Providing a robust and reliable mission-critical communications solution to a UNESCO World Heritage Site

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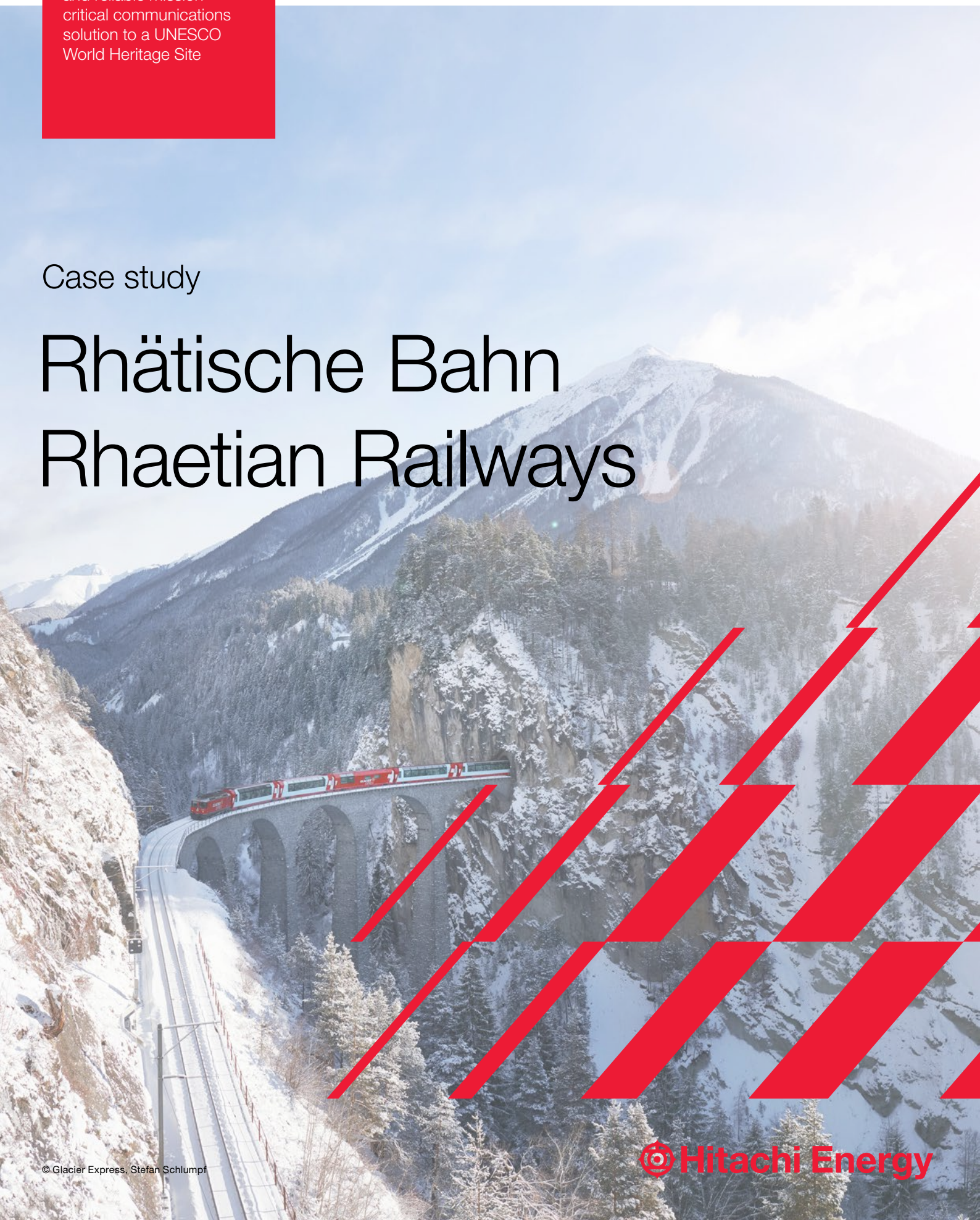
Case study

Rhätische Bahn
Rhaetian Railways



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Hitachi Energy

Modern communications solutions for a timeless railway

Historic railway upgrades mission-critical communication system without disruption

Every year, Rhaetian Railway (RhB) offers 12 million passengers a memorable journey through the mountainous Swiss Alps aboard the world-famous Glacier Express. One-third of the 384km railway is a UNESCO World Heritage site, situated more than 1,500 meters above sea level and one-fifth of its length, about 77km, composed of man-made structures. While the route is stunning, the weather in the region can vary considerably—subzero temperatures, heavy snow and gusty winds are regular occurrences, making it among the harshest rail environments in the Alps.

The same rugged terrain that is the hallmark of the route created issues for the aging signaling and communications technologies as they ran through the long tunnels and across the deep gorges. To address these challenges, RhB began collaborating with Hitachi Energy in 2013 on the mission-critical communications (MCC) network modernization project with the aim of updating those systems and renewing their communications equipment that had reached end of life. The team developed a robust and reliable communications solution to support the vital signaling systems required to safely run the railway in the mountainous terrain.

When the time came to replace additional legacy communications infrastructure in 2020, RhB again selected Hitachi Energy to support the continued modernization process of the entire RhB communications network. Under the new assignment, Hitachi Energy is supplying mission-critical communications products, coupled with commissioning and system integration services by on-site expert technical teams. The project is scheduled to run through 2026.

The panoramic journey aboard “the slowest express train in the world” takes passengers over 291 bridges and through 91 tunnels.

The importance of centralized communications

As the operator of one of the world’s most scenic railways, RhB needed to ensure millions of annual passengers could enjoy their journeys in comfort and safety. For their modern, digitalized communications systems, this meant combining multi-generational and multi-technology features to ensure a 100% stable network with unwavering operational availability, which met the primary objective of delivering data traffic to RhB operations teams so they could monitor activity throughout the network. To improve this capability, RhB sought to install a new, application-specific network management system (NMS) and construct new fiber-optic rings to provide reliability and redundancy, enabling teams to fulfill a variety of tasks in their safety systems with the existing hardware.

At the same time, RhB was interested in consolidating train servicing resources into a centralized operational control center to provide a more collaborative environment for the dispatch operators and a much more comprehensive view of the entire railway network.

> “The project will run until 2026 and has several highlights. From the competent and professional advice, to the very good technical support, to the implementation of the customer-friendly solutions, we recommend Hitachi Energy’s technical team in charge of the project.”
>
> Jürg Wielath, Electrical Engineer, Safety Installations, Rhaetian Railways

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To meet these goals, the team would have to introduce and prove the viability of many new technologies and systems capable of performing flawlessly in the harsh mountain environment – and have them implemented without disruption. One of the key criteria for eliminating disruption was selecting a trusted and reliable supplier for innovative products and system integration.

Hitachi Energy enables highest network availability for RhB

The core of the modernization solution integrates Hitachi Energy's XMC20 multi-service telecommunications network elements that are purpose-built to meet stringent access and transport network requirements for mission-critical systems (MCS). Cost-efficient and user-friendly network management applications play a vital role in the organization of a network. The equipment nodes are managed with Hitachi Energy's UNEM network management system for multi-service access platforms, providing accurate real-time status information that gives operators the ability to analyze network disturbances and quickly reconfigure routes as needed.

In addition to ensuring reliability and flexibility, another important consideration for RhB was the optimization of total cost of ownership (TCO). By selecting a solution that ensured backwards compatibility of all devices, the integration of legacy and new equipment into the UNEM network management system was simple and efficient. The ease of use of UNEM allowed RhB and Hitachi Energy to maintain continuity and keep the same technical teams engaged over the duration of the project which improved the speed and quality of decision-making, especially in the later stages.

Since UNEM was easy to learn and the NMS was already known to the trained personnel, the transition to the new system was made with minimal disruption to the staff workflow. The XMC20 product portfolio's proven extra-long lifecycle further enhanced TCO.

Fundamental to increasing reliability and lowering TCO is the post-implementation commitment of the supplier. After working together for many years, RhB had experienced Hitachi Energy's excellence in technical and commissioning support, which underscored the value of selecting a solid, reliable, and collaborative supplier.

Stress-free upgrade increases communications system reliability and operational efficiency

The mission-critical communications network modernization project has been a success for RhB and has improved operations in many ways that support the overall goals of the project:

- **High availability.** The ruggedized XMC20 nodes have kept the mission-critical communications system running 24/7 without service interruption despite the harsh, often frozen, high alpine environment. Proven integrity of the XMC20 product family means RhB can expect an exceptional high availability of up to 99.999% over the solution's lifetime.

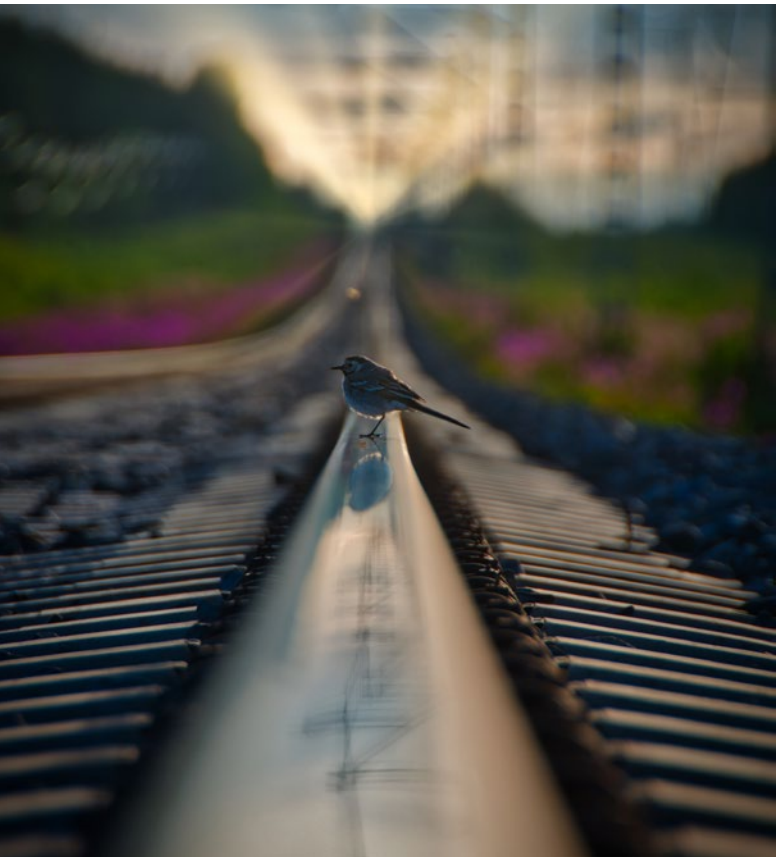
- **Streamlined operations.** The XMC20 solution enabled RhB to consolidate operations to a single centralized control center which fostered collaboration, enhanced team communication and improved individual operators' effectiveness as a result. Consolidation also reduced operating costs and complexity.

- **Seamless integration.** The mission-critical communication network modernization was successfully deployed without disruption to RhB operations. This was made possible by the seamless integration of existing and state-of-the-art interfaces that allowed for secure and stable system testing and cutover.

- **Tailored solutions.** XMC22-based solution is 100% application-specific and adapted to RhB needs. For example, the solution was able to successfully meet an RhB requirement for alarm customization to integrate with a specific railway monitoring system.
- **Optimized TCO.** Universal backwards compatibility meant easy integration of multiple generations of communication nodes into the UNEM network management system, which reduced costs and will help RhB phase in new solutions over time.
- **Secure services.** The UNEM network management system features secure management communication that is fully encrypted and completely isolated from external networks, which ensures the highest level of security for the mission-critical communications network.

In Hitachi Energy, RhB found the perfect partner. Bringing 100+ years of experience in mission-critical communications and solutions renowned for their long lifecycles, Hitachi Energy committed the local team and single point of contact for RhB from the first day of the project until today.

The trusted relationship and successful long-term collaboration between the technical teams of Rhätische Bahn and Hitachi Energy are amongst the greatest highlights of the mission-critical communications network modernization project.



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XMC22
100% application-specific & adapted to customer needs

TECHNICAL TEAMS
Continuity of staff since day one of the project in 2013

REPUTATION
100+ years of experience in mission-critical communications

ENSURED OPERATIONS
Guaranteed operations even in extremely harsh environment

OPTIMIZED TOTAL COST OF OWNERSHIP
Easy integration of new and legacy nodes into UNEM

INTEGRATION
Seamless integration of legacy and state-of-the-art interfaces

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