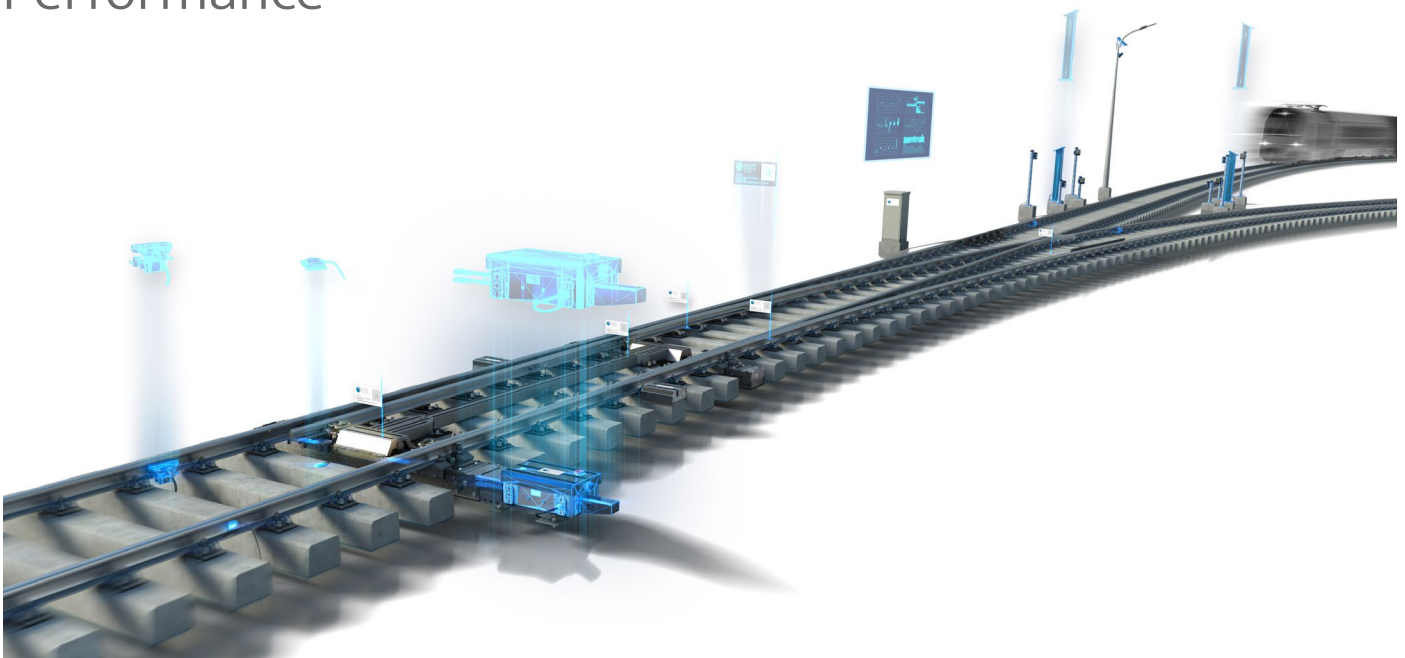


voestalpine Railway Systems

Turning Railway Infrastructure Data into Reliable Performance



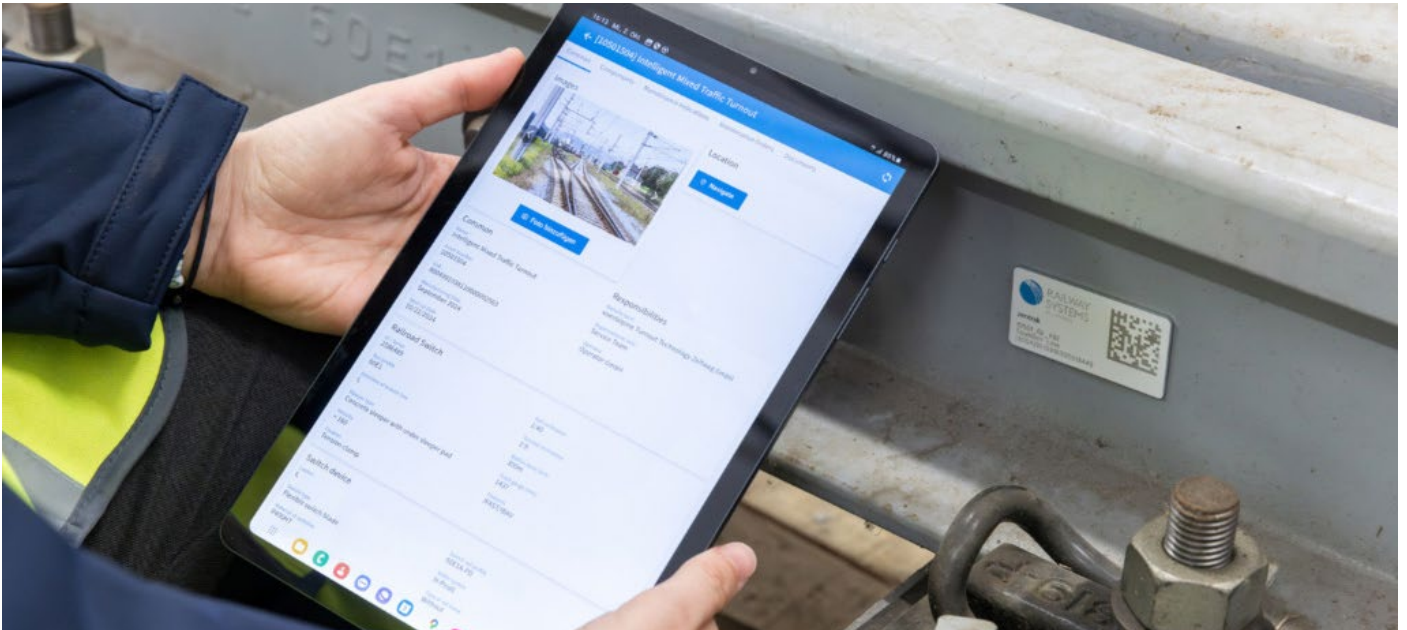
Digitalisation is changing the way railways operate. By combining engineering expertise with smart data, voestalpine Railway Systems helps operators improve reliability, increase availability, provide necessary safety and cut costs and plan with precision, says CTO Profit Center Signaling, Heinz Schatz.

Digitalisation is transforming the rail industry, unlocking new opportunities to improve reliability, availability, maintainability, safety and efficiency across networks. From advanced condition monitoring to predictive and prescriptive knowledge driven maintenance, the integration of digital systems is helping operators move away from being reactive towards smarter, data- and knowledge-driven decision-making.

It's About System Thinking, Not Isolated Tools

Delivering these benefits requires more than technology alone – it relies on a holistic, hybrid approach that brings together the strengths of physical systems and digital tools. Success depends on integrating these elements into existing processes and having a clear strategy for how information will be used to add value throughout an asset's life.

In an industry where reliability is non-negotiable, adopting new digital tools can be daunting. The key lies in aligning technology with customer needs, embedding digitalisation into the physical product from the outset, and ensuring that the insights generated are not just collected, but transformed into actionable improvements that enhance performance and reduce lifecycle costs.



Challenges Rail Operators Face

At voestalpine Railway Systems we often talk about the ‘pains’, or major challenges our customers face, which are reliability, availability, maintainability, safety and security.

Rail operators face the constant challenge of doing more with less, working within tight budgets while under pressure to maintain punctual timetables and keep assets in service. A major hurdle is the lack of transparency over asset condition – without clear, up-to-date insights, maintenance can become reactive rather than proactive, increasing the risk of costly delays.

Digitalisation can help with these pains. With predictive algorithms and artificial intelligence for example, operators can gain real-time visibility into asset health, identify emerging issues before they become an issue, and better prioritise (service and inspection) activities. Spare parts inventory is also a cost driver, so predictive information to optimise spare parts management and thus improve working capital is another optimisation approach. This not only supports availability, but also enables smarter allocation of resources, helping operators deliver a more reliable and efficient service.

The Digital Push Reshaping Railway Infrastructure

Digitalisation is becoming increasingly important

for our customers, particularly as Europe advances initiatives like EULYNX — a standard for digital interlocking systems that defines how they communicate both with field elements and with systems handling safety-relevant maintenance information. This is driving greater demand for both digitalisation (creating new digital processes) and digitisation (converting physical processes and information into digital form).

The genie’s out of the bottle. For operators, predictive and prescriptive maintenance, AI-backed insights, knowledge-based recommendations and greater automation are fast becoming the new standard, and those that don’t embrace the change risk being left behind.

Data, Decisions and Action

The biggest benefits come from working with a trusted systems partner rather than just a product provider. Traditionally, once a product was manufactured and delivered, its lifecycle was largely managed by the operator. With our digital system solutions, we aim to support the entire lifecycle, from commissioning through to end of service, which in terms of rail components can be as long as 30 years. We deliver this through what we call the digital layer, which is made up of three key stages:

- Data harvesting (sensor) technology – collecting the right operational data from robust add on and/or embedded sensors and monitoring systems

- Prediction (information generation) – using algorithms and software tools to turn raw data into actionable insights, whether that’s the current condition of the system, or a probability-based prediction of future performance
- Prescription (knowledge provision) – providing clear recommendations on what actions to take, either to resolve an existing issue or to prevent a potential future problem

By combining condition monitoring with predictive and prescriptive analytics, we can help operators make informed decisions in the present that positively impact asset performance and lifecycle costs in the future. It’s a continuous feedback loop that ensures our solutions keep delivering value over decades of service.

Predictive Insights in Action

voestalpine Railway Systems brings together mechanical engineering expertise, digital innovation and industry experience to deliver solutions that are built in, not bolted on. Whether upgrading existing infrastructure or delivering new-build projects, we design our products to work seamlessly in the most demanding railway environments. Our goal is simple: to help operators improve reliability, increase availability, optimise maintainability in a safe environment to reduce costs and get the most out of every asset.

Take a frog, or crossing point. By applying our monitoring systems, we are able to detect wear, track its progression over time and predict the future behavior. This data provides a prediction of how the crossing will develop, enabling the customer to plan ahead for service interventions and inspections.

Our algorithms can forecast the expected end of the crossing’s useful life under certain conditions, allowing

operators to prepare well in advance. This supports dynamic spare parts management, reducing the need to hold large stocks while ensuring components are ready exactly when required.

Data-driven maintenance is supported by our state-of-the-art and future-oriented zentrak Asset and Maintenance Software Platform.

Choosing the Right Partner for Digital Success

While not every segment is fully digitalised yet, the trend is clear – there’s no turning back. In the industry, buzzwords like artificial intelligence (AI) dominate headlines, but the real challenge is finding a partner who can deliver tangible value over the entire lifecycle of an asset.

Once the right partner is selected, trust in that choice and move forward with digitalisation and digitisation initiatives. Done well, these can significantly optimise reliability, availability, maintainability, safety and security – all while helping manage costs more effectively in today’s competitive environment.



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