

# Railway-News

M A G A Z I N E

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**Esri Summit Showcases the Benefits of GIS to the Rail Industry**

**EULYNX: Enabling the Digital Future of Railway Signalling**

**ISSUE FOUR 2024**



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# Letter from the Editor



Dear Readers,

In our final issue of 2024, we are taking a look at rail market liberalisation in Spain. Global Mobility Call, which recently took place in Madrid, featured a panel discussion entitled “Rail Mobility: Liberalization and the Spanish Case”, during which speakers from ADIF, the Comisión Nacional de los Mercados y la Competencia and Idom Consulting, Engineering And Architecture S.a.u. spoke about the history, successes and challenges of rail market liberalisation in Spain.

Our principal journalist Tiana May attended the event and has written about the key points in her article It’s Not Plain Who Runs the Trains in Spain (p.6).

Another event that recently took place was Esri’s annual GIS Rail Summit, which highlighted the ways in which US railroads are benefitting from geographic information

systems. Read about the ‘State of the Railroads’ roundtable session from this event on p.34.

Standardisation and interoperability have long been goals for the rail industry – for rolling stock, infrastructure and technical systems such as railway signalling. EULYNX is a consortium comprising national rail infrastructure managers that is focused on standardising railway signalling in order to bring about interoperability, cost efficiency and technological cohesion. In the article “EULYNX: Enabling the Digital Future of Railway Signalling” (p.27), Mirko Blazic, EULYNX Technical Lead, looks at how EULYNX is contributing to these changes and what some of the key trends in railway signalling are.

This is of course just a snapshot of all the features in this issue. We hope you enjoy the read. As always, we welcome your feedback and insights, which you can send to [editorial@a2bglobalmedia.com](mailto:editorial@a2bglobalmedia.com).

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# Issue Four 2024

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**p.6** **It's Not Plain Who Runs the Trains in Spain**

Tiana May looks at the European Union's mission to deliver rail market liberalisation in Europe and how Spain has been delivering on this with great success

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**p.12** **Upcoming Events**

A look at what key railway events are taking place between January and March 2025.

RAILWAY  
NEWS  
2024

# It's Not Plain Who Runs the Trains in Spain

By Tiana May



© Ouigo

Rail network liberalisation is currently an increasing trend worldwide as governments aim to introduce competition, improve services and reduce costs. In Spain, the first phase of rail liberalisation was completed in 2020, while the second phase recently launched in October 2024.

Elsewhere in Europe, the introduction of Italo as a competitor to state-owned Trenitalia in Italy has helped improve service quality and lower fares. Likewise, France began opening its rail network to competition in 2021, enabling operators like Thello to run on high-speed routes, including Paris-Milan. Similarly, Germany's partly liberalised network has seen private operators like FlixTrain offer low-cost alternatives to Deutsche Bahn (DB).

These reforms align with European Union directives aimed at creating a Single European Railway Area

(SERA), promoting efficiency and enhancing customer choice.

## Rail Liberalisation in Spain

Taking a closer look at this process, this year's edition of Global Mobility Call explored how rail liberalisation in Spain has marked a transformative shift in the country's transport sector, introducing competition into a market long dominated by the national rail operator, Renfe.

The first phase of Spain's rail liberalisation was completed in 2020. It included the high-speed lines between Madrid and Barcelona, Madrid and Valencia and the Madrid-Seville/Malaga corridors. By opening the rail market to new operators, this move broke the monopoly held by Renfe, allowing companies like Ouigo (SNCF) and Iryo (a consortium involving Trenitalia, Air Nostrum and Globalvia) to enter the market.



At Global Mobility Call, Raúl Míguez, Deputy Director of the Presidential Office at Adif noted that Spain's success in this process was facilitated by its advantage of having a dedicated, high-speed rail network that helped attract a range of operators. This highly efficient network spans over 4,000 kilometres in length and reflects a social demand for rail connectivity across Spain, thus incentivising operations.

Míguez emphasised that this infrastructure was previously underutilised, with significant available capacity, thus making Spain well-positioned to liberalise its railway market. To facilitate this, the infrastructure manager proactively introduced a framework capacity offer, clearly outlining the network's available capacity and inviting operators to submit applications. This approach allowed Adif to establish rules and criteria in advance, ensuring proposals aligned with the network's requirements.

The subsequent competition on the network has resulted in more diverse services, offering passengers more options in terms of price, schedules and comfort.

With multiple operators vying for customers, there has also been a focus on enhancing service quality, such as better onboard amenities, more punctual services and greater ticketing options.

What's more, competition among operators has driven down ticket prices, making rail travel more affordable for passengers. Indeed, a report by CNMC shows a decrease in ticket prices of 22% and 23% in the Madrid-Barcelona and Madrid-Valencia corridors respectively in the first quarter of 2023 compared to the same period in 2022. These fare reductions benefit budget-conscious travellers and encourage a modal shift from cars and planes to trains. Consequently, by encouraging more passengers to travel by train, this liberalisation is also supporting Spain's environmental carbon reduction goals.

In recognition of these benefits, María Concepción Ortega, Vice-president of the Spanish Railway Association, Mafex, highlighted that the liberalisation of railway services has been "a lever for attracting and generating demand". Notably, in less than two and



a half years, the number of passengers travelling on the liberalised high-speed networks has increased by an additional 10 million, bringing the total number of annual passengers on these high-speed lines to 31 million.

Ortega highlighted that this growth has likewise resulted in increased activity in the industry through the production, maintenance and power of new rolling stock, as well as the expansion and growth of control centres and signalling systems and the adaption of signage and facilities at stations. Consequently, the entire value chain has benefited from this success, prompting investments and innovations that result in an increasingly solid economy.

In line with this prosperity, the rise in ridership has resulted in increased revenue on the network. Indeed, Ivan Santos, Deputy Director of the Railway Sector's National Commission for Markets and Competition (CNMC) in Spain noted that, when comparing 2019 with 2023, Spain's rail infrastructure manager, Adif has benefited from an additional 150 million EUR in revenue. This profit has in turn been invested into

further improving the network, bringing additional benefits to passengers.

## Phase Two

The second phase of Spain's liberalisation process began in October 2024. Replicating the model of the first phase, it will include up to 72 new daily services. This phase will link Madrid with Galicia, Asturias and Cantabria, as well as with Cádiz and Huelva.

At the end of October, Adif published preliminary information on the capacity offer for these routes. This includes 32 train paths each day on the Madrid-Galicia line, 24 between Madrid-Asturias/Cantabria and 16 on the Madrid-Cádiz/Huelva line. More detailed information will be published in the first quarter of 2025, including the complete capacity with available time slots, along with the process schedule and its rules.

As in the initial phase of liberalisation, Adif plans to establish multi-year framework agreements with successful operators. These agreements are expected

to be signed by late 2026 and would enable companies to commence operations shortly thereafter.

## Challenges

Alongside the benefits of liberalisation, Global Mobility Call also acknowledged several key challenges throughout the process.

In particular, Santos highlighted significant challenges with the second phase of rail liberalisation, largely stemming from technical complexities. Phase 1 involved modern high-speed lines that are interoperable with diverse rolling stock. This has allowed operators like Ouigo and Iryo to seamlessly introduce their own trains. In contrast, phase two covers lines with non-variable track gauges and electrification systems. Currently, these routes are compatible with only one train model, creating operational constraints. These technical limitations may deter operators, potentially reducing competition and making the phase two services less appealing to prospective entrants.

What's more, Santos noted that population densities and ridership demands differ on these routes. Indeed, the first phase of liberalisation had a population reach of 25 million inhabitants, while the second phase covers just 7.5 million. Despite this contrast, he anticipates that competition will continue to act as a lever for growth and will thus help drive demand in these regions.

Finally, it is worth noting that with an increase in rail services, energy demands on the network are also rising. At Global Mobility Call, Concepción Ortega emphasised the environmental advantages of rail travel over air and road transport, with journeys producing up to 30 times fewer carbon emissions. However, as demand rises, the industry arguably needs to increase its adoption of green energy solutions and improve energy efficiency to further advance its climate goals. In response to this challenge, Concepción Ortega noted that the industry's prosperity, driven by network liberalisation, is facilitating increased investments in R&D in these areas, thus helping to address such demands.

Overall, Spain's ongoing rail network liberalisation exemplifies how competition can revitalise public transport, bringing tangible benefits such as lower fares, improved services and enhanced sustainability. The success of phase one, resulting in increased ridership and revenue, demonstrates the potential of this approach. Although phase two presents technical and demographic challenges, by addressing these hurdles, Spain now has the opportunity to further position its rail network as a competitive, efficient and environmentally sustainable transport option.

To hear more from Tiana May, Principal Journalist visit [www.railway-news.com](http://www.railway-news.com)



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# Gmeinder

## Our Way to Success

During Innotrans 2024, Dr Wolfgang Fischer, Managing Director of GGT Gmeinder Getriebetechnik GmbH, presented the Gmeinder 2025 project. It is certainly worth introducing this unique project to the wider professional public.

*"The tradition of the Gmeinder brand, which celebrated its 111th anniversary this year, has continually committed us to pushing the boundaries of human endeavour in the production and service of mechanical gearboxes and drives for rolling stock. And one of the stones in the mosaic of these efforts is the Gmeinder 2025 project,"* says Dr Wolfgang Fischer.



Dr Wolfgang Fischer  
Managing Director of GGT Gmeinder Getriebetechnik GmbH

Gmeinder Getriebe has been part of the Wikov industrial group for 5 years and is thriving under its wing. At the last InnoTrans, it presented a complete range of innovative gearboxes for railway maintenance vehicles, won key orders as a result, and is now throwing its efforts into another area in which it has long been strong – the servicing of gearboxes for rolling stock.

At this year's InnoTrans, the company presented the Gmeinder 2025 project, whose motto is One Stop Shop Service. In particular, the intention is to offer customers the most efficient process for repairing gearboxes and drives for rolling stock. As Dr Wolfgang Fischer says: *"There is no room for any waste of time in this business. The aim is to take the problems off the customers and solve them for them. We need to concentrate as many operations as possible in one place and thus eliminate the risks of outsourcing. We successfully launched the project last year and brought it to life in an extremely short time. The project required extensive*





Here is a brief overview of other significant investments: Aquakleen™ automatic washing machine, wheel jet 30 – 2000 bar blasting system, Spyre SPR500 mobile laser cleaning system, SMEC lathe for axle shaft processing, surface renovation by plasma-spraying, industrial painting and drying system, robotic workstation for deburring gears, CNC inner bore grinding system, digital guide and documentation of assembly processes and newly built disassembly area.

Gmeinder Getriebe not only services its own gearboxes, of which it has delivered more than 70,000 units in its existence, but also gearboxes from other competing brands form a significant part of its business.

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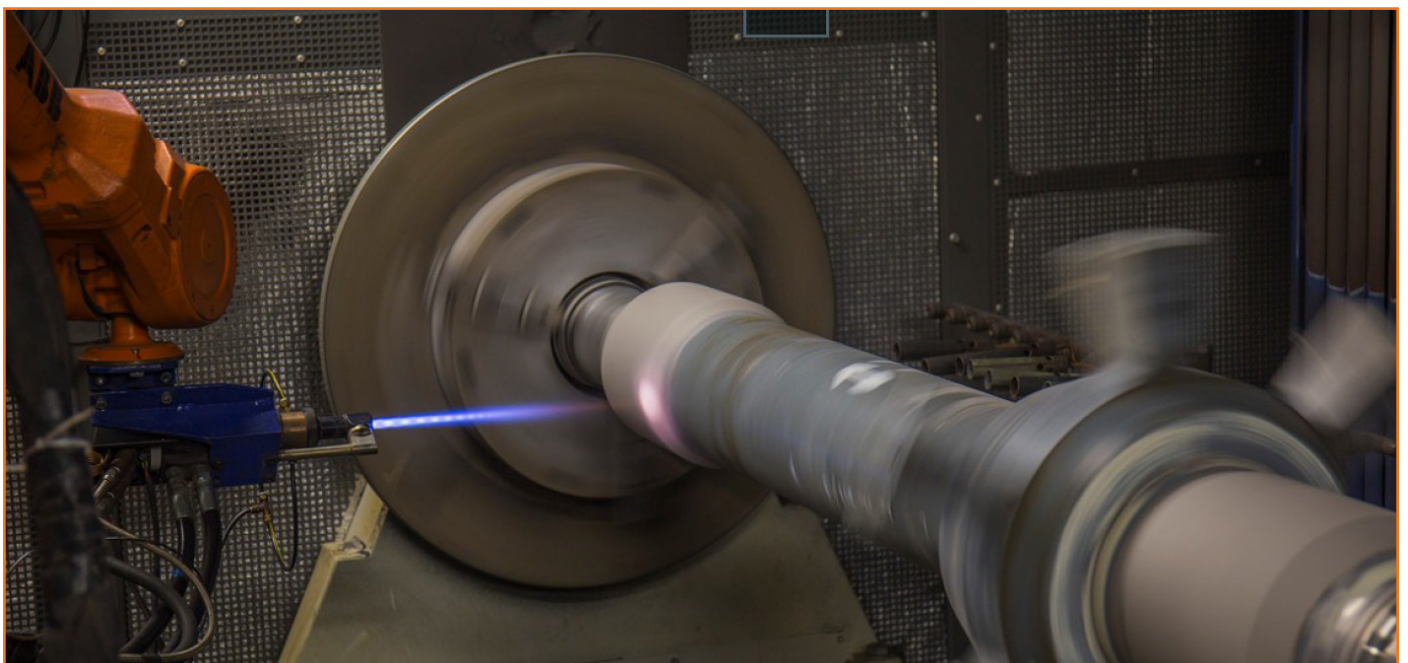
For more information visit [www.gmeinder.com](http://www.gmeinder.com).

*investment in both the efficient running and continuity of individual operations and in the technological equipment."*

The project is now almost complete. During October, the new RADS 2-250 wheelset press from MAE. Group was tested and calibrated. This is a technology that is absolutely essential for Gmeinder to fulfil the purpose of the whole project – One Stop Shop Service. However, this is far from the only technology Gmeinder has invested in this year.

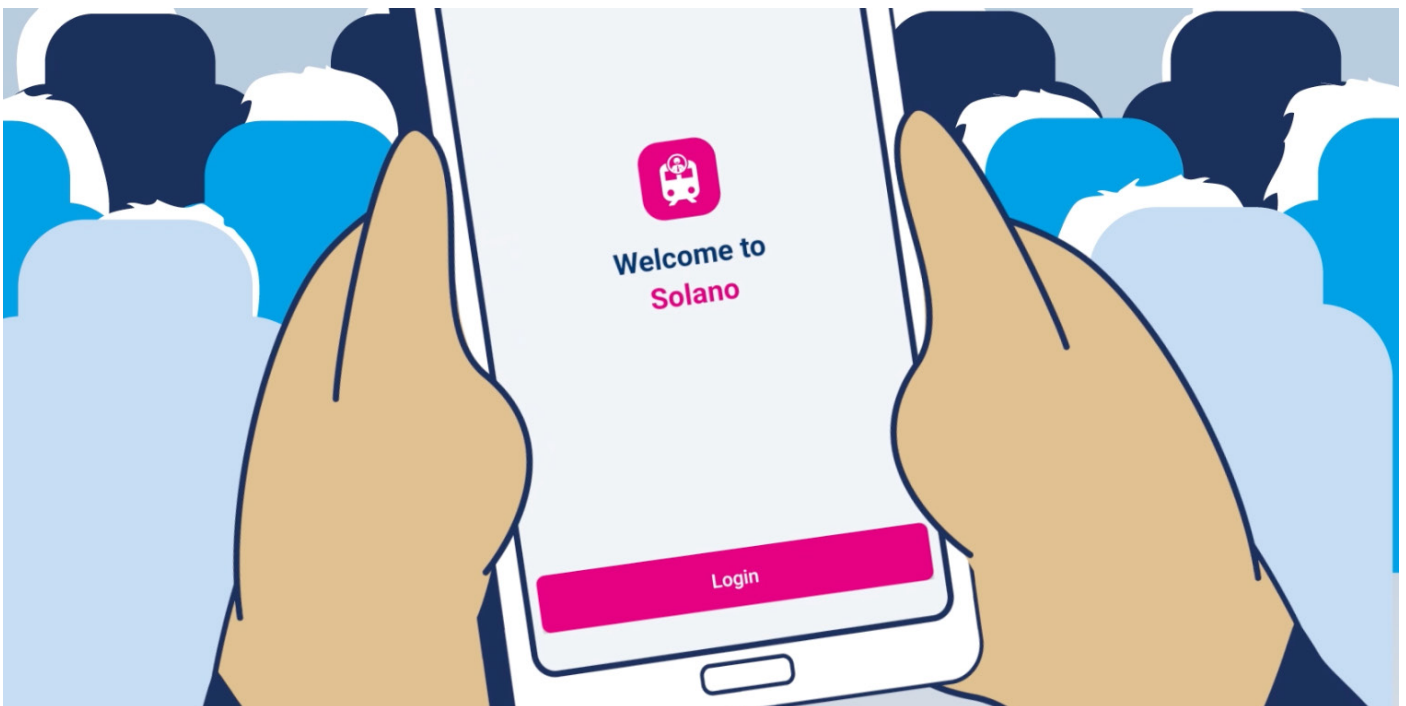


*A Wikov Company*



# Mistral Data

## Solano: Streamlined, Real-Time Support for Frontline Rail Operations



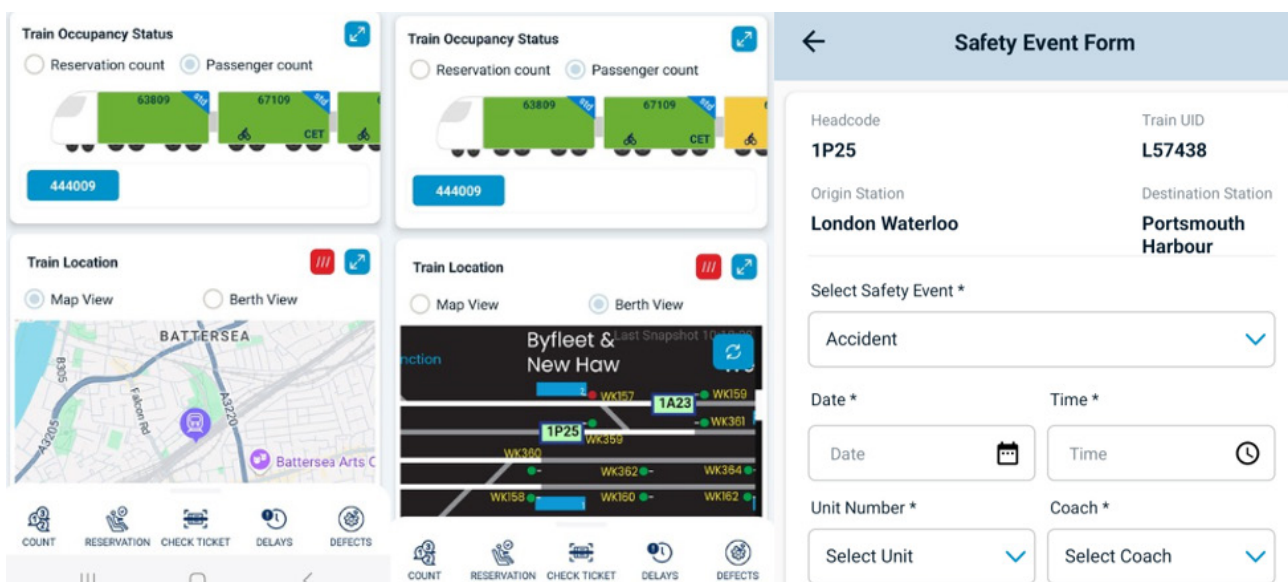
In the railway industry, real-time communication and information for frontline staff are critical for ensuring the safety, efficiency and reliability of operations.

With thousands of passenger services running daily, even a small delay in communication can have significant ripple effects on schedules, passenger experience and safety protocols.

Real-time communication allows railway staff to stay connected and informed about the latest developments, ensuring they can respond swiftly to incidents, adjust schedules or provide accurate updates to passengers.

Solano, is Mistral Data's staff engagement mobile application, providing effective communication between dispatchers, on-train and platform staff, maintenance and office teams, enabling seamless coordination of activities such as train arrivals, departures and any potential service disruptions. It also plays a crucial role in time-sensitive situations where the immediate relay of information is essential to prevent further disruptions or mitigate their impact.

Solano offers on-train staff a powerful suite of tools to streamline daily operations and enhance passenger service. The app allows staff to track real-time train running information, ensuring they are always up-to-date on schedules, delays and potential disruptions. Additionally, it provides access to reservation and



Solano screens showing location with both Google Maps or an integrated Berth Maps view. Incident reporting screen

occupancy levels and onward travel information, enabling staff to assist passengers with their connections and travel plans.

With an integrated view of berth maps, Solano allows staff to view precise train locations, aiding in the smooth coordination of train movements, location and context for potential delays or service alterations. The app also includes a ticket validation feature, giving staff the ability to quickly and efficiently verify passengers' tickets, improving the boarding process while collecting data to improve fraud prevention processes.

The app also allows staff to view their personal schedules for the day, providing a clear overview of scheduling and turnarounds, leading to a better service and smoother journey for passengers.

By providing real-time data on train positioning, schedule adjustments or passenger assistance requests, Solano can help optimise the customer experience and overall operational efficiency. By leveraging up-to-date information, railway staff can make informed decisions that improve service punctuality, reduce costs and ensure that safety and performance standards are maintained at the highest levels.

Solano provides on-train staff with a quick and efficient way to report incidents or defects directly to the teams that need them – be that the control room, safety teams or fleet maintainers.

The app allows users to categorise the type of issue,

provide detailed descriptions and even upload photos or videos for visual context. This immediate reporting capability helps reduce response times, allowing maintenance teams or emergency personnel to be deployed swiftly, minimising service disruptions and enhancing passenger experience and safety.

Solano enhances collaboration between back-office operators and frontline staff by ensuring that critical information flows between users without delay. It provides an intuitive platform for on-train staff to share updates, receive instructions and coordinate more effectively with operations teams. Control room operators, in turn, have access to real-time data, allowing them to make informed decisions faster, adjust schedules and deploy resources more effectively.

Solano ensures consistent, timely and targeted messaging to any staff, at scale. To send a message, users define the audience, timing window and message content. Messages can be sent to specific crew, or more broadly to crew based on certain services, at stations, depots, calling points or linked to on-the-day passenger assistance requirements.

Each message can be tailored to identify if an action is required by the recipient – either acknowledging receipt, or if task based, confirming completion. Once sent, all messages and recipient actions can be viewed and monitored from a dashboard.

Ensuring that messages are received only when they are relevant, Solano manages distribution by holding



and releasing messages based on crew schedules. If a crew member is on duty and the message is specific to a service currently running, the message is sent immediately. If a staff member has not yet started their shift, the message will be delivered one hour prior to their shift starting. Similarly, if a staff member is on shift but the message is not relevant until later in the day, Solano holds the message until one hour prior to the issue window.

In addition to manually generated messaging, Solano also facilitates automated messages, prompting on train staff to provide context for delays or notify scheduling changes like cancellations or calling point alterations.

Keith Hawkins, On Train Depot Manager, Strategy and Projects (SWR) said: *“Solano is a complete game changer, providing focused and timely information directly to those who really need it. It will transform our approach to messaging, ensuring frontline colleagues*

*are not inundated with network-wide information, only getting messaging that is relevant to keep their trains on time and customers informed.”*

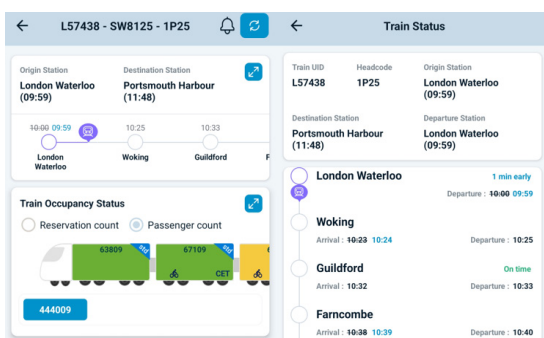
The seamless communication capability provided by Solano leads to a more integrated and responsive railway operation, ultimately improving both operational efficiency and passenger experience.

Real-time communication and access to accurate, timely information is indispensable for railway staff to operate trains safely and efficiently, maintain customer satisfaction and ensure the smooth functioning of rail networks.

By using Solano, on-train staff play an essential role in maintaining operational standards, ensuring that technical faults are quickly reported and any incidents onboard are managed efficiently. The integration of real-time reporting improves communication between train staff and control room operators, leading to faster resolutions and more effective train management, ultimately enhancing the overall service quality and safety.

Mistral Data’s mobile application serves as a vital communication bridge between back-office teams and frontline staff. It streamlines the flow of information, ensuring that both on-train staff and control room operators remain synchronised in real-time.

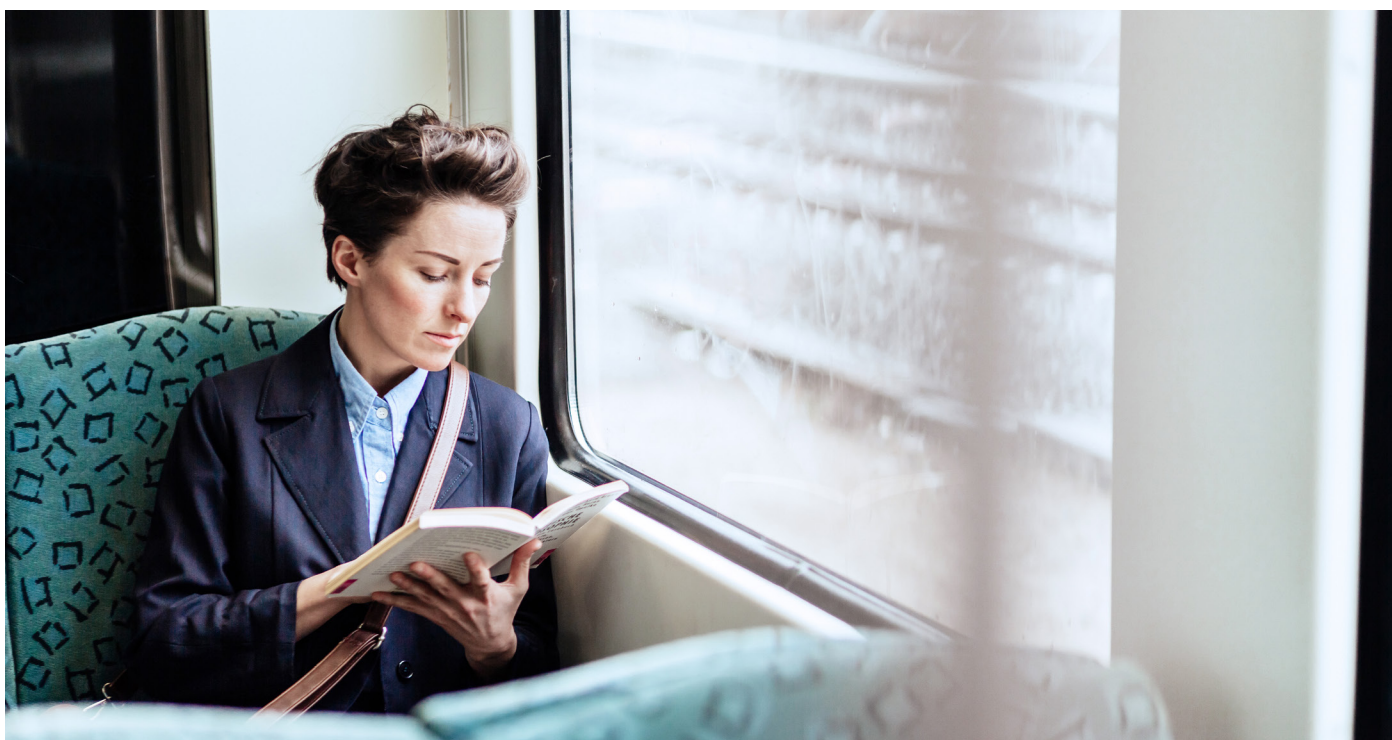
[www.mistral-data.com](http://www.mistral-data.com)



Solano screens showing service occupancy, facilities and calling points with real-time train running

# AON

## Top Risks Facing Transportation and Logistics Organisations



Transportation and logistics industry respondents to our Global Risk Management Survey (GRMS) ranked cyber attack or data breach and economic slowdown or slow recovery as their two most critical risks.

One continually evolving risk is cyber attack or data breach, which is the top-ranked risk for the industry in our 2023 survey. Other risks don't appear on the top 10 list but are intimately connected to cyber risk, including disruptive technologies such as artificial intelligence (AI) and quantum technologies, which have the potential to amplify these risks and bring about more regulatory or legislative changes. Geopolitical risk could cause business interruptions and property damage.

The list goes on. The industry will need to continue to develop new strategies to address the fast-evolving risks that are on its doorstep as well as any new risks that are approaching. Resilience – not to mention significant value – is at stake.

### Current Risks

Some of the most notable risks for the transportation and logistics industry can cause significant disruptions. A few overlooked vulnerabilities can accumulate to cause immense systemic damage. Cyber attack or data breach is already the top risk for the industry according to respondents, but an organisation's cyber vulnerability should receive more attention and support from C-suite decision-makers as well as more collaboration between HR, risk and IT to create

a whole-enterprise approach. Consider uninsured warehouse liability risks that may result from a cyber event. Many in the industry hold liability coverages that exclude losses that result from cyber events, but many warehouses still have elements in their software systems that are vulnerable to bad actors, and the uninsured losses for the industry could run into the billions. Elsewhere, hidden liabilities in shipping contracts are often not quantified or are underexamined, but they can cause very significant financial damage.

### Top 10 Current Risks

1. Cyber attack or data breach
2. Economic slowdown or slow recovery
3. Business interruption
4. Increasing competition
5. Workforce shortage
6. Supply chain or distribution failure
7. Regulatory or legislative changes
8. Failure to attract or retain top talent
9. Property damage
10. Failure to innovate or meet customer needs

### Related Products and Solutions

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- **Cyber Insurance**
- **Errors and Omissions Liability Insurance**
- **Climate Risk Consulting**

The failure to attract or retain top talent (ranked

number eight) – distinct from workforce shortage (ranked number five) – is also an area of significant risk for the sector. Most industry respondents cited a shortage of skilled talent, partly the result of losing experienced talent to other sectors with more appealing pay or working conditions and partly fallout from the pandemic, which has seen some employees reconsider their work-life balance. Indeed, these developments have catalysed unionisation efforts among transportation workers.

Other human factors can create easily overlooked risks for the sector. Notably, social media can create an expectation of constant visibility to parts of company operations that used to be less scrutinised. This openness can help bad actors identify opportunities for theft along the supply chain, spread misinformation and damage brand value.

Straightforward supply chain or distribution failure is another top risk, ranked number six. By its nature, the sector participates in complex, extended supply chains, which means there are many possible points of failure. Consider the rise in cargo theft, which is at a **10-year high**. Social media and advanced technologies have made it easier for bad actors to spot and seize opportunities, including impersonating drivers and conducting fraudulent cargo pickups.

### Top 10 Future Risks

- Economic slowdown or slow recovery
- Cyber attack or data breach



- Workforce shortage
- Regulatory or legislative changes
- Failure to attract or retain top talent
- Increasing competition
- Political risk
- Cash flow or liquidity risk
- Commodity price risk or scarcity of materials
- Ageing workforce and related health issues

For instance, the industry will likely need to be able to electrify fleets or pivot to non-fossil-fuel technologies in the future. But because many sub-sectors within transportation and logistics are highly visible, they often attract regulatory oversight that can make growth and implementing change difficult or complex. For instance, making medium-term decisions about the energy transition can be difficult because regional and national policy agendas can differ significantly from one country to another. And because the industry is still powered mostly by fossil fuels, the combination of factors such as carbon taxes and infrastructure costs for the energy transition will likely continue to boost operating costs. Finally, infrastructure that supports trucking and logistics is deteriorating in many places, and the lack of safe, legal parking places for tractor-trailers will constrain capacity, create risk or both.

Finally, the industry continuously faces reputational risks. Many of the losses it experiences are high-profile because they involve passengers or communities, for example in aviation or rail. These losses are associated with higher costs and litigation, all of which exposes industry participants to scrutiny on social media channels, which often negatively affect transportation and logistics companies' brands and reputations. Concerns about these issues can be seen in industry respondents' future rankings for cyber attack or data breach (number two), workforce shortage (number three), failure to attract or retain top talent (number five) and increasing competition (number six).

## How Can Transportation and Logistics Organisations Mitigate These Risks Effectively?

For transportation and logistics, a key part of mitigating cyber risk is to continuously update assessments of relevant threats. In an arms race against bad actors, industry decision makers should quantify

the efficacy of their existing mitigation strategies, both for themselves and for stakeholders such as insurers or investors. Entire organisations should receive up-to-date training on cyber risk, and areas identified as the most vulnerable points of potential failure could receive special focus.

To guard against the risk of economic slowdowns, the industry could prioritise building up cash reserves and update its approach to capital expenditures to protect cash positions. An increased focus on interconnected risks that can compound economic losses would also benefit many industry participants.

Protecting brands and reputations will require a similarly holistic approach, starting with taking action before adverse events occur. For instance, companies should monitor social media to track public sentiment on topics related to their brands and the industry and strategically connect with stakeholders to build and maintain trust. Should a crisis happen, companies should have a rapid response ready that includes defined roles and responsibilities within the organisation.

Finally, organisations could create robust strategies around pay, benefits and working conditions to attract and retain talent. As AI continues to develop, industry participants could invest in employees even as they invest in the technology, so their workforces have the skills to work well with AI.

### General Disclaimer

This document has been compiled using information available to us up to its date of publication and is subject to any qualifications made in the document.

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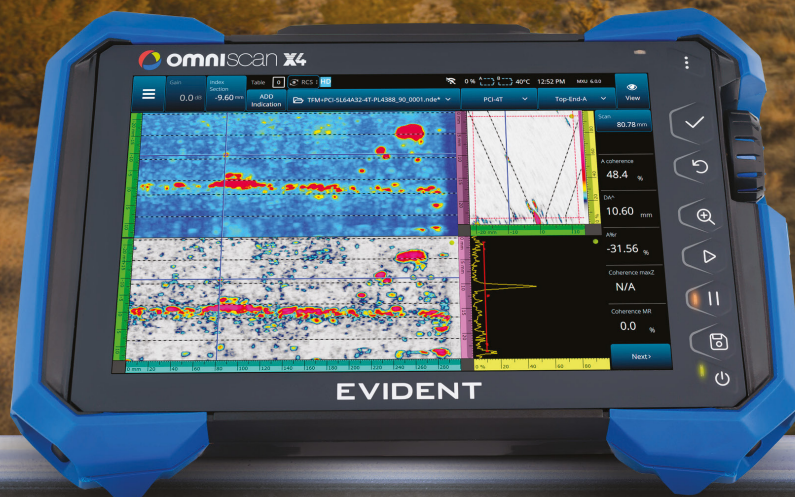
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# ASTRONICS

TEST SYSTEMS

## Ensuring PTC Reliability with Astronics Test Systems

The R8200 helps rail operators ensure PTC safety compliance and optimal performance, writes Steve Fairbanks, Senior Director New Business Development and Government Solutions, Astronics Test Systems.

The implementation of positive train control (PTC) marked a pivotal advance in US rail regulation. Mandated by the 2008 Rail Safety Improvement Act, this transformation in rail safety technology emerged from a series of tragic accidents that highlighted critical safety gaps in America's rail network.

The act's passing followed several high-profile incidents, most notably the 12 September 2008 Los Angeles collision between a Metrolink commuter train and a Union Pacific freight train that claimed 25 lives and injured over 100. This tragic event, caused by the commuter train's driver running a red signal, became the catalyst for comprehensive rail safety reform.

PTC automatically prevents train accidents caused by human error, including collisions, derailments and unauthorised movements. Using a network of radios on trains, wayside equipment and base stations, PTC ensures real-time tracking of all railcars while maintaining constant communication between systems and operators. It can detect excessive speeds, misaligned switches and unauthorised train movements, automatically applying brakes when necessary to prevent accidents.

The implementation of PTC represented one of the largest and most complex safety programmes in US rail history, facing numerous technical challenges and



**deadline extensions.** In total, more than 11 billion USD was invested into development and installation costs.

Today, PTC operates across more than 57,000 miles of track mandated by the Federal Railroad Association (FRA), covering crucial freight and passenger routes. Since its implementation, the FRA has documented a significant reduction in preventable accidents, particularly collisions and overspeed derailments.

### Maintaining PTC Effectiveness

With PTC now fully operational, the industry's focus has shifted to ensuring its continued reliability. The system's effectiveness – beyond meeting Federal Communications Commission (FCC) mandates – depends entirely on the proper functioning of each component. A single malfunctioning radio can compromise the entire safety system, returning operators to complete reliance on human vigilance.

Regular testing has become imperative for transport authorities to verify their PTC systems are fully functioning, FCC-compliant and operating at peak safety levels. This is where **Astronics Test Systems** can help with its specialised solution.

## A Legacy of Innovation in Rail Testing

Astronics Test Systems brings over four decades of expertise in transportation testing solutions to the rail industry and today serves more than 80% of US rail car builders, transit authorities and OEMs.

Its comprehensive understanding of rail operations and safety systems has been built through partnerships with major rail operators across North America, Europe and Asia.

This global experience has informed the development of its testing solutions, ensuring they meet the diverse needs of modern rail operations.

### The R8200

Building on this extensive expertise, Astronics offers the **R8200** land mobile radio service monitor designed specifically for PTC applications. This portable unit offers a comprehensive solution for testing all three PTC radio applications – onboard, wayside and base station units – ensuring compliance with manufacturing specifications and FCC certification requirements.

**The R8200** combines comprehensive digital and analogue land mobile radio (LMR) testing with the ability to measure important radio frequency (RF) network characteristics such as return loss, voltage

standing wave ratio (VSWR) and phase. This enables your two-way technician to carry one portable instrument rather than two – making their job easier, freeing space in the van or bench and also **saving thousands in equipment costs**.

The R8200 is an out-of-the-box solution, with applications for the majority of radio vendors already in place. Simple to use, with a straightforward graphical user interface (GUI), it's just a case of pulling up the application for the radio you wish to test and hitting the go button. This simplicity means you don't need a specialist radio engineer to understand what's happening, your regular inspector can easily pick it up and start testing.

### Advanced Features

The unit comes with a range of advanced features including Astronics' proprietary 'Dual-Display' showing the carrier and modulation scope on the same screen, a cable fault locator and tracking generator.

This provides an integrated instrument that sets up the RF generator in a sweeping mode that's lock-stepped with the spectrum analyser. Its dynamic range and response time provides an invaluable tool for measuring and servicing RF filtering and combining networks like intermediate frequency (IF) filters and duplexers, and the unit also has a low spectrum analyser noise floor of well below -140 decibel milliwatt (dBm) at narrow spans.



The R8200's software-based architecture also allows for field upgrades and additional feature integration, making it a futureproof investment. As testing requirements evolve or new protocols emerge, users can easily expand the system's capabilities through software updates, ensuring long-term value for rail operators.

## Industry Support and Reliability

**As the FRA moves to tighten PTC operational requirements following reports of unexpected system-level outages**, rail operators face new challenges in managing PTC reliability. The proposed rules underscore the importance of consistently functioning PTC across all operating conditions. Astronics' R8200 radio service monitor offers a timely solution, empowering rail operators to detect and resolve PTC system faults more efficiently. With the R8200's ability to test radio functionality on-the-go, operators can ensure that each component is operating at peak performance and swiftly address failures, aligning with the FRA's evolving safety expectations. This forward-looking approach from Astronics supports

both compliance with current standards and readiness for emerging regulatory requirements.

With Astronics' proven track record and ongoing commitment to innovation in rail testing, operators can trust in a solution that meets today's needs while preparing for tomorrow's challenges.

## Get in Touch!

To find out more about the **R8200**, or the other ways **Astronics Test Systems** can support your organisation's PTC validation, please visit **ASTRONICS TEST SYSTEMS | PTC** or contact:

Barry Webster, Sr. Sales Engineer,  
[Barry.Webster@astronics.com](mailto:Barry.Webster@astronics.com)

Doyle Wofford, Sales Manager,  
[Doyle.Wofford@astronics.com](mailto:Doyle.Wofford@astronics.com)



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today to get started



# Enabling the Digital Future of Railway Signalling

By Mirko Blazic, EULYNX Technical Lead

As railway networks across Europe face increasing pressure to modernise ageing infrastructure, digital transformation has become a cornerstone of the industry's evolution.

Central to this transformation is EULYNX, a consortium comprising national rail infrastructure managers (see box) that is dedicated to standardising railway signalling and facilitating a future defined by interoperability, cost efficiency and technological cohesion. This feature explores how EULYNX is driving these changes and provides key trends in railway signalling.

## Bridging Complexity: The Vision of EULYNX

The origins of EULYNX lie in the recognition of an industry-wide challenge: the diversity and complexity of interlockings and their interfaces, which have historically driven high lifecycle costs. Infrastructure managers across Europe faced the urgent need for a unified strategy to address the obsolescence of signalling systems and foster an environment that would support efficient digital transformation.

### Modular Architecture as a Game Changer

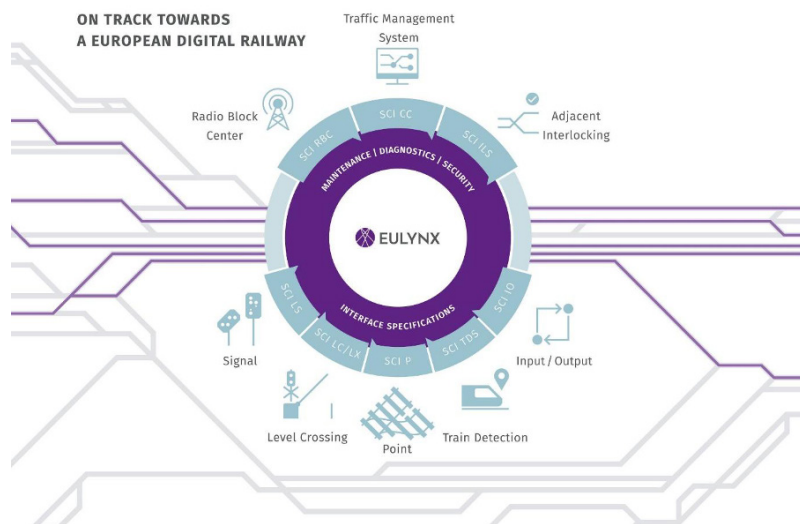
EULYNX's response to this challenge is an innovative modular architecture. By decoupling the signalling core from field components through harmonised and standardised interfaces, EULYNX has laid the groundwork for flexibility and cost savings. This

approach optimises the use of system components, facilitates seamless migration strategies and reduces vendor lock-in risks by enabling access to multiple suppliers.

The consortium's initiative aligns seamlessly with ongoing digitalisation trends in Europe, positioning it as an enabler of future-ready railway infrastructure.

### Interface Specifications and Model-Based Systems Engineering

EULYNX's main activities revolve around developing interface specifications. These specifications support a modular, standardised signalling architecture, covering aspects from signalling data, diagnostics, maintenance and security. Model-based systems engineering (MBSE) underpins the development process, improving efficiency and clarity. This methodology allows for





the creation of simulators to test interface behaviour, ensuring robust compliance and integration.

### The EULYNX Academy and Compliance Testing

To address the growing demand for expertise in railway signalling systems, EULYNX has launched the EULYNX Academy. This programme offers online and onsite training, structured into modular courses to cater to various levels of expertise. Such initiatives ensure that professionals across the sector are equipped to navigate and leverage the new architecture effectively.

Moreover, EULYNX's commitment to facilitate industry adoption is evident in its investment in product compliance testing. Plans are in place to establish a testing laboratory, enabling infrastructure managers and industry partners to validate products prior to deployment. The laboratory will offer an open database with a comprehensive test case catalogue.

### Key Trends and Current Discussions in Railway Signalling

The railway signalling sector is in a critical phase of transformation, driven by the urgency of replacing obsolete systems and embracing digital solutions. The shift towards standardisation and modularity is at

the forefront of industry discussions. This shift allows infrastructure managers to reduce system complexities and lifecycle costs while empowering suppliers to streamline product portfolios and develop products that can be deployed across a broader market beyond their traditional reach.

### A Landmark Example: Nationwide Rollout in Norway

One notable example of EULYNX's impact is the nationwide rollout in Norway, led by Bane NOR as part of its ETCS rollout. The Norwegian infrastructure manager has fully embraced EULYNX's modular standardised framework, setting a benchmark for other railways. This project shows that digitalisation and standardisation enhance operational efficiency, lower maintenance costs and bring longer life cycles.

### Challenges and Solutions

Despite its benefits, the adoption of EULYNX standards is not without challenges. Currently, the specifications hold the status of voluntary industry standards, rather than being part of a regulatory framework. This requires infrastructure managers to adopt a proactive approach, applying EULYNX specifications in their procurement strategies to harness the potential for reduced costs and vendor independence.

EULYNX's collaborative work with the System Pillar of Europe's Rail, which acts as a generic system integrator and architect of the future European railway system, marks an important step towards regulatory integration. Some specifications have already been jointly published by EULYNX and Europe's Rail, signalling a shift towards EULYNX as a binding standard.

## The Future Path for EULYNX

Looking ahead, EULYNX is poised for significant growth. The latest publication of Baseline Set 4 Release 3 expands the consortium's portfolio, offering 54 comprehensive documents that further specify its modular architecture. This release, part of a collaborative effort with Europe's Rail System Pillar, is expected to strengthen the adoption of EULYNX's solutions across more European projects.

EULYNX's future also includes expanding its membership base, with new infrastructure managers from both Europe and beyond expressing interest. This growth reflects a global recognition of the benefits brought by EULYNX's strategic standardisation and modular architecture.

### Preparing for Deployment

For infrastructure managers and sector professionals, preparation for the deployment of EULYNX requires tackling integration challenges. Integrating EULYNX into national specifications and preparing tenders that align with its modular approach are essential steps. This evolving demand creates new opportunities for rail professionals, with integration services becoming increasingly crucial.

To support this, EULYNX has established a deployment support team. This team assists members by conducting gap analyses, advising on migration strategies and ensuring that the integration of EULYNX specifications is as seamless as possible.

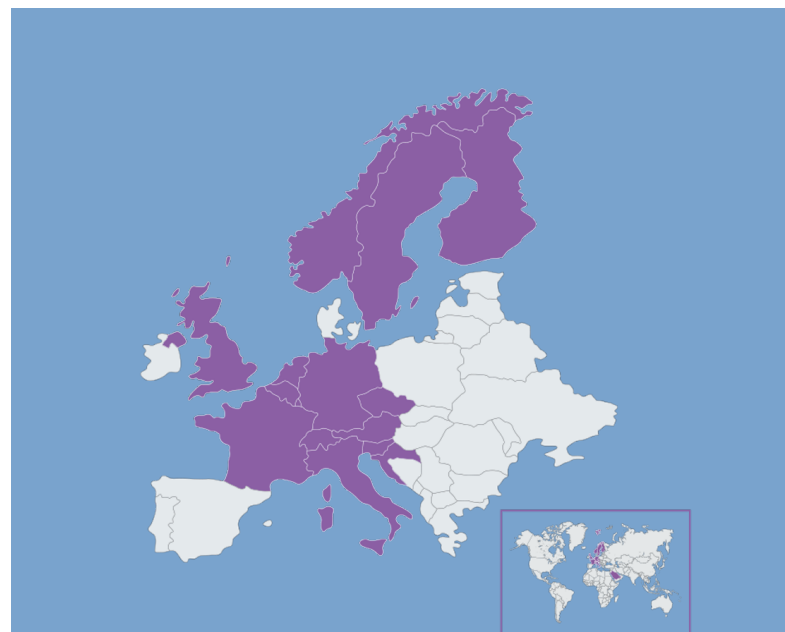
### Conclusion: A Unified, Digital Future

EULYNX's dedication to redefining railway signalling through standardisation and modularity sets a powerful example of how digitalisation can impact infrastructure. Its proactive strategies, including the launch of the EULYNX Academy and the development of a testing facility, underline its commitment to

creating an ecosystem that supports adoption and long-term sustainability.

As more projects across Europe and beyond align with EULYNX's specifications, the vision of a unified, interoperable railway network becomes clearer. In this new era, digitalisation is more than a trend—it is the foundation of future railway signalling, with EULYNX acting as both guide and enabler.

[www.eulynx.eu](http://www.eulynx.eu)



### EULYNX Consortium Members:

- Bane NOR, Norway
- Société Nationale des Chemins de Fer Luxembourgeois (CFL), Luxembourg
- DB InfraGO (DB), Germany
- HŽ Infrastruktura (HŽ), Croatia
- Infrabel, Belgium
- Network Rail, United Kingdom
- ÖBB Infrastruktur, Austria
- ProRail, Netherlands
- Rete Ferroviaria Italiana (RFI), Italy
- Schweizerische Bundesbahnen (SBB), Switzerland
- Société Nationale des Chemins de Fer Français (SNCF), France
- SŽ-Infrastruktura (SŽ), Slovenia
- Správa železnic, Czech Republic
- Trafikverket, Sweden
- Väylä (FTIA), Finland
- Saudi Arabia Railways (SAR), Saudi Arabia

# Cohesive

## Bold Rail Scheme Brings Cutting-Edge Tech and Connected Data to South Wales' Historic Coal Valleys

By James Frampton, Global Director for ComplyPro Progressive Assurance Solutions at Cohesive

If one rail programme could perfectly illustrate the meeting of old and new, then the Core Valley Lines (CVL) is surely it.

The project, part of the South Wales Metro Scheme, is designed to upgrade the ageing lines serving the rural communities of the South Wales Valleys (the lines to Aberdare, Coryton, Merthyr Tydfil, Rhymney and Treherbert). It will enable more frequent and fast services and support decarbonisation goals through electrification.

On the 37.5km Treherbert Line, the signalling system looks much like a museum exhibit. Known as a Token Exchange Signalling System, the equipment, dating back to the 19th century, depends on the train driver collecting a key then inserting it into a token machine at different points along the line to alert the signaller.

In contrast, the CVL programme to upgrade the lines is so cutting-edge that it was recently shortlisted for a **Going Digital award** – the awards that celebrate those projects which are best demonstrating the power of ‘going digital’ across the infrastructure lifecycle to improve project delivery and performance.

Instead of approaching the programme in a traditional way, with siloed execution and stand-alone sets of documents and drawings, Transport for Wales and Amey, the lead managing contractor and operator, were determined to work in an efficient, fully digital and data-centric way.

Deploying a carefully selected portfolio of

infrastructure project delivery software and prioritising a collaborative, streamlined and co-ordinated approach, over 1,500 users who are working on the programme, spread across 40 organisations can readily and easily share project data – everything from surveys to designs and reports.

It has developed over 30 different ISO 1960-compliant automated workflows and, to support its engineering assurance, Amey has deployed Cohesive’s ComplyPro platform.

Successfully used on Crossrail, ComplyPro packages-up thousands of requirements and enables progressive verification and validation activity aligned to the project delivery structure and staging. *“The real power of ComplyPro is in linking all the registers and processes, allowing us to manage complex interfaces between different parts of the project efficiently,”* explains Nathan Sealey, Head of Systems Engineering at Amey.

The benefits are multiple: reduced risk, assured workflows, better decision making, reduced re-work and far enhanced governance and insight are among the key ones.

### HS2: Getting Hands-On with Data

Another rail programme getting hands on with data is HS2. Back in 2021, its Chief Information Officer, Dr Sonia Zahiroddiny, **explained the challenges it faced:** terabytes of data, all coming in from contractors in various formats and stored and managed in a number of specialist systems.

We have been privileged to help the team there develop a so-called ‘visualisation hub’ that brings all of the data sets together making it readily accessible and actionable so that it can support sound decision making. Ultimately it will become a digital twin of the railway system.

Recently, HS2 **announced the formation of a new consortium**, led by Atos and including Cohesive, which will blend our digital twin for infrastructure expertise with the data, digital and AI expertise of partners Arup, Chimera Datalabs and Futuria. **Dr Zahiruddin explained that it would “support HS2 in delivering the right capabilities at the right time.”**

## The Art of Adapting

Modern transport infrastructure delivery, operation and maintenance has at its disposal vast volumes of data.

The challenge for transport teams lies in their approach, ensuring that their digital foundations are solid; that the connection and aggregation of data from across multiple relevant sources underpins their work and that they have in place the systems and technology to enable that. Security is a consideration and so too are skillsets.

Key areas for transport owner operators to consider and questions to ask are these:

1. How do I make it easy for people in my business to find all the data they need to support their decision making?

2. What insights do I need to deliver a reliable, good quality service? What datasets do I need to integrate to get these insights?

3. Can I be confident my data can be trusted?

Owner operators and their teams must consider not only the technologies they need to implement, but also the changes in organisation, behaviour and processes required to derive the full value from investments in digitalising their business.

Building the case for a ‘big bang’ digital transformation programme is difficult and risky. Instead, think about initial projects you might want to introduce as ‘experiments’ to provide you with evidence of the impacts that you can achieve.

Grappling with these sorts of questions, probing the possibilities and understanding what your organisation stands to gain from a digital approach is key. Then we can usher in a new era of transport management – in a way that is achievable, affordable and has data at its heart.

Learn more about ComplyPro [here](#) and follow us on [LinkedIn](#).






## All Aboard the Digital Express: Catenda as Your Rail Project Partner

At Catenda, we're revolutionising the rail infrastructure industry by championing openness and connectivity. Think of us as the conductors of change, steering the industry towards a more innovative future.

We've seen the challenges our sector faces – it's like watching a reliable old locomotive trying to keep up in a high-speed rail world. Slow adoption of new technologies, resistance to change and a focus on features rather than project objectives have been holding us back. But don't worry, we're here to get things back on track.

Our solution is built on four key principles: collaboration, transparency, sharing and empowerment, all of which are driven by a commitment to openness – the sturdy wheel of our innovation engine.

We believe openness isn't just a nice-to-have, it's the express route to digital transformation. Our environment fosters connectivity and engagement, helping you transition from outdated methods to cutting-edge solutions more smoothly than a well-maintained rail switch.

However, our focus goes beyond flashy technology and quick fixes. We recognise that true innovation comes from empowering individuals. Our ecosystem addresses industry issues like disjointed planning processes – because nobody wants their project to go off the rails.

With our project collaboration platform, Catenda Hub, sharing and viewing content and establishing

communication channels is easier than finding your platform at a well-organised station. And rest assured, we've got tighter security than a modern train coupling.

We're also rethinking traditional software licensing models. Unlimited access without additional costs per project? That's our way of making advanced tools accessible to rail projects of all sizes.

Ready to connect your project team and deliverables anytime, anywhere? Join us as we provide you with a ticket to the future of infrastructure. Experience a central hub that can guide you through effortless coordination to build railway systems that are smarter, more efficient and ready for tomorrow's challenges.

For more information contact Catenda

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# All Aboard the Digital Express



Discover HUB, a collaborative open platform that guarantees smooth infrastructure project management as a train on-time.



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Unlimited Access



Cutting-edge Security



Seamless Coordination

# Esri

## Esri Summit Showcases the Benefits of GIS to the Rail Industry



Esri's annual GIS Rail Summit showcased the many ways US railroads are benefiting from geographic information systems.

Esri, a leader in geographic information system (GIS) technology, recently held its annual GIS Rail Summit as part of its IMGIS Conference in Palm Springs, California.

This two-day event brought together railroads, transit authorities, associations and vendors to share knowledge and their experiences implementing GIS solutions.

Attendees included Utah Transit Authority, OmniTrax, Amtrak and Conrail, all of which participated in Esri's 'State of the Railroads' roundtable session.

The summit was arranged and opened by Erik Henderson, ESRI's Director Rail Industry Solutions, who then welcomed speakers to the stage to discuss the GIS projects they've been involved in.

First up was Bartlett & West Software Developer, Trevis Martin. He presented the work his team is undertaking to improve linear reference system (LRS) functionality for mobile users. Railroads often use many different systems and methods for recording information about field assets, but the accurate milepost value and engineering station values are difficult to obtain when standing in the field, so they created the functionality to identify your location along a measured line to obtain these values. This will help inspectors to more accurately record incidents in the field as well as to correctly identify areas of concern.



and the effects they have had on rail which have caused several station embargos. His session ended with information on their other services, such as AskRail and Clearpath.

## How Railroads Are Using GIS

It was also great to hear the experiences of those on the ground, and how they've used GIS to create solutions for their specific needs. Take Alaska Railroad for example, which has to deal with extremely remote environments, with large distances between its cities and towns.

Other presenting vendors included Cybertech and ReportAll. The former addressed concerns around data security and how cloud-based security is becoming more accepted, while the latter discussed how organisations' real estate portfolios are like Lego, in the sense they're made up of a lot of different pieces.

*"They offer their parcels in many different ways, also like Lego: they have mobile access, streaming services and an API to connect to," Henderson explains. "They're constantly connecting with parcel maintainers like cities and counties for updates and refreshes to always provide the most up-to-date information."*

## FRA Provides NARN Update

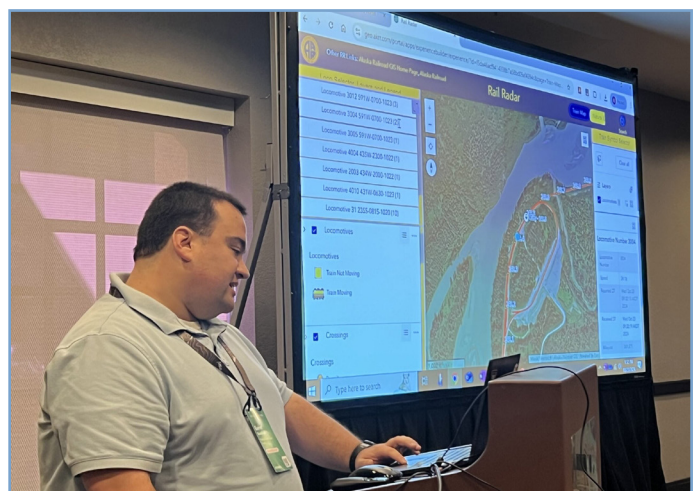
It was also great to hear from Federal Railroad Administration (FRA) representative Raquel Wright about how the organisation is continuing to improve the North American Rail Network (NARN). The administration recently signed an MoU facilitating a more seamless exchange of railroad data and information, and GIS Program Manager Wright outlined a new storymap about the FRA and US Department of Transport (DOT) Corridor Identification and Development (CID) Program to advance new and enhanced intercity passenger rail corridors and support long-term development in communities across the country.

Wright was followed by Railinc GIS Manager Brent Kastor, who talked about what most railroads understand as their function, maintaining the Station Master and handling all of the electronic data exchange (EDI) messages generated from automatic equipment identification (AEI) sites nationwide. They also receive station embargos from railroads when certain stations have to be shut down, mentioning the recent hurricanes

There was a need to have better visibility of its locomotives and trains, and so the railroad's GIS Program Manager Garret Giordano created a new tool, the Rail Radar, to provide a near real-time view of its vehicles.

*"He's had a great response to the app so far and has added lots of requested info like weather, earthquakes and stream gauges," Henderson says. "He'd like to add real-time arrival estimates for passengers at stations and make the map outward-facing in the future. Very unique to Alaska is that the railroad doesn't connect with any other railroads and receives all of its cargo via barges at several ports."*

Over at Union Pacific, Tim Boland, Senior Manager, Engineering Infrastructure has been working on a project to analyse the risk of high wind speeds on the network that can cause train derailments. Through his maps and analysis, he was able to identify what locations had the highest probability of winds in excess of 55mph. He was also able to identify that the winter months had historically produced the highest winds.





Ultimately, he was able to create business rules about rail operations in those high-risk routes during the peak hazard seasons.

## Esri Product Team Takes to the Stage

As you'd expect, Esri's 3D GIS team also presented at the summit, and Lee Brinton, Senior Product Manager – 3D Analyst and Point Cloud workflows, discussed many of the products his team offers.

*“Much of the team’s work is about helping customers to better represent their areas of responsibility in the most realistic version they can. Our world is in 3D so people are getting used to seeing their data in 3D as well,”* Henderson says.

Brinton talked about the great work that’s been done with the City of Zurich’s Digital Twin for example, where they’re modelling water flow to help municipalities identify where’s at the greatest risk of flooding in the event of heavy rainfall. He used this opportunity to discuss with the railroaders what other types of flow would be helpful for them to model, and one of the ideas that came up was avalanches in Alaska.



While perusing the Esri giftshop during the Esri IMGIS Conference, Union Pacific’s Tim Boland and Aaron Brown discovered that their map was chosen as the cover of the latest edition of the Esri Map Book.

*“I actually worked on the project with them at my last job prior to Esri, so it was great to buy them each a copy to say thanks,”* says Erik Henderson, ESRI’s Director Rail Industry Solutions.

*“Esri’s Founder, Jack Dangermond was also there, so I walked up to him and introduced them as the creators of the map. It was a very cool moment, as Jack had handpicked their map as the cover art, so was very excited to meet them!”*

The ability to build 3D models of the weather itself to better represent things like wind, was also discussed. Finally, Brinton showcased that Esri has created a new compression file type, zLas, which can compress lidar data up to four times more than regular LAZ files. The team is now looking to partner with railroads to learn what new types of tools, storage and displays are needed with lidar data and is asking anyone willing to share their data, so that the team can continue to develop their tools.

For more information visit [www.esri.com](http://www.esri.com) or contact one of the team



# Track & Infrastructure

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Argus Fluidhandling

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🏠 Directory

Track & Infrastructure

# Complete Composite Systems (CCS)

A new 'ClickFit' bracket design has been introduced to make ARCOSYSTEM® cable troughing even easier to install along railway lines — especially when working in tight spaces.

If you need your rail cabling securely contained but are faced with restricted trackside access or limited attachment options along the route, then the latest addition to our ARCOSYSTEM® range of specialist bracketry could be just what's required to complete your job smoothly and safely.

The innovative ClickFit brackets are designed with a powerful spring effect, allowing the troughing cells to be simply clicked into place with a satisfying snap.



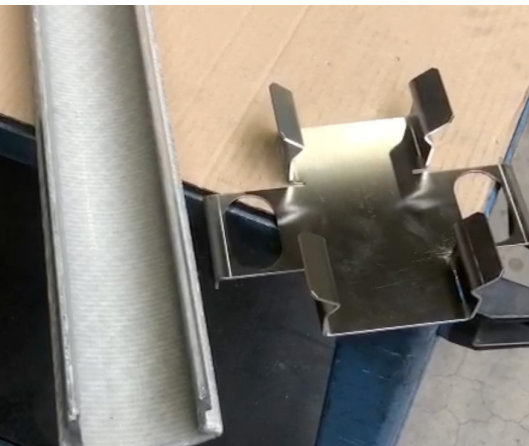
*The new ClickFit brackets used here in conjunction with rock bolts to attach ARCOSYSTEM® troughing to a rock face*



*The run of troughing attached to the rock face with the aid of ClickFit brackets*

These new brackets were recently used for a job that required cable troughing to be fitted to a rock face slanted at an awkward angle of approximately 45°. The ClickFit design ensured the troughing could be clicked into the brackets — which were fixed to rock bolts clamped into the rock face itself — with ease, as opposed to the on-site operatives struggling to slide the troughs into the shoes of the brackets. This resulted in a much quicker, easier, and safer install, especially with the operatives working on slippy, sloping ground.

The lightweight and versatile ARCOSYSTEM® is the rail industry's benchmark elevated cable management system, offering unrivalled durability in all weathers. The troughs and lids are made from pultruded fibre-reinforced polymers (FRP/GRP) for excellent structural and load-bearing performance, and are supported by the bespoke range of laser-cut galvanised steel bracketry.



A ClickFit bracket ready to receive a cable troughing cell



Slotting the troughing into place, activating the bracket to 'click' shut



ARCOSYSTEM® installed using specially designed Anchor Screws instead of in-situ posts

The fitting of ARCOSYSTEM® has also been made quicker and easier with the development of the 'Rapid Route' installation technique. Conceived in partnership with Anchor Systems International Ltd, Rapid Route uses a foundation system that replaces the need to excavate and use cast in-situ posts to support the troughing. Instead, Anchor's patented Anchor Screws are driven into the ground, and the domed connections between the troughing and the screws allow for alignment correction that ensures an accurate first-time installation.

## Key benefits of ARCOSYSTEM®

- Can be post-mounted (spanning as far as 6m between support posts), wall-hung or fixed to trackside structures such as railings, bridges, noise barriers, rock faces or hillside slopes
- Composite construction means the system is resistant to heat, water, corrosion, UV rays and a wide range of chemicals
- Constant working temperature range from -40°C to +80°C, excelling in locations subject to intense heat or extreme freeze-thaw cycles
- Flexible bracketry enables height and direction changes to be accommodated with ease
- Twin-walled design of the troughing enables the system to resist lateral forces from embankment subsidence, high snow loads and wind effects from high-speed trains
- Carries cable loads of up to 90kg/m and is electrically insulating, suitable for HV use

Contact the experienced **technical experts at Complete Composite Systems**, the exclusive UK distributor of ARCOSYSTEM®, for enquiries about your rail cable containment requirements.

### Complete Composite Systems Ltd



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Email: [info@completecomposites.co.uk](mailto:info@completecomposites.co.uk)

The exclusive UK rail stockist of ARCOSYSTEM® is Scott Parnell:



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ARCOSYSTEM® is manufactured by CCS's Swiss partners, **Castioni Kabelführungssysteme GmbH**



# ARCOSYSTEM® — The Rail Industry's Benchmark Elevated Cable Management System



The flexible ARCOSYSTEM® troughing can be easily adjusted for height and directional changes during a long run



The composite troughing can be fastened to a variety of trackside structures, such as ballast boards and railings here during an installation in Germany's Black Forest



The lightweight construction of the troughing allows ARCOSYSTEM® to be fitted to hillside slopes



The twin-walled design of the troughing enables the system to resist lateral forces such as wind effects from high-speed trains

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Custom made products to fit the needs of each application



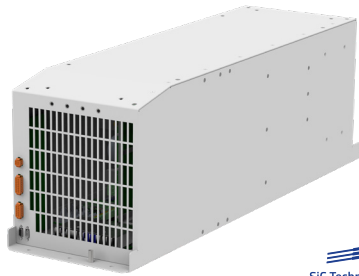
The largest range of DC/AC inverters on the market for the railway sector



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FREQUENCY CONVERTER FOR MOTOR CONTROL AND SOCKETS



**35KW+SKW V/F 3PH INVERTER**  
750VIN  
RAILWAY HVAC COMPRESSOR AND FANS POWER SOURCE



**DC/DC CONVERTER, MULTIPLE REDUNDANT OUTPUT**  
RAILWAY SIGNALING (ERTMS)

# Premium PSU

## Ensuring Reliable Power Supplies for HVAC Systems in Railways

In railway systems, heating, ventilation and air conditioning (HVAC) systems play a vital role in providing comfort during train journeys.

However, the backbone of these systems' performance lies in a consistent and reliable power supply, which ensures HVAC functionality under various conditions. Without stable power, even the most advanced HVAC system cannot deliver the comfort that passengers expect on their journeys.

### Why Reliable Power Supply Is Essential for Train HVAC Systems

The power supply in railway applications faces unique demands due to variable weather, load conditions and environmental challenges. HVAC systems in

trains rely heavily on stable electrical power to keep temperatures regulated and maintain high air quality. Reliable power ensures that HVAC systems can function smoothly, providing heating during cold weather and cooling on hot days, regardless of fluctuating outside temperatures or onboard conditions.

### Catenary Systems and Power Conversion for HVAC Efficiency

Catenary systems, which provide overhead electrical power to trains, serve as the primary source of energy for HVAC systems. To make this energy usable for HVAC, power conversion is required. DC/AC inverters play a key role in converting DC power from the catenary lines into AC power, suitable for HVAC operation. This conversion ensures that HVAC systems receive the correct power type, supporting efficient operation throughout the train journey.





## Importance of Backup and Parallel Connection for HVAC Reliability

Redundancy is critical to ensuring uninterrupted HVAC performance. Backup power solutions and parallel connections allow HVAC systems to remain operational even if part of the power system fails. In a parallel setup, multiple HVAC units share the load and provide redundancy; if one unit stops functioning, others continue to operate, preventing a full system shutdown. This reliability is essential to maintaining passenger comfort, especially on long-distance or high-density routes.

## Power Supplies Built for Railway Demands: The Premium PSU Advantage

With over 40 years in power conversion for railway applications, Premium PSU provides power solutions specifically designed for HVAC systems in demanding railway environments. Their ODX-1300, ODX-3000 and ODX-4500 inverters are engineered to convert DC power from catenary lines into AC power, efficiently meeting HVAC power needs. Additionally, Premium PSU's CRS-1000 and CRS-2000 converters offer consistent and adaptable power for various HVAC configurations, ensuring system stability under fluctuating conditions. These products, all compliant with EN50155 standards, guarantee safety and high performance, offering the stability that HVAC systems need to operate efficiently.

Premium PSU also offers custom solutions, including models 0804, 0788.2 and 0795.2, widely used across metros, trams and trains globally. With a dedicated R&D team and over 900 custom designs, Premium PSU focuses on developing high-quality, durable power supplies that support HVAC systems in delivering stable performance in variable and challenging rail conditions.

## The Core of Comfort: Reliable Power for Reliable HVAC

Ultimately, the comfort provided by an HVAC system is only as reliable as the power supply it depends on. By prioritising stable, efficient, and rail-specific power solutions, train operators can ensure that HVAC systems deliver a consistently comfortable environment for passengers, no matter the journey length or weather conditions.

For more information contact Premium PSU

[www.premiumpsu.com](http://www.premiumpsu.com)

+34934751480

[marketing@premiumpsu.com](mailto:marketing@premiumpsu.com)



**Premium**  
Powering Your Challenge

# Argus Fluidhandling

## The Alfa Water Barrier



Alfa Double Dam

Water-inflated dams are quickly deployed, filled with any available source of water, and are very friendly where environmental impact is a concern.

Double Dams are reusable, repairable, provide flexible layout options, do no substrate damage and are suitable for worksite dewatering and flood protection in waters up to 3' (0.9m) deep.

Our water-inflated dams are quickly deployed, filled with any available source of water and are very friendly where environmental impact is a concern.

Double Dam is reusable, provides flexible layout options, does not cause substrate damage and is suitable for worksite dewatering and flood protection in waters up to 3' (0.9m) deep.

Double Dam features a single internal stabilising panel to provide safety and stability for all sizes up to 4' (1.2m) high.

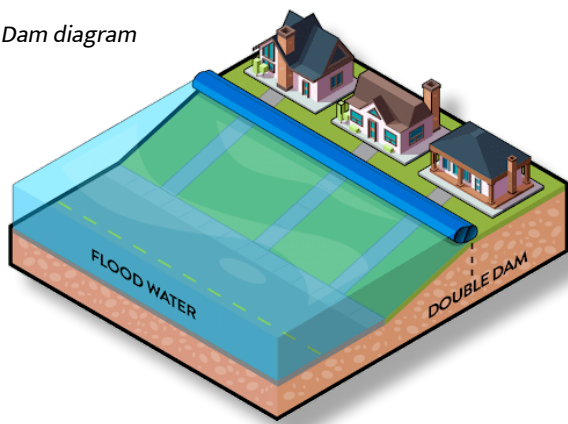
### Q: Are they repairable?

A: Yes. Minor holes and tears can be easily repaired.

### Q: How do they work?

A: Double/Triple Dams use any available water source for filling. When the dam is full and the water level outside of the dam is up to  $\frac{3}{4}$  of the filled height (25% freeboard) that makes the filled dam heavier than the surrounding water. The integral stabilising panel(s) force the dam to maintain an oval shape so it cannot roll.

Alfa Double Dam diagram



## Alfa Triple Dam

Triple Dams are reusable, repairable, provide flexible layout options, do no substrate damage and are suitable for worksite dewatering and flood protection in waters up to 6' (1.8m) deep.

Water-inflated dams are quickly deployed, filled with any available source of water and are very friendly where environmental impact is a concern.

The Triple Dam features two internal stabilising panels to provide safety and stability for all sizes from 3' (0.9m) to up to 8' (2.4m) high.

Our water-inflated dams are quickly deployed, filled with any available source of water and are very friendly where environmental impact is a concern.

Triple Dam is reusable, provides flexible layout options, does not cause substrate damage and is suitable for worksite dewatering and flood protection in waters up to 6' (1.8m) deep.

Triple Dam features two internal stabilising panels which results in three constrained compartments for even greater stability.

### Q: What is the difference between Double Dam and Triple Dam?

A: Double Dam features one interior stabilising panel which results in two constrained compartments. Triple Dam features two internal stabilising panels which results in three constrained compartments for even greater stability.

### Q: Are they reusable?

A: Yes. They are designed to be drained and put away

for repeated use. That's a major advantage compared to conventional methods such as sandbagging or dirt berms.

## Alfa Double / Triple Dams vs. Sandbags

### Q: Can you get sandbags from the council?

A: Your local council may have some sandbags ready to deploy at times of flooding, but their priority is to protect the public at large. You should check with your own local authority in advance to find out what their policy is and how you can get access to sandbags before flooding starts.

It requires approx. 2,250 sandbags to cover the same area as one 25m Alfa water dam @ £200 per 80 sand bags = £5625, less the legal disposal cost of the sand & bags (see below).

### Q: How do they compare to sandbags?

A: A 3' high sandbag dyke would require approx. 30 sandbags per linear foot. Using conventional filling and placing methods, a rate of 12 bags per manhour can be applied, taking around 125 manhours to build a 50' long dyke 3' high, and in addition a cost of approx. £2.50 per sandbag.

A Double / Triple Dam at 3'X50' can be deployed by two people in a couple of minutes and pumped full of water in less than 30 minutes. Cleanup time and cost benefits are even greater, especially when the reuse of the Double / Triple Dam are factored into the cost.



Alfa Triple Dam

## Sandbags – Regulatory Requirements

This regulatory position statement (RPS) is for local authorities and those acting on their behalf who need to set up temporary collection points to store waste sandbags that have been used during a flood.

If you comply with the conditions in this RPS you do not need to apply for an environmental permit for a waste operation to temporarily store waste sandbags at collection points.

This RPS only applies to:

- Storage of waste sandbags carried out by, or on behalf of, the local authority
- Temporary storage (no more than 3 months) of waste sandbags before they are sent for recovery or disposal at a permitted site
- Sandbags that have had a visual or olfactory (smell) assessment (or both) to help determine whether they may be hazardous waste

This RPS does not apply to any other activity, even if it is under the same legislation. You may still need other permits or licences for other activities you carry out.

Conditions you must comply with:

- Store all waste sandbags in a secure place – one where you have taken reasonable precautions to prevent waste escaping and where members of the public cannot access them
- Segregate and store discarded sandbags that may be contaminated with hazardous waste in secure containers, or in an area with impermeable pavement and sealed drainage
- Use a registered waste carrier to transport waste sandbags from the temporary collection point to a permitted site for recovery or disposal
- Keep records for 2 years that show you have complied with this RPS – you must make these records available to the Environment Agency on request

You must make sure the stored sandbags do not endanger human health or the environment. They must not:

- Cause a risk to water, air, soil, plants or animals
- Cause a nuisance through noise or odours



*Alfa Air Bung*

- Adversely affect the countryside or places of special interest

### Alfa Air Bung

For spill containment and civil/municipal construction.

The air-inflated Air Bungs are made to friction fit to the inside of a culvert or pipe to prevent the passage of liquids during construction or during emergency spill response.

Air Bungs are made with high-strength industrial coated PVC fabric, they are compact for easy handling or storage, easily inflated with a hand or foot operated pump, reusable and repairable.

Each Air Bung comes standard with a 3/4" fill/drain fitting, pressure relief valve, valve stem and tie-off loop fixed to both ends.

The patent-pending, self-supporting design comes in two heights. Both sizes feature a working water depth equal to the product height of either 26" or 52".

25' long sections are joined together with a combination zipper/ hook and loop coupling, allowing the berm to be extended as long as needed.

Sentry Dam redefines rapid deployment with a built-in structure that's easy to set up on any firm substrate and just as easy to decommission.

Sentry Dam is reusable, repairable and responsible with no pumping required! Simply stand the system up and ensure the toe of the skirt is anchored.

[www.argusfluidhandling.com](http://www.argusfluidhandling.com)





It's not magic, it's engineering.®

# GenieMat® RAIL minimizes vibrations & maximizes durability.

## PROVEN VIBRATION MITIGATION

Minimizes ground-borne vibrations enhancing comfort for nearby residents.

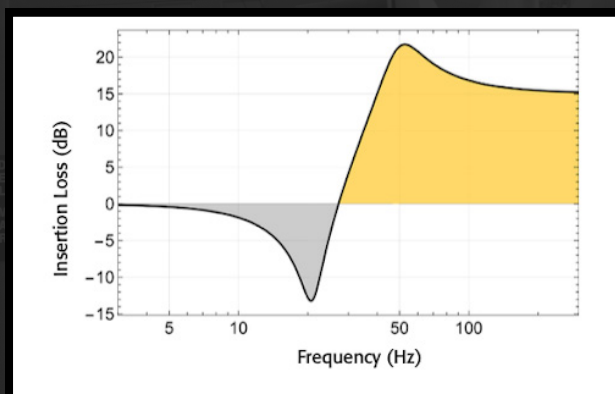
## ENHANCED TRACK MODULUS AND LONGEVITY

Optimizes track stiffness and reduces ballast degradation, extending component life.

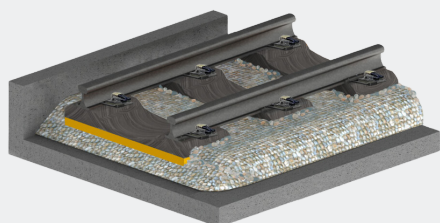
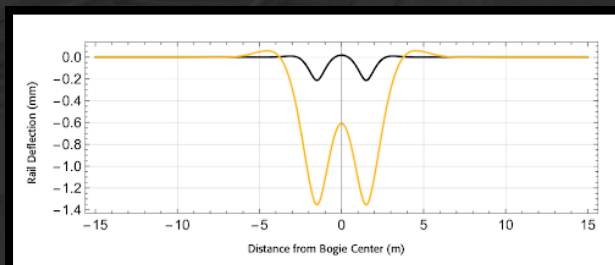
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Proven for 20+ years, backed by Pliteq's engineering expertise, patented technologies, and continuous R&D for optimal vibration control and durability.

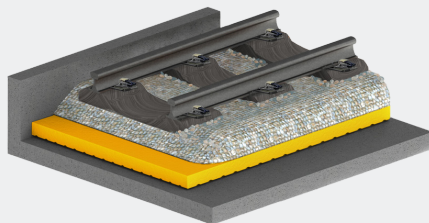
## Insertion Loss Modelling



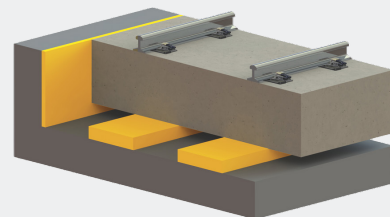
## Rail Deflection Modelling



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Railway Tie Pads



**GenieMat® RAIL BST**  
Ballast Mat



**GenieMat® RAIL FST**  
Floating Slab Track

# Drive for Future Public Mobility

Gearboxes & Drives



- Solution for light rail vehicles, metro & suburban applications, locomotives and other mass transport vehicles
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- Gear manufacturing tradition since 1918
- Complete drive train solution (gear units, couplings, traction motor, brakes)
- Extensive test facility up to 1,4 MW and simulated dynamic load  $300 \text{ m.s}^{-2}$

# Rolling Stock

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# Palfinger

## Improving Accessibility for Wheelchair Passengers with Easy-to-Operate Train Lifts

Discover Palfinger Passenger Lift's latest train lifts for high-speed and regional trains.

Palfinger Passenger Lifts has over 30 years' experience improving accessibility in the transport industry thanks to its customised lift and ramp solutions. Its factory near Bremen, Germany, has produced more than 2,800 train lifts for clients including Alstom, Pesa, Siemens and Stadler.

The company's flexible lifting range for trains features semi-automatic lifts, which can be equipped on both new and refurbished vehicles, as well as specially developed and produced designs to meet customers' bespoke requirements.

Safety features on all train lifts include automatic roll stops, safety markings, anti-slip surfaces and acoustic and visual signals.

All of Palfinger's solutions for the rail industry are manufactured to meet TSI PRM (EU) 2023 certification. During development the company goes so far as to hold on-site workshops with wheelchair users and operators, to ensure everyone's needs are met and the best solution developed.

### Palfinger's Train Lifts

When it comes to customer lifts for trains, Palfinger offers both rotational (Trainlift TR) and vertical lifts (Trainlift TRV 2).

The Trainlift TR can be hydraulic or fully electric and has



been designed with high-speed and commuter trains in mind. A key advantage of this swivel lift is its ability to be fully stored and hidden behind cover elements.

The Trainlift TRV 2 has been developed specifically for high-speed trains, and this vertical lift provides semi-automated operation via two-button push.

### Deutsche Bahn Chooses Palfinger Train Lift

The latter was recently put into service on Deutsche Bahn's (DB) fastest passenger trains, the ICE 3 neo, which has a dedicated door for passengers with limited mobility to enter and exit.

This provided a new challenge for the Palfinger team, as they had to factor in the limited space they had to

play with. TSI PRM certification requires a lift platform's width to be a minimum of 760mm, however this door was only 920mm wide, leaving little room for the two lifting arms required for the lift to operate.

Palfinger's engineers were able to overcome this challenge however, adapting their design to meet these specific requirements, and after the concept and first development phases, the first prototype was built.

This was reviewed in a joint workshop with Siemens, DB, train attendants and representatives from wheelchair users' associations. During this workshop practical tests were carried out by users of both electric and manual wheelchairs, with feedback from all parties taken on board and changes incorporated during the next phase.

The final solution was a two-arm vertical lift with a maximum lifting height of 900mm and a load capacity of 350kg. This ensures that electric wheelchairs can use the lift without issue.

Like all other Palfinger train lifts, this innovative model is perfectly adapted to the demanding specifications in the railway sector, being easy to operate, extremely reliable, durable and certified, according to TSI PRM.

## Palfinger's Latest Train Lift Innovations

Palfinger continues to look for ways to improve and advance its solutions, and this innovative mindset has led to the creation of two new models.

With the **TRB 1000E**, an electric lift for regional trains, Palfinger's engineers have eliminated the hydraulics from its TRB 1000 model, making it possible to use an electric actuator, which in the case of the TRB 1000E comes from Schaeffler. The advantages of going fully electric include simpler operation and lower lifecycle costs.

This was showcased for the first time at InnoTrans 2024, with very positive results.

Palfinger also recently launched the hybrid lift TRV1 for commuter trains, which is a one-arm lift and cover 'all-in-one' solution. This has a maximum lifting height of 1250mm and a weight capacity of 350kg and provides the benefits of reduced material costs, manual

operation steps and component maintenance. The prototype was completed this July, and production of the model is scheduled for 2025.

### Want to know more about Palfinger's lifting solutions?

For further information on any of **Palfinger's** train lifts, please visit [www.palfinger.com/engb/products/passenger-lifts](http://www.palfinger.com/engb/products/passenger-lifts) or contact a sales and service representative via [passenger.service@palfinger.com](mailto:passenger.service@palfinger.com).

## The benefits of choosing Palfinger

### Long experience in customisation

Palfinger offers customised solutions, designed and built in its factory near Bremen with more than 30 years' experience in the railway industry. The company adapts to customer requirements quickly while following all relevant technical specifications for interoperability (TSI) and railway norms.

### Easy use and low maintenance

Palfinger passenger lifts have been proven to be user-friendly for wheelchair users and train attendants. Wheelchair users regularly visit the company's verification and validation (V&V) facilities to test new products and give first-hand feedback.

### Quality and installation

All Palfinger wheelchair lifts undergo full testing procedures before they leave the factory. Furthermore, the lifts are designed for easy installation on your train.

### Direct communication and transparent project management

Palfinger communicates in an open and fast manner. Transparent project management is a central element for the collaboration with its customers so they stay in the loop at all times.



# PALFINGER PASSENGER LIFTS

## MOBILITY WITHOUT BOUNDARIES





## RAILWAY MODULAR CONNECTORS

# EvoTrak – the real modularity

### **EvoTrak family**

#### **Simplifying and unifying your traction chain connections**

Experience seamless connectivity across your entire traction chain with the EvoTrak family. Stäubli's compact and flexible modular solutions ensure a consistent connection philosophy.

Whether your application requires 1 to 4 poles, straight or angled design components or receptacles, EvoTrak is configurable to meet your specific needs. In addition, EvoTrak not only meets all relevant standards but also undergoes rigorous testing beyond railway requirements, ensuring sustainable reliability.



# Stäubli

## Powering the Rails: Discover Stäubli's EvoTrak lite for Medium Power Applications

With a total length of approximately 1.2 million kilometres, the international rail network is a pivotal element of the global transportation system.

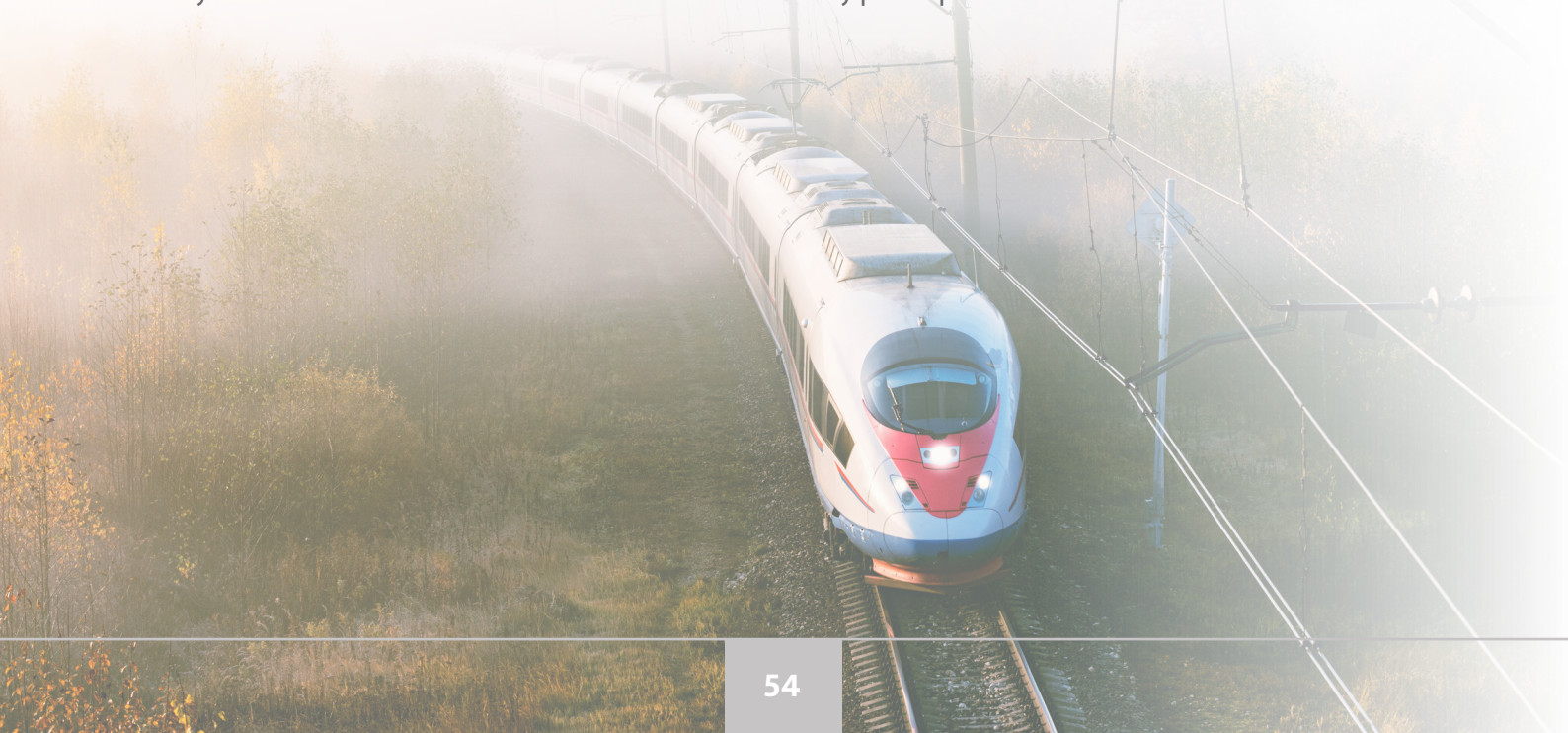
It supports both domestic passenger travel and light freight transport, playing a significant role in efforts to protect the climate. Rail-bound transport, with its relatively low CO<sub>2</sub> emissions, is regarded as an eco-friendly alternative to motorised road transport, contributing substantially to the reduction of greenhouse gas emissions.

Nevertheless, there are significant challenges to address for applications within the medium traction current range. Continuous operation demands the utmost reliability to minimise downtime and sustain eco-friendly operations. Moreover, the development of low-maintenance systems, enhancement of energy efficiency and resilience to environmental factors are

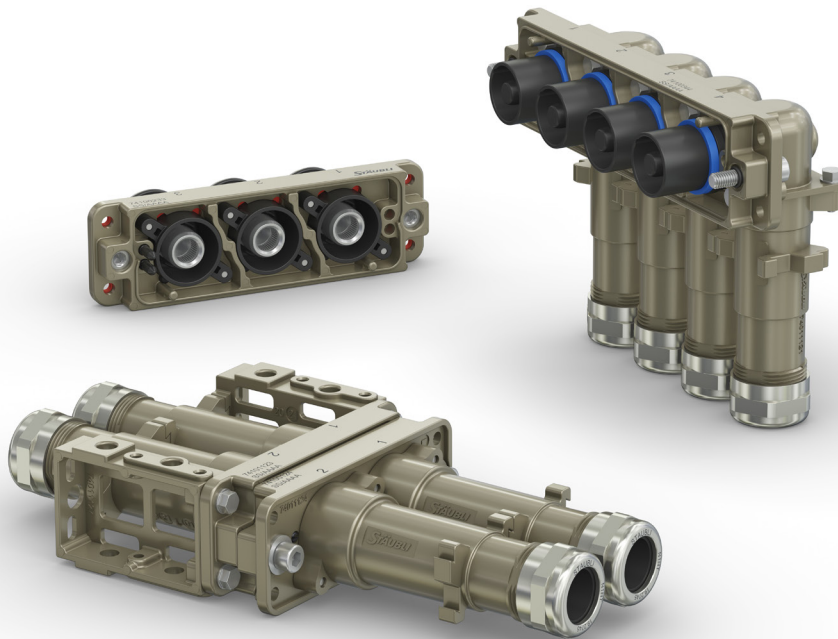
critical in meeting more stringent safety regulations. These demands necessitate innovative technical solutions and specialised engineering knowledge.

### 1. Committee Work – Always at the Cutting Edge of Technology and Regulations

Stäubli is deeply committed to maintaining the highest standards of innovation and compliance by actively participating in key national and international committees. In Switzerland, our participation in the TK9 committee of Electro Suisse ensures that we remain at the forefront of norms and standards for electrical and electronic applications in railways, contributing to the development of key proposals and resolutions. On a global scale, our experts play a vital role in influential organisations such as CENELEC, IEC and ISO, where they participate in critical discussions and initiatives



EvoTrak lite from Stäubli



related to electrical equipment, grounding and battery systems. This proactive involvement ensures that our products not only meet but exceed the latest regulatory requirements and industry standards, reinforcing our commitment to excellence and innovation.

## 2. Stäubli's EvoTrak lite

This committee work is an important pillar for the further development of Stäubli railroad application products, such as EvoTrak lite. This connector from Stäubli has been developed following the railroad standard IEC62847. It is also certified in accordance with EN 45545-2, EN 61373 cat.B and according to other railways standards.

The EvoTrak lite is a modular metal connector whose compact design makes it particularly suitable for the limited space available for components in passenger transportation. This modular connector is available in different configurations from 1 to 4 poles in straight and angled versions. In addition, it utilises patented technology specifically for shielded cable applications, which removes the necessity for specialised EMC cable glands.

Stäubli connector solutions are characterised by exceptional reliability and robustness. The proven MULTILAM contact technology guarantees a firm connection across all contact surfaces while maintaining uniform contact resistance. As a result, it

provides increased reliability and safety even under severe conditions, such as electrical stress, temperature changes, significant mechanical stress, temperature fluctuations, as well as vibration and shock.

During the development of EvoTrak and to respond to new PMM (permanent magnet motor), pole segregation technology was used, which is particularly important when using reverse currents in new generation PMM to reduce energy consumption. In the worst-case scenario, a short circuit in the traction cable could lead to a fire in the train and damage a large part of the traction system. EvoTrak lite, on the other hand, conducts the current directly to the earthing connections of the carriage body via its separate pole connections in the event of a short circuit, thus preventing the arc from spreading further. This ensures that the system is effectively and safely earthed along the entire drive chain. In the event of a short circuit, the return current is interrupted, and the traction chain is protected. The connector acts like a fuse that protects the overhead line and prevents major damage to the train itself.

Find out more by visiting [www.staubli.com](http://www.staubli.com).

# STÄUBLI

# Bel Fuse

## The Future of Railway Power Conversion – The RCM500E

By Silvan Mueller

### Introduction

Power conversion in railway applications forms a critical component in power distribution and safety, ensuring that energy is efficiently transformed and managed to support various onboard systems.

Choosing the right partner for power conversion equipment can significantly benefit engineers by ensuring reliability and performance enhancements, while maintaining an edge with the latest innovations. Bel's next generation of DC-DC converter under the Melcher brand, the RCM500E, does just that.

Using modern technologies and manufacturing, this converter delivers all the same rugged and efficient design expected of the Melcher brand, while significantly reducing cost and form factor. This article investigates the design and innovations inside the latest railway DC-DC converters.

### The Challenges of DC-DC Conversion

The challenges faced by DC-DC converters are well documented, and yet, the need for their use remains constant. Some of the biggest challenges faced by DC-DC converters by far are the tradeoffs between size and efficiency.

The size of reactive components, such as transformers and capacitors, are all frequency-dependent and shrink with increasing frequency. However, switching losses go up with frequency, lowering efficiency and giving designers a choice between designing a small converter or an efficient converter. At the same time

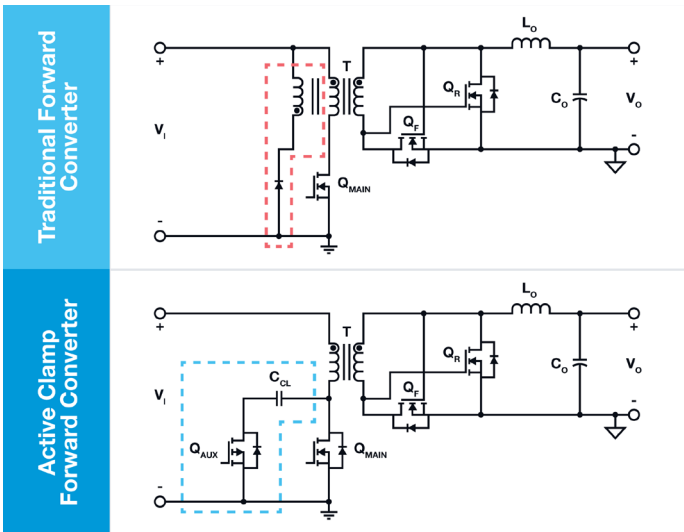
low efficiency means more thermal management, which can negate any power density gains from increased frequency.

The high-frequency make/break of inductive currents through transformers can also induce large voltage spikes which can damage components. This is often compensated for with larger, less efficient switches and makes them more expensive. These spikes can also lead to EMI and require additional large magnetic filtering components to mitigate. All of this can make a DC-DC supply larger and heavier, which can negatively affect an application with physical constraints.

A lot of research has gone into developing new methods and topologies that can limit switching losses, enable higher switching frequencies and reduce form factors.

*Bel's RCM500E from the Melcher brand is the next generation of DC-DC for railways*





Comparison to traditional forward converter schematic (top) and active clamp forward converter (bottom)

## The Benefits of Active Clamping Forward Converters

One design topology that is starting to gain traction in the power industry is active clamp forward converters (ACF). In an ACF, an active switching device and capacitor replace the core reset winding and diode of a traditional forward converter.

In both the traditional and ACF cases the reset circuit prevents so-called flux-walking, where the flux in the transformer core increases with each switching cycle until it saturates. However, the ACF's active reset circuit brings other benefits that make it an excellent choice for DC-DC conversion including:

- Low switching loss
- Reduced voltage stress
- Low EMI
- High power density

A key benefit of the active clamp is zero-voltage switching (ZVS), which reduces switching losses and allows for increased switching frequencies. In the traditional forward converter, the voltage across the switch is still high when current begins to conduct, leading to large power losses until the switch is fully turned on. With ZVS, the switch voltage is kept low while the switch is turned on which significantly reduces these losses.

The soft ZVS switching, enabled by the active clamp, also reduces the large voltage spikes and high-

frequency noise generated during switching events. This reduces voltage stress on the semiconductors and other components and helps in minimising EMI, making it easier to meet electromagnetic compatibility (EMC) standards without requiring extensive filtering.

Reduced switching losses, increasing switching frequency and better utilising the transformer core all help improve the power density of the topology and extend its viable power range. Where a traditional forward converter could only reasonably achieve 200W, the ACF is useful up to 500W or more.

However, the downside to active clamp forward converters is the inclusion of additional design complexity. Compared to the simple and passive reset winding method, the active clamp method has additional timing stages, gate drivers, and design considerations that can make it a challenging topology that requires expertise in DC-DC converter design to successfully apply.

## How the RCM500E Solves These Challenges

Recognising these challenges faced by engineers in the railway industry, Bel has introduced its latest Mecher brand DC-DC offering, the RCM500E, which takes advantage of the active clamp forward topology to achieve significant reduction in size and cost without sacrificing performance or efficiency.

Because traditional forward converters could not achieve the necessary power levels, previous generations of Bel DC-DC converters used two power stages to achieve their industry-leading performance. By applying the newer ACF topology, Bel's engineers reduced the number of power stages from two to one without sacrificing performance or efficiency. This also resulted in a lower component count, around 60% less than previous designs.

The RCM500E also makes minimal use of through-hole parts, resulting in faster production times, which in turn allow for more extensive testing and inspection. Furthermore, the automation of the manufacturing has reduced overall cost of production while increasing the number of tests that can be performed each time.

The improved manufacturing techniques, combined

Bel's Mercher-brand DC-DC converters support the power needs of modern railway systems



with reduced component counts has led to a 36% reduction in cost compared to the previous generation.

### RCM500E Specs

- Input voltage range from 72V to 110V designed for railway
- Output voltage of 24V
- Up to 500W output
- Compliant with EN 50155, EN 50121-3-2, AREMA
- Safety-approved to the latest edition of IEC/EN 62368-1 and UL/CSA 62368-1
- Fire and smoke: compliant with EN 45545 and NFPA 130
- Overtemperature, overvoltage, overcurrent and short-circuit protection

### Hidden Risks of DC-DC Selection

When it comes to railway systems, the importance of choosing the right DC-DC converter cannot be overstated. Unlike other applications, where a DC-DC converter may be a small, inconspicuous component, in railway systems, the size and weight of such units can be a major issue. The fact that several hundred of these units can be present within a single train makes this a critical consideration.

The increased weight that comes with larger DC-DC converters can lead to higher fuel costs, while the high component count introduces multiple points of failure. Additionally, the need for quiet, EMI-free designs can be

particularly challenging, requiring careful attention to detail and a deep understanding of the complex interactions between different components.

### State-of-the-Art Solutions

Fortunately, engineers now have access to state-of-the-art solutions that can help address these challenges. One such example is the RCM500E, which employs an active clamping forward converter topology. By reducing the number of switching components from six to one, this design achieves a 60% reduction in component count, resulting in considerable cost savings of around 30%. This reduction in complexity not only makes the design more efficient but also more reliable, as there are fewer potential points of failure.

The Melcher brand has been a leading developer of high-quality power electronic solutions for decades, earning a reputation for delivering reliable and efficient systems even in the most demanding environments. With a deep understanding of the unique challenges faced by railway systems, Bel's power solutions are designed to meet the highest industry standards.

[www.belfuse.com](http://www.belfuse.com)



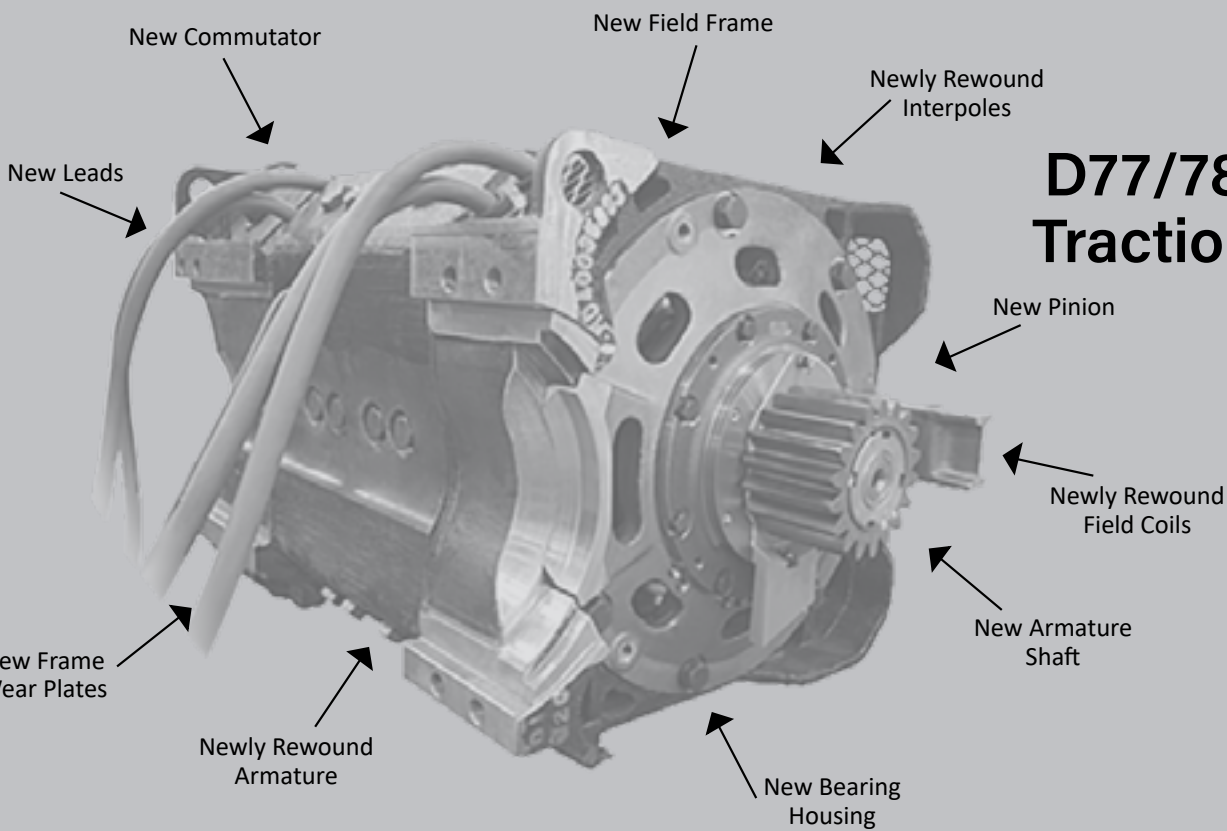
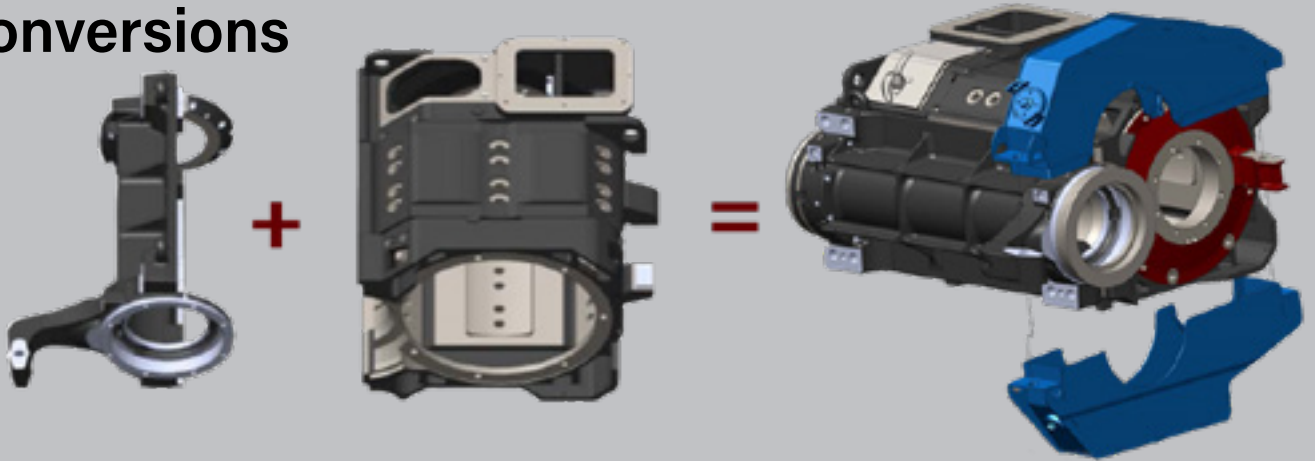


# POWERRAIL

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# PowerRail

## PowerRail's Partnership in Locomotive Remanufacturing and Engine Emission Upgrades

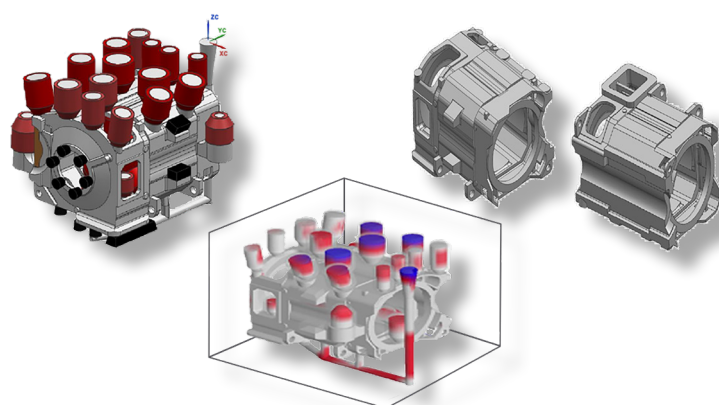
When one of PowerRail's customers recently embarked on an ambitious remanufacture project for their EMD GP40PH locomotives, they knew they needed a partner capable of matching their vision.

The project, centred around upgrading the engine emissions to meet modern standards, while also resetting the locomotive's lifecycle, was no small feat. Fortunately, PowerRail was more than ready for the challenge.

At the heart of the upgrade was the conversion of the locomotive's D77 traction motors to the advanced D78BTR style. Traction motors are the powerhouse behind the movement of a locomotive, and PowerRail understood that extending their lifecycle was critical to the success of the remanufacture. By resetting the lifecycle of these motors to match that of the trucks and the entire locomotive, PowerRail would help ensure the rebuilt locomotives could meet decades of future service.



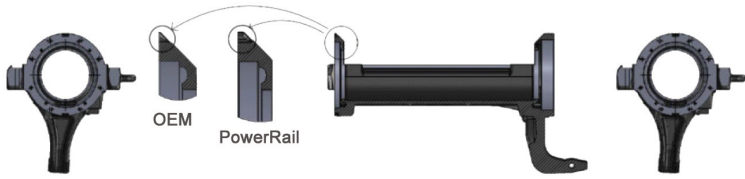
Advanced Axle Mounting Style



PowerRail's new cast frames for increased resistance to shock and vibration

The work was done at PowerRail's AAR-certified motor facility, where the BTR conversion process is carried out with expert precision. This particular conversion involved extensive traction motor rebuilding, incorporating new cast frames and PE housing for increased shock and vibration resistance – an upgrade that is crucial for railroads operating in demanding environments. PowerRail's use of specialised machining and welding processes further enhanced the stator frames and magnetic section, delivering greater stability and longevity for the traction motors.

In addition to the motor rebuild, PowerRail supplied matching converted wheelsets, which featured new axles, and a newly designed enhanced BTR housing. With 80% more thickness compared to the original design, the conversion to the BTR style also eliminates the brass support bearings and wick assemblies. Other benefits include tapered roller support bearings, which are sealed, eliminating wick lubricators and the addition of oil. In addition, the tapered roller support bearings only require a visual inspection of the seals



*PowerRail's U-Tube offers 80% more thickness over the OEM*

every 90 days, vs. sleeve-type bearings which require inspection and oil addition every 45 days, drastically improving reliability and reducing maintenance costs and downtime.

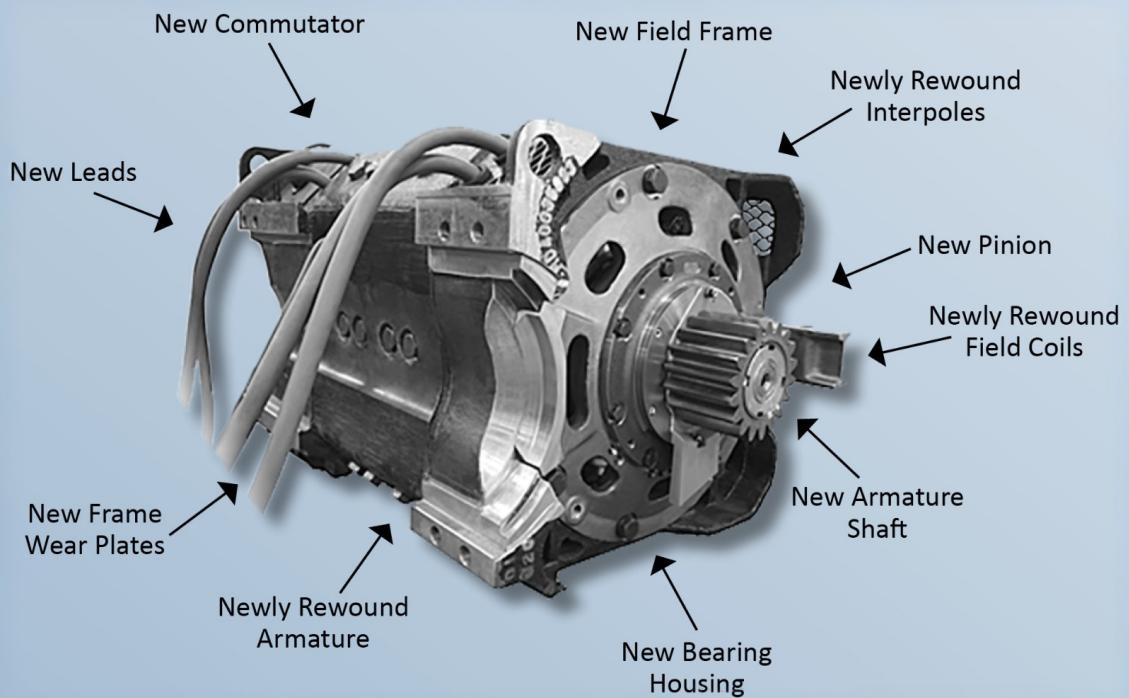
But PowerRail's value does not stop there. PowerRail offers its customers the flexibility to acquire these traction motor conversions either as an outright sale or by converting the customer's core motors – allowing for both cost efficiency and sustainability. Furthermore, for customers seeking a more extensive overhaul, PowerRail now offers the (re)New D78/D87 Traction Motor. This premium traction motor provides customers with a like new motor, equipped with new rewind armatures, shafts, pinions, commutators and new rewind inter poles and field coils, resetting the life of the motor with a more cost-effective price tag than buying new.

Thanks to PowerRail's expertise and cutting-edge solutions, the customer's EMD GP40PH locomotives are not only remanufactured but also significantly enhanced, resetting the standard for locomotive overhauls and power conversions. PowerRail has proven itself as not just a vendor, but a true partner in extending the life and performance of the customer's fleet.

Through this collaboration, PowerRail continues to set the bar in remanufacturing, solidifying its position as a leader in innovative, long-lasting traction motor solutions for the rail industry.

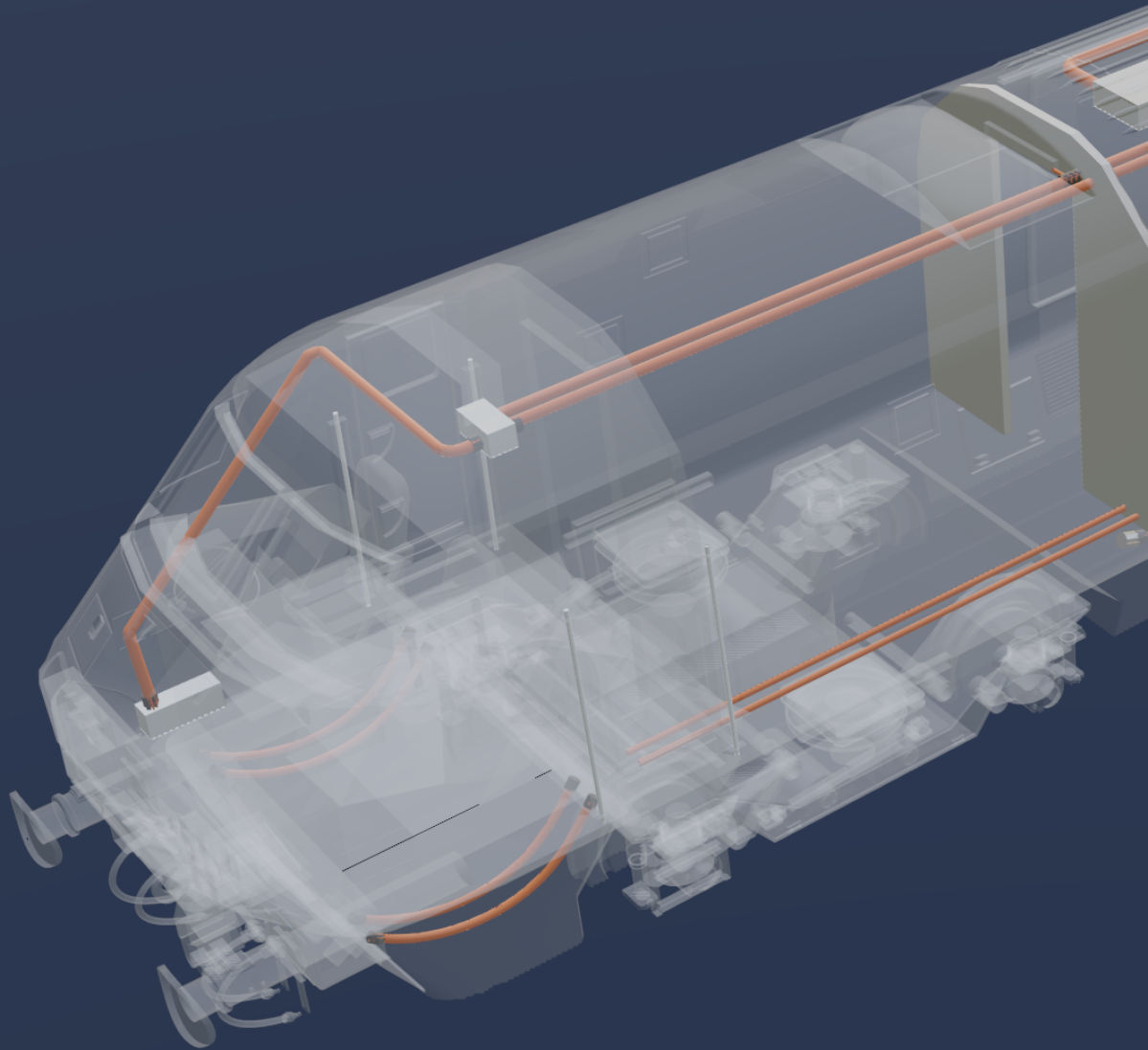
**For more information contact PowerRail**

[www.ePowerRail.com](http://www.ePowerRail.com)  
 +1 570-883-7005  
[Sales@ePowerRail.com](mailto:Sales@ePowerRail.com)



*PowerRail's (re)New Traction Motor*

Moltec is at the forefront of developing long-lasting wire and cable protection solutions, expertly engineered to withstand even the harshest environmental conditions. With decades of experience in the industry, Moltec has established itself as a trusted partner for OEMs and transit authorities, providing innovative products that ensure the safety and longevity of critical electrical systems.

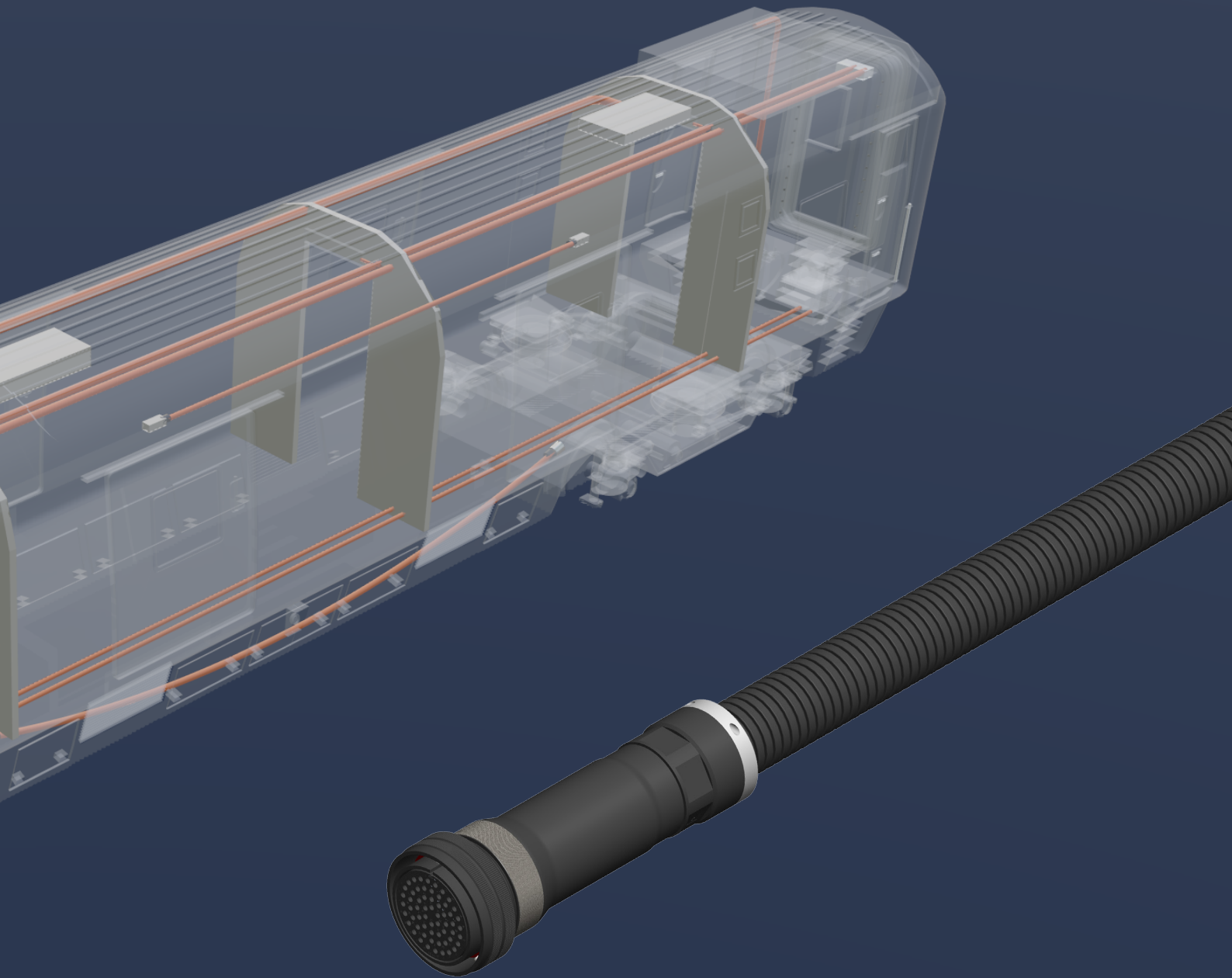


### Benefits:

- IP69K full ingress protection
- 360° EMI shielding
- NFPA 130
- Flexible
- Custom adapters and back shells
- Complete plug and play solutions
- Able to adapt to virtually any connector
- Designs, drawings, first articles to prototypes, samples and production
- Engineering expertise on hand

# QUALITY ENGINEERED SOLUTIONS

Specializing in Wire and Cable Protection Systems



Moltec remains committed to delivering high-quality wire and cable protection solutions that enhance safety and performance in various applications. By integrating our Griplock® fittings, polyamide 12 flexible conduits and custom adapters, we provide comprehensive protection that stands the test of time. Whether you're an OEM or a transit authority, you can trust Moltec to safeguard your critical systems against environmental challenges.

Contact:

[info@moltecinternational.com](mailto:info@moltecinternational.com)

Website:

[www.moltecinternational.com](http://www.moltecinternational.com)

# VUE (Vehicle Undercarriage Examiner)

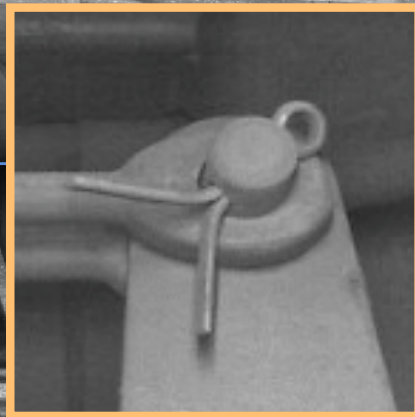
High-resolution end-to-end scanning of railcar undercarriages in real time at track speed

made exclusively for

**rip**®

railcar inspection portal

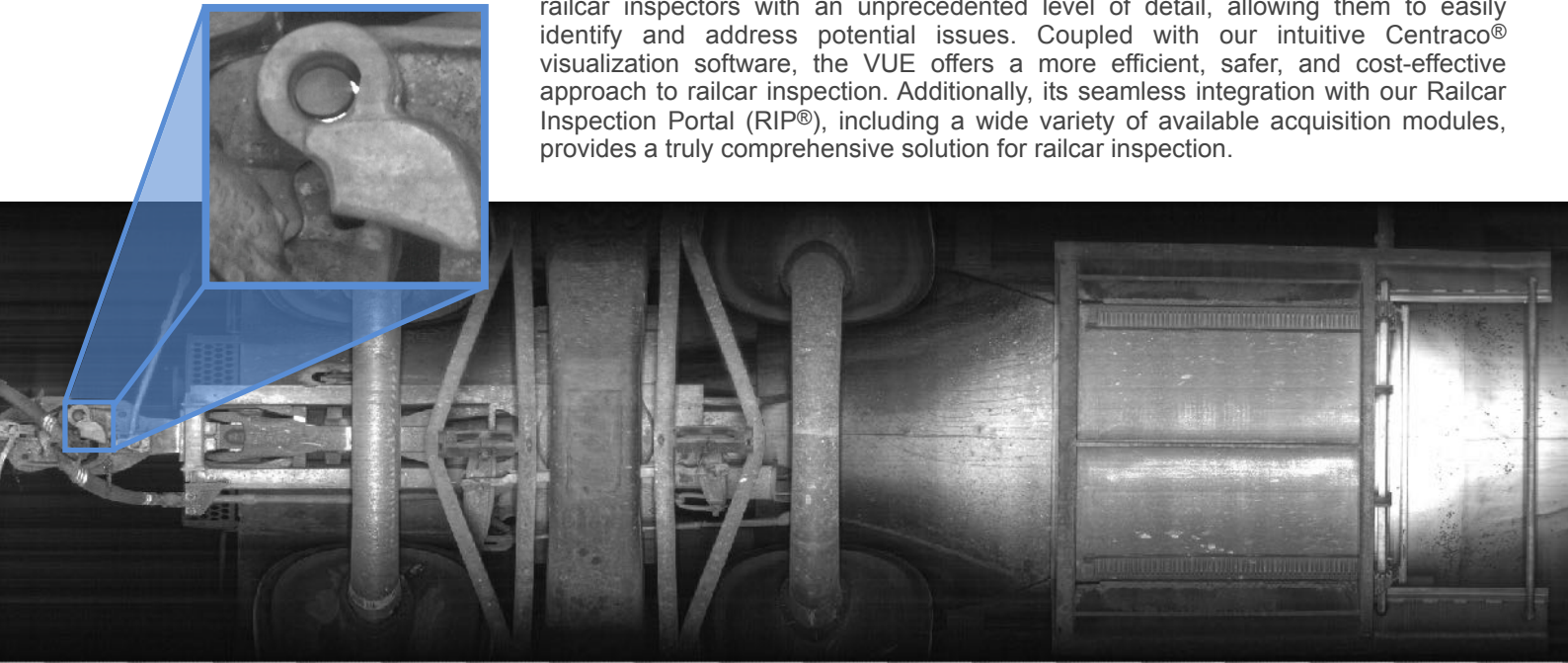
**Duos Ai**  
compatible



**duostech**  
intelligence in motion

# VUE (Vehicle Undercarriage Examiner)

The VUE is a cutting-edge railcar inspection tool that captures high-resolution panoramic images of railcar undercarriages. This innovative technology provides railcar inspectors with an unprecedented level of detail, allowing them to easily identify and address potential issues. Coupled with our intuitive Centraco® visualization software, the VUE offers a more efficient, safer, and cost-effective approach to railcar inspection. Additionally, its seamless integration with our Railcar Inspection Portal (RIP®), including a wide variety of available acquisition modules, provides a truly comprehensive solution for railcar inspection.



## Feature Highlights

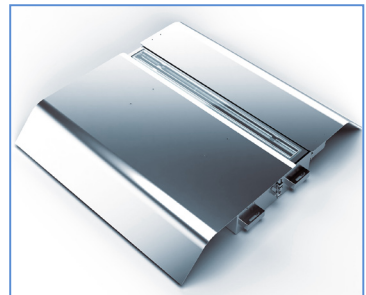
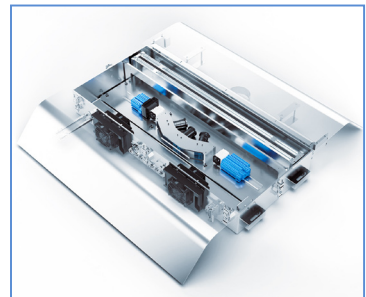
- Produces crisp, high-resolution (panoramic) images of railcar undercarriage
- Acquires image data at track speed (up to 80 mph for freight rail and up to 125 mph for high-speed passenger rail)
- Ruggedized, sealed, and protected for operation in harsh environments
- Integrated Air-blade technology helps to keep acquisition surface clean and free of debris

## See it in Centraco®!



## Specifications

**Module Hardware Version:** 1.3  
**Data Acquisition Type:** Image Data (Panorama Image)  
**Number of Cameras:** 3  
**Camera Sensor Type:** Line-scan (Grayscale)  
**Resolution:** 2k  
**Light Source:** Integrated LED  
**Approximate/Average Data Size (Single Railcar Scan):** Approx. 5.4 MB  
**Physical Location:** Between Rails (below top-of-rail)  
**Connectivity:** Via Duos Railcar Inspection Portal (RIP®)  
**Control:** Automatic via Duos Railcar Inspection Portal (RIP®)  
**Power Requirements:**  
 Chassis Control Panel: 220-240VAC, 50/60Hz, 50A Breaker  
 Air Knife: 220-240VAC, 50/60Hz, 40A Breaker  
**Environmental:**  
 Chassis: -40° - +40°C  
**Dimensions:**  
 Chassis Control Panel: 36"x60"x13" (WxHxD)  
 Chassis w/Kick Plate and Air Knife: 52 3/4"x 48 1/4" x 7 3/8" (LxWxH)



## rip® ready!

The VUE is 100% compatible with the **Duos Railcar Inspection Portal**. Leveraging the power of the RIP's modular architecture, the VUE can be selected for a new RIP or added to an existing RIP® system for greater coverage.



# Totalkare

## What Rail Lifting Equipment Do You Need to Lift Bogies and Trains?

**W**orking with heavy-duty vehicles comes with its own challenges. But when you're working in rail, everything is amplified:

The weight, the size — and the consequences of any hazards.

So if you're running a rail depot that needs to lift rolling stock, you need the strongest and safest rail lifting equipment around.

Here's what you need to get started:

### Bogie Lifting Platform

Compared to some parts of the train, a railway bogie can be one of the most complex and component-dense parts of a rail system.

Between the wheels and axles and suspension, there's a lot going on — and that means it's one of the most commonly serviced and maintained parts of a train.

That's why lots of rail depots invest in specialised equipment designed specifically for working on bogies — like our Totalkare Bogie Lifting Platform.

It's a self-contained mobile unit that runs on rails with a battery-driven motor controlled by a wireless remote, sliding underneath a railway bogie and raising it up on an electrohydraulic lifting system.

With the bogie safely raised above the tracks, your teams can get the access they need to the critical components and systems that need servicing — before safely lowering the bogie back into operation on the tracks.

### So how much can it lift?

Our bogie lifting platforms come with lifting capacities between 6,000kg and 14,000kg — which means they're a perfect fit for lifting almost any single railway bogie you're likely to see in your depot.





## Railway Lifting Jacks

If you've seen our industry-leading mobile column lifts, you'll know exactly how our Railway Lifting Jacks work.

Each mobile column gets wheeled into position and attaches to the train carriage to form a set of lifts that work in tandem — safely raising entire carriages (or trains!) to the height your teams' need to gain access to its components.

### How Much Can You Lift?

Each column in our railway lifting jacks comes with a range of lifting capacities — from 5,500kg up to 50,000kg.

But unlike our vehicle column lifts (which come in sets of up to 8), our railway jacks can be configured in sets as large as 128 columns — giving you a potential total lifting capacity that can be as high as 6.4 million kg!

Here's how it works out in practice:

**With 5,500kg columns**                      **With 50,000kg columns**

	With 5,500kg columns			With 50,000kg columns		
<b>No. of columns</b>	4	32	128	4	32	128
<b>Total capacity (kg)</b>	22,000	176,000	704,000	200,000	1,600,000	6,400,000

With enough railway jacks working in tandem, you can lift anything from a single carriage or a series of cars — right up to a full-length train.

### So how does it work?

With a computerised control unit (operated with a Wi-Fi remote), you can perfectly synchronise up to 128 columns to lift and lower as a group — with low-tension control and emergency stop buttons for safety.

### And the result?

Your teams can safely service some of the biggest trains on the tracks today — without any need to split the carriages apart.

## Looking to Make Some Upgrades to Your Rail Depot?

We're known for our industry-leading equipment designed for heavy-duty vehicles.

But we've also been serving the rail industry for years — taking every innovation and advance from the road industry and applying that to our equipment and services for rolling stock.

[www.totalkare.co.uk](http://www.totalkare.co.uk)

0121 585 2724

[sales@totalkare.co.uk](mailto:sales@totalkare.co.uk)





VEHICLE LIFTS



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**TOTALKARE**

WORKSHOP EQUIPMENT EXPERTS



MOBILE COLUMN LIFTS TO SUIT  
**ALL WORKSHOP REQUIREMENTS**



FOR  
**WORKSHOP  
EQUIPMENT**

IT'S **TOTALKARE**

IN STOCK & READY FOR  
**IMMEDIATE DELIVERY**



REQUEST A QUOTE



From column lifts to brake testers, tyre changers to wheel alignment, vehicle pits to oil management and almost everything in between, for workshop equipment, it really is Totalkare. **Call us for a quote today.**

**GET IN TOUCH: T:0121 585 2724 / WWW.TOTALKARE.CO.UK**

# INVENTOR OF THE PORTABLE TRAIN WEIGHER (PTW)



- ▶ Ideal for railcar maintenance
- ▶ Weighing systems supplied globally
- ▶ Established in 1988

# Weighwell

## Weighwell Engineering: Revolutionising Train Weighing Solutions Since 1997

**W**eighwell Engineering Ltd is a global specialist in train weighing and has been supplying the patented Portable Train Weigher (PTW) since 1997. Invented by Founder and Managing Director Paul Horsfall, the PTW is an integral part of train manufacture, overhaul and maintenance operations.

An everyday focus within the rail industry is to provide rolling stock that is safe and reliable. The PTW can provide accurate wheel weight data and is an innovative solution for weighing a wide variety of rail vehicles from high-speed trains to metro and tram cars.

Suitable for understanding the weight distribution of a rail vehicle, the PTW can be supplied in a variety of configurations and used to statically weigh each axle, bogie or the complete railcar/locomotive. Achievable accuracies with a Static Train Weighing System are  $\pm 0.1\%$ .

The PTW has evolved from its initial introduction in 1997. The system length has been reduced from 600mm to 500mm and our latest patented design has an in-built ramped portion on the loadcell. A shorter PTW length allows for greater flexibility between rail fastenings, whilst the improved loadcell design provides a smoother 'flange friendly' interface. The mobile rail scale is suitable for different track gauges and rail profiles with no obstruction to regular train movements.

The PTW can be hired on a timescale to suit your project requirements. The easy-to-install weighing

system requires no permanent track modifications or mains power connection. This results in a seamless and convenient solution for pre/post modification weighings. Our RISQS-audited company offers skilled technicians to oversee your weighing operations, ensuring reliable service from initial setup through to ongoing support.

Our flagship product has been supplied into over 40 countries and led to working with a large and diverse range of rail companies. We are dedicated to providing an exceptional service underpinned by decades of knowledge and experience. Contact us today to learn more about how we can help you achieve your objectives.

[www.weighwell.com](http://www.weighwell.com)

**WEIGHWELL**  
TRAIN WEIGHING SPECIALISTS





## STATIC WEIGHING SYSTEMS

### KEY BENEFITS



#### EASY INSTALLATION

Systems can be installed within 15 minutes.



#### PORTABLE

No permanent, time consuming modifications to the track infrastructure.



#### NO MAINS POWER

Systems operate with a battery powered connection.



#### COST EFFECTIVE

Systems can be provided for a variety of rail projects, with hire options available.



#### PRECISION

Our weighing interfaces can accurately determine if weight distribution is balanced.

## WE CARE ABOUT YOUR SAFETY

Our static weighing systems can assist rail engineers, fleet managers and rail consultants with the information needed to implement potential corrective actions. This can help improve ride quality and the vehicle stability of rolling stock



[www.weighwell.com](http://www.weighwell.com)



[sales@weighwell.com](mailto:sales@weighwell.com)



🏠 Directory

Rolling Stock

# HEXAGON

## The CALIPRI X – An On-Track Wheel Profile Measurement System



**N**EXTSENSE, part of Hexagon AB, is at the forefront of rail measurement technology, setting standards for accuracy and reliability.

Its **CALIPRI X** automated, permanently installed on-track wheel profile measurement system eliminates time-consuming and costly manual wheelset measurements, identifying out-of-tolerance areas in seconds. As a result, the system cuts unplanned fleet downtime, reduces costs and increases maintenance efficiency.

### Data-Driven Insights

CALIPRI X's enhanced connectivity and embedded analytics puts data to work to deliver conclusive

results in seconds. Moreover, it's easy to install, even on frequently used tracks such as in front of depots, workshops, washing facilities or in sidings. This enables regular measurements to be automatically taken to support safe operations, in line with European standard EN 15313, which covers wheel profile, diameter, back-to-back distance, equivalent conicity, camber and wheel toe.

*“We know, from conversations we’ve had with customers, that they want data captured from as many profiles as possible, which is what we’ve set out to do,”* says Philipp Sandheigl, NEXTSENSE’s Team Leader Railway Applications.

*“With CALIPRI X it’s possible to automatically capture all the required information, without human resources. Thanks to its automated operations it helps the*



*less downtime and reduced lifecycle costs,” says Sandheigl.*

The operator can connect from everywhere to the cloud, even using mobile phones or other handheld devices.

*“So you can walk in with your mobile and get immediate access to when the train passed the system and the results from the Predictor software. If one of the parameters is out of range, you can see it on whatever device you’re using, all from the one platform.” This feature is unique to NEXTSENSE, he adds.*

## Customer Benefits

So, where has CALIPRI X been implemented and what sorts of results have been achieved?

*“Vienna public transport operator, **Wiener Linien**, purchased nine of the automated systems – that’s a real success story,” says Sandheigl. “The customer operates Austria’s largest regional transportation service, ensuring that around two million passengers reach their destinations quickly, safely and comfortably every day. Safety, reliability and sustainability are paramount here.”*

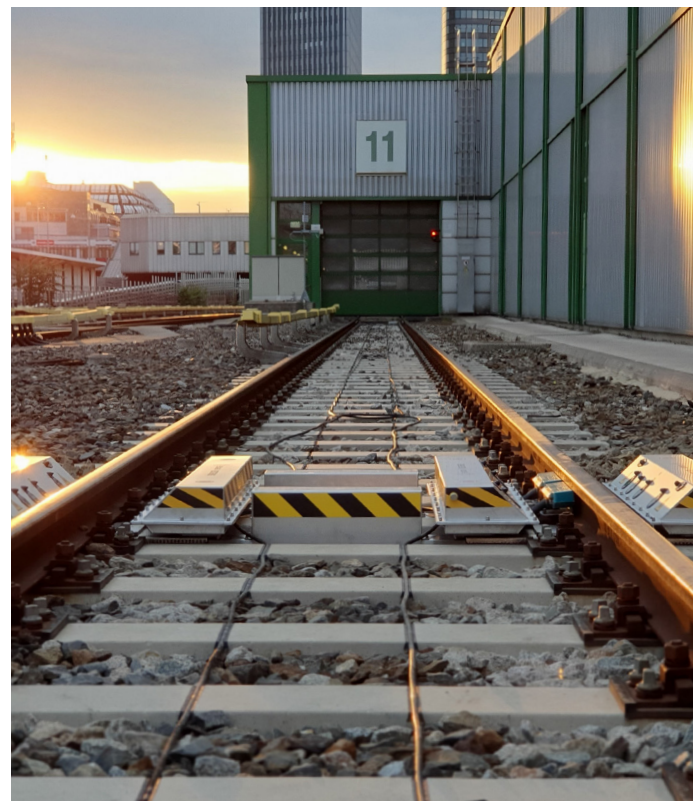
*industry address challenges around maintenance costs and labour shortages.*

*“It’s always our intention to provide a high-quality product at an affordable price, which we firmly believe we’ve achieved with CALIPRI X, without compromises.”*

## Accessing the Data

A single pass over the system is sufficient to obtain both wheel parameters and wheel profiles. Measurements, which are taken using a laser light section method, are automatically stored in the cloud where the data can be analysed.

If a customer is already using a database or predictive maintenance software, NEXTSENSE can just hand over the data to the existing programmes. However, if a customer hasn’t got an analysis solution in place, *“we provide predictive maintenance software, **CALIPRI Predictor**, a cloud-based solution with annual licence fees. This enables users to safely operate their trains with longer, more predictable maintenance intervals,*



To ensure safe operation, all wheels are frequently measured to ensure that operating tolerances are adhered to. However, Wiener Linien was looking to improve the efficiency and reliability of this process, so the operator investigated the various options on the market to assess which one would enable it to increase the productivity of its maintenance operations.

*“After a rigorous selection process, they chose the CALIPRI X automated on-track solution for precise train wheel profile measurement,” explains Sandheigl. “The data it generates is processed by Wiener Linien’s specially developed in-house software, which determines the ideal maintenance time and the necessary measures needed to achieve the longest possible wheel service life with the best possible workshop utilisation.”*

Previously, Wiener Linien manually measured wheels, which was highly labour-intensive, time-consuming and less accurate. Using conventional mechanical gauges, it took around 2.5 hours to measure all 48 wheels on a subway train. In comparison, with CALIPRI X, all 48 wheel profiles are now determined in a single pass, with measurement data available in seconds.

## Find Out More

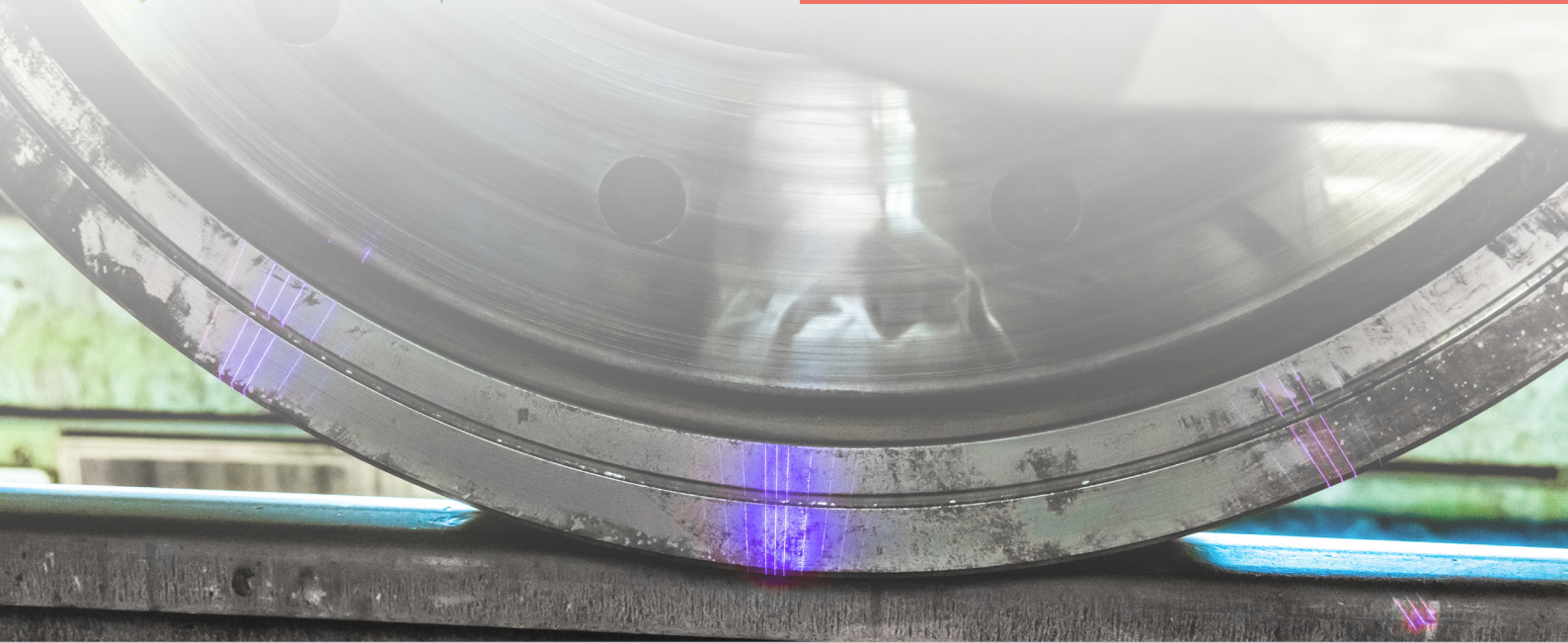
To find out more about **CALIPRI X**, the **CALIPRI Predictor** or **NEXTSENSE** in general, please visit our [website](#) or contact one of the team via [sales.mi.nextsense@hexagon.com](mailto:sales.mi.nextsense@hexagon.com).



**NEXTSENSE**

## High availability, reliable results

- Independent from loads and vibrations**  
 Calipri X is mounted on screw foundations with no direct contact to the rails. This ensures that different axle loads or vibrations won't influence the results.
- Ambient temperature under control**  
 A chiller keeps the sensors' geometry, which directly influences the measurement results, at a constant temperature all year round. In addition, the beam structure connecting the sensor boxes is made of steel and the temperature measured, which enables the software algorithms to factor in any temperature drift.
- Copes with the environment**  
 A smooth outline design ensures no sticking of leaves or dirt, while an air stream to all sensor windows keeps away dirt or rain automatically. For winter months, the Calipri X sensor boxes heat to melt ice and snow.
- Minimal maintenance needed**  
 No moving parts ensure a high system availability; nothing can break or block.
- Measurement standards compliant**  
 All dimensional results are calculated according to the EN15313 standard. The wheel profile alignment is done based on the profile, not relying on the wheelsets position above the system. All dimensional results are converted to a wheelset temperature of 20°C according to ISO-1 standard. This allows the comparison of the results and to analyse wear trends.

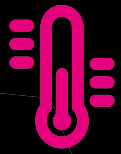




extend your senses



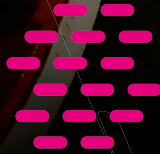
# Traditional Czech Producer of Sensors, Switches and Converters for Railway Vehicles



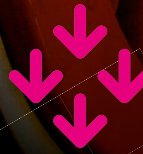
temperature



humidity



CO<sub>2</sub>



atm. pressure



VOC



Let us take care of your travelling comfort



EN 45545-2 / EN 50121-3-2 / EN 50155 / EN 61373 / NFPA 130

For more information about SENSIT s.r.o. sensors, switches and converters, please visit [www.railwayvehicles.com](http://www.railwayvehicles.com) or contact us directly at [randysek@sensit.cz](mailto:randysek@sensit.cz)

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the rail sector.

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