de nos opérateurs et techniciens et respecter les exigences qualité de nos clients.

Our quality certification and our rigorous management of skills enables us to guarantee the qualification of our operators and technicians and to meet our customer's quality requirements.

**50+**

CLIENTS dans le monde entier | CLIENTS in the whole world

**15+**

FILIALES AAA dans le monde | AAA SUBSIDIARIES in the world

**3600+**

COLLABORATEURS à votre service | COLLABORATORS at your service

DANS LE MONDE

WORLDWIDE

## WORLDWIDE FOOTPRINT

*AAA s'engage à satisfaire ses clients: Accompagner, comprendre et respecter leurs exigences.*

### PARMI NOS REFERENCES

*Liste non exhaustive de nos clients*

*AAA is committed to satisfying its customers: support, understand and respect their requirements.*

### AMONGST OUR REFERENCES

*Non-exhaustive list of our clients*

ALSTOM

NOMA COMPOSITES mgd technologies group

BOMBARDIER

BOMBARDIER TRANSPORTATION

Groupe Stratiforme Compreforme

Satys

AVANTIS Concept INGENIERIE MECANIQUE & SYSTEMES MECHANICAL ENGINEERING & SYSTEMS

CAF

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# A MULTITUDE OF NEEDS REQUIRE A MULTITUDE OF SOLUTIONS

**BLASCHKE UMWELTTECHNIK GMBH**

EACH RAIL MAINTENANCE DEPOT IS A STORY FOR ITSELF AND HAS ITS OWN UNIQUE EQUIPMENT, LAYOUT AND SCOPE OF WORK.
WHEN A DIESEL ENGINE EXHAUST EMISSIONS EXTRACTION SYSTEM IS REQUIRED BLASCHKE UMWELTTECHNIK HAS THE RIGHT EXPERTISE. ESTABLISHED IN 1976, IT HAS BEEN AROUND LONG ENOUGH TO UNDERSTAND THE SPECIFIC NEEDS TO DESIGN, MANUFACTURE AND INSTALL A TAILORED AND PERSONAL EXHAUST EXTRACTION SOLUTION.

## Why invest in an Exhaust Extraction System?

Diesel Engine Exhaust Emissions (DEEEs) are an important health and safety issue in workshops where locomotives and railcars are running indoors during repair and maintenance procedures. Short-term exposure may cause different irritations whereas exposure over a long period may increase the risk of cancer. DEEEs have been classified as carcinogenic to humans in 2012 by the International Agency for Research in Cancer. The best method of controlling the DEEEs is to capture them at the source and to remove them outside the building.

In many countries, employers have a legal obligation to protect health and safety of their workforce. Creating a health and safe workplace can also be an important aspect of the company's culture. Different studies have, for example, shown that health and wellbeing at work can have a positive impact in terms of lower sickness and absence rates and better performance. Another reason may be the economic benefit deriving from reduced cleaning and maintenance costs of the building and its equipment.

## Four basic lines

A typical Exhaust Extraction System is composed of

- an exhaust capture unit to capture the harmful exhaust fumes at source,
- ducting to channel the exhaust fumes,
- an extract fan that ensures, the harmful exhaust emissions are extracted and discharged outside the workshop and
- an electric control system allowing for easy operation.

The main feature of the capture unit is the adjustable hood. It may be fixed to the roof structure or suspended from cantilever beams or bridge girders travelling on suction rails or the runways of existing overhead cranes. Basically, Blaschke Umwelttechnik proposes four different extraction units: RailPoint, Swivel Arm, RailBridge, RailBridge-Crane. Starting from one of these lines the experts design an individual system adapted specifically to the needs of every single client.

## Lots of questions

How big is the workshop? How many rail tracks are there? What other equipment is in the workshop e.g., an overhead crane or an overhead line? Does maintenance work occur in specific pre-defined locations? Which train types are serviced? How many exhaust pipes has the locomotive or railcar? Where are the exhaust pipes located? Does the train always enter in the same direction? What is the power output of the engine? These are only some of the questions the designers ask to develop a needs based individual solution that is then manufactured piece by piece and installed on site by Blaschke's experienced specialists.

## Case study: Transdev Instandhaltung Husum

Transdev Instandhaltung Husum, an independent business within Transdev Group, has been maintaining and servicing rolling stock for many years. In 2020 the range of locomotives and railcars was extended, and the existing fixed Exhaust Extraction System was no longer appropriate to effectively protect the workers from exhaust fumes hazardous to health.

Blaschke Umwelttechnik has been selected to design, manufacture and install a new Exhaust Extraction System. The main objective was to provide a more flexible solution that allows to capture and to remove the exhaust fumes from different rail vehicles, parked in different places. Additionally, Transdev asked to reuse as many components as possible of the existing and fully operational Exhaust Extraction System that has been built by Blaschke more than 15 years ago. The equipment had to be easy to

operate and to maintain. An alternate use of the overhead crane and the Exhaust Extraction System was a further requirement as well as compliance with health and safety regulations. Together with the workshop management of Transdev an optimal solution has been elaborated.

A mobile BRB Swivel Arm has been chosen as the best extraction unit basic line to meet the different demands. The significant feature of the flexible and space saving BRB Swivel Arm are the two slotted aluminum suction rails that are attached one on top of the other to the columns of the building. They perform two functions: they serve as runways for the swivel arms and to remove the DEEEs. The TDI maintenance depot has been provided with a 100 m long pair of suction rails and five swivel arms, each equipped with a round height adjustable capture hood. To extract the exhaust fumes generated by the underfloor heating of the train, four mobile electric hose reels, coupled to the swivel arms, have been added. A duct system made to measure, an appropriate number of extract fans adapted to the exhaust volume of the diesel engines and an up-to-date PLC control system as well as various height and distance control sensors complete the BRB Swivel Arm system of TDI.

"As a modern maintenance facility in the rail industry, we are constantly improving our services and the related workshop infrastructure. To meet the requirements of our customers and the market even better, it became necessary to improve the flexibility of our exhaust fumes extraction system. With the company Blaschke we could find an effective and reliable partner, who helped us to overcome this challenge. We are enthusiastic about the system designed and installed by Blaschke that far exceeds our expectations."

**Sylvia Horst, CEO Transdev Instandhaltung GmbH Husum**


# CASESTUDY
BY MINILAMPE

**BESPOKE SOLUTION**

**COMPLETE LED LIGHTING SYSTEM**

# RAILWAYS
## SNCF – TGV DUPLEX
## 1ST CLASS SEAT 1ST GENERATION

**TRAIN INTERIOR OUTFITTING REFURBISHMENT**




**DESIGN**
**MANUFACTURING**
**AESTHETICISM**
**ERGONOMICS**


## THE REQUIREMENT
SNCF, the French transport operator, in a constant effort to bring more comfort to its passengers, wished to renovate its TGV DUPLEX 1st class 1st generation fleet. SNCF studied an ergonomic seat which adapts to the passengers 'needs. MINILAMPE has been selected by the manufacturer of the seat to bring the complete lighting solution on the TGV first class seat.

## SOLUTION MINILAMPE
With its research and Development Department, its production unit and its laboratory located in France, MINILAMPE has designed all lighting functions of the first class seat in partnership with the seat manufacturer to deliver a number of lighting features required by SNCF. The seat adapts to the passengers' need (working, reading, or relaxing). In this case study, only the lighting features are presented.
The solution of the complete kit driven by a main electronic card located in the folder of the seat includes all lighting features: folding table light, reading light, under seat light, and USB light. This kit is EN50155, EN45545-2 approved.

**1. Lighting for folding table and touch.** Enables to light automatically the tablet once pulled down. Dimmable tablet lighting by touch switch for a better working comfort.

**2. Lighting 5V USB port.** USB with LED included.

**3. 12V reading light.** Individual reading light with indirect lighting for a better visual comfort.

**4. 12V under seat lighting.** Floor lighting, corridor for security and control.

## THE RESULT
MINILAMPE was the lighting expert for this project from the electronic study, certification to prototypes manufacturing to bring the best comfort lighting features.
- **Product reliability.** All lighting functions are independent of each other in case of damage (eg: USB socket used many times by users, risks of failure).
- **Reduction of maintenance costs.** The complete kit (all lighting functions) does not need to be replaced, only the function concerned by the failure.
- MTBF 1 500 000 hrs.


MINILAMPE
www.minilampe.com

**MINILAMPE**
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Z.I. La Bouriette • 11890 CARCASSONNE Cx
FRANCE

Tel.: +33 (0)4 68 25 14 26
Fax: +33 (0)4 68 72 57 44
contact@minilampe.com • www.minilampe.com

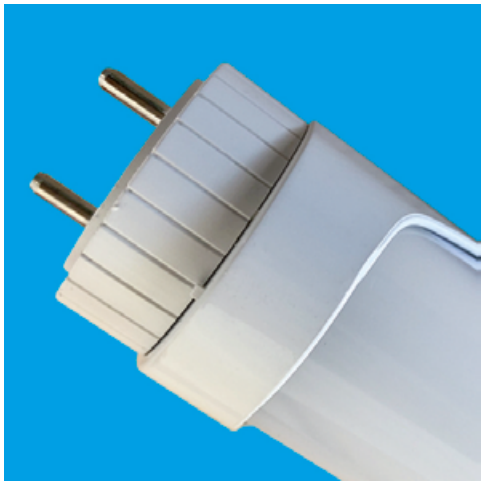

EDITION 2017

MINILAMPE
www.minilampe.com

# LED TUBE 72V DC 1200 mm

# PLUG & PLAY SOLUTION

This LED tube replaces T8 fluorescent tubes such as TLD18W, TLD36W types and ballast.
Just shunt the ballast of the fluorescent tube during installation.




## SPECIFICATIONS

Voltage: **72V DC**
Voltage range: **50-90**
Power: **20W**
Length: **1200 mm**
Diameter: **26 mm**
Front face: **PC**
Housing material: **aluminium**
Cap base: **G13**
Beam angle: **120°**
Lifetime: **30 000 hrs**
Colour rendering index: **> 80**
Luminous flux: **2000 Lm**
Colour temperature: **4000K**
DC/DC converter: **built into the tube**
Operating temperature: **T3 class**

EN50155 & EN45545-2 **RAILWAYS APPROVED**

## BENEFITS

- Energy consumption reduction by 50%
- Lower maintenance costs thanks to a longer lifetime (30 000 hrs) than conventional fluorescent tubes.
- Instant ignition.
- Resist to chock.

*Do not hesitate to consult us for any request you may have.*

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EDIT.: 2019

# CASESTUDY
BY MINILAMPE

**CUSTOM-MADE LIGHTING SOLUTIONS PLUG & PLAY SOLUTIONS**

# RAILWAYS
## GBF LED LAMP
## SNCF - DEUTSCHE BAHN

**TRAIN INTERIOR OUTFITTING**

**UPGRADING**

**RENOVATION**

**SOLUTION TO OBSOLESCENCE**


## THE REQUIREMENT

Make the trains more pleasant and improve the passengers'comfort are today Railway operators' aims.
Technological transition to LED in train interior outfitting is one of the considered solutions in innovation and reliability of equipment in order to improve passenger ambience and meet the requirement in energy consumption reduction for the environment.
For this, SNCF and DEUTSCHE BAHN Engineers, among others, intended to replace the existing lighting in cars by LED technology. Priority was the replacement of the GBF halogen lamps ALUine PRO type 6435 12V 20W 32° further to the discontinued production by PHILIPS.

**ENJEU.**

- To support SNCF and DEUTCHE BAHN technical teams in this technological transition project by offering a plug &play custom-made lighting solution.

## SOLUTION MINILAMPE

With its Research & Development Department, its production unit and its laboratory located in France, MINILAMPE is an historical manufacturer of the Railways sector. MINILAMPE is recognized for its capability to provide custom-made solutions in technological evolutions of the new lighting systems for train interior outfitting.
MINILAMPE offers you 3 certified Railway solutions. The first one has been chosen by SNCF and DEUTSCHE BAHN.

**1.** MINILAMPE has designed the EN50155 certified Railway LED lamp to replace the GBF halogen lamp according to the customers' specifications (Plug & Play).
**2.** MINILAMPE can manufacture and re-industrialize the original halogen lamp from PHILIPS.
**3.** MINILAMPE can design a complete LED lighting system that will fit within the existing space of the halogen lamp.

## RÉSULTAT

- **Solution to obsolescence.** Replacement of the obsolete lighting (GBF halogen lamp PHILIPS type 6435) without any modification of the existing installation and equipment.
- **Reduction of maintenance costs.** Life is 30 000 hrs for the LED lamp compared to 2000 hrs for the halogen lamp.

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# CASESTUDY
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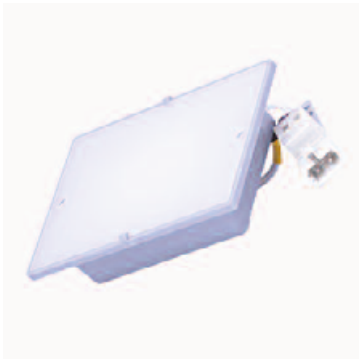
**CUSTOM-MADE LIGHTING SOLUTIONS**

# RAILWAYS
## REGIO2N FLEET
## LED READING LIGHT SYSTEM

**TRAIN INTERIOR LIGHTING**



**DESIGN**

**DEVELOPMENT**

**MANUFACTURING**

## THE REQUIREMENT

An equipment manufacturer develops the seats of the new regional train expected in Ile-de-France, the REGIO2N train manufactured by BOMBARDIER. This equipment manufacturer wishes to improve the functional and aesthetical qualities of train cars by designing new seats with high-quality material, innovative design and new interior lighting technologies. He plans as specified in BOMBARDIER technical specifications a 72V DC LED lighting system (under seat lighting system) to improve passenger comfort and the well-being.

**ISSUE.**

- To support this equipment manufacturer by offering a custom-made and economical solution, develop and manufacture the LED lighting system.

## THE SOLUTION

With its Research & Development Department, its production unit and its laboratory located in France, MINILAMPE is an historical manufacturer of the Railways sector. MINILAMPE is recognized for its capability to provide lighting custom-made solutions for train interior.

The equipment manufacturer has chosen MINILAMPE to design its 72V DC LED lighting bespoke system that meets the technical constraints, and which is EN50155/EN45545 certified, within the customer's deadlines.

## THE RESULT

- **Reduction of maintenance costs.** Life is 60 000 hrs.
- **Complete lighting system solution** that integrates electronics, mechanics and cabling.
- **Improvement of functionality and design.** Ergonomic LED lighting system for comfort lighting.

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# CASESTUDY
BY MINILAMPE

**CUSTOM-MADE LED LIGHTING SOLUTION PLUG & PLAY SOLUTION**

# RAILWAYS
## SNCF RESEAU

**RAIL AND INFRASTRUCTURE SIGNALLING**

**DESIGN**

**DEVELOPMENT**

**MANUFACTURING**

**PLUG & PLAY SOLUTION**

## THE REQUIREMENT

In the context of the technological evolution to LED, SNCF RESEAU plans to change the incandescent lamps of their signals , lamp types B21s/4 6.5V 12.5W & B21s/4 19.4V 25W CT198 by LED technology.

**ISSUE.**

- To design, develop and realize LED lamps that meet our customer's technical specifications and bring a PLUG & PLAY solution.

## THE SOLUTION

With its Research & Development Department, its production unit and its laboratory located in France, MINILAMPE which is the historical manufacturer of these existing incandescent lamps 6.5V & 19.4V, has designed LED lamps as replacement for the signal lights, following SNCF RESEAU 's technical specifications, drastic environmental and dimensions constraints.

MINILAMPE designs, develops and manufactures obsolete lamps. MINILAMPE supports its customers by offering bespoke LED lighting solutions in the context of technological evolution of lighting systems.

## THE RESULT

Improves visibility of the signals.

Enables maintenance in operational conditions without changing the installation and equipment.

Plug & Play solution.

- **Lower purchasing cost** of a LED lamp as plug & play in the existing signal compared to the replacement cost of a complete LED module, much more expensive (X 10).
- **Reduction of maintenance costs.** Life is 30 000 hrs for LED lamps against 4 000 hrs for incandescent lamps.

The average time to replace the existing lamp with the LED lamp in the signal is 5 seconds.


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# CASESTUDY
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**COMPLETE BESPOKE LED LIGHTING SYSTEM SOLUTION**

# RAILWAYS
## SNCF MOBILITES
## TER2NPG Z23500

**MID-LIFE REVISION**

**DESIGN**

**DEVELOPMENT**

**MANUFACTURING**

## THE REQUIREMENT

With the mid-life revision, operators today wish to update their trains by bringing more comfort and improving design. Within this context, SNCF has decided to replace the halogen lighting systems by LED technology on TER2Npg Z23500 train platforms.

**ISSUE.**

■ To support our customer by offering a custom-made and economical solution for the replacement of the current lighting by LED technology.

## THE SOLUTION

With its Research & Development Department, its production unit and its laboratory located in France, MINILAMPE is an historical manufacturer of the Railways sector. MINILAMPE has been chosen by SNCF to design a custom-made Monobloc 72VDC LED spot that meets the technical constraints, EN50155/EN45545/EN13272 certified, within the customer's deadlines.

## THE RESULT

■ **Reduction of maintenance costs.** Life is 50 000 hrs.
No change of your equipment fits within the space envelope of the existing lighting.

■ **Power consumption reduction from 160W to 20W by platform** (8 X 20W halogen spots replaced by 8 X 2.5W LED spots).
Guarantee of the lighting level when using the 72V battery in case of failure.


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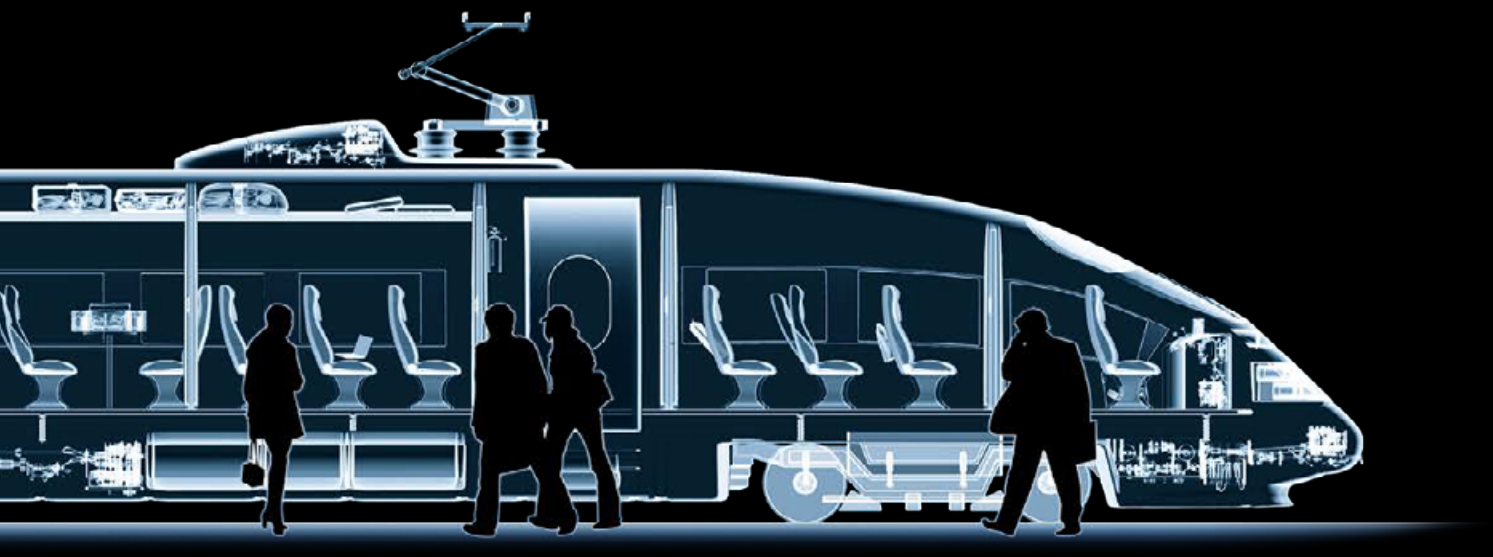

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