Intelligent Communication Systems
Consistent Integrated Communication

Overview

103 passenger stops

384km of track

Industry
Rail

Challenge
Improve voice communications

Solution
Trapeze Intelligent Transport System (ITS), On-Board Computers, Digital Radios

Results

- Integrated bus information systems
- More reliable operations
- Improved asset efficiencies and effectiveness

Background

Chur, Arosa, Davos, St. Moritz, Pontresina, Scuol and Ospizio Bernina with its station on the Bernina Pass at 2253 metres above sea level: Rhätische Bahn RhB offers its passengers 103 stops and stations at these world-famous places and many other locations.

The network run by the traditional railway operator encompasses eight lines on 384 kilometres, 58 kilometres of which in tunnels. The network mainly runs in the Swiss canton of Graubünden and partly also in Italy. The Bernina line and the Albula line are featured on the list of UNESCO World Heritage Sites. For about twenty years now, RhB has also been operating the Vereina line with the Vereina tunnel, which connects the Swiss Plateau and the Lower Engadine. On this route cars are loaded onto the car train.

The Challenge

RhB wanted to introduce a system enabling a dispatcher to handle the entire voice communication via a touchscreen operator unit – both the conversations with train drivers on the numerous routes via radio and the calls to operating staff over the phone. It should also be possible to connect radio subscribers with telephone subscribers. The success of the system depended on developing an interface for the technical link to the digital radio system of RhB.

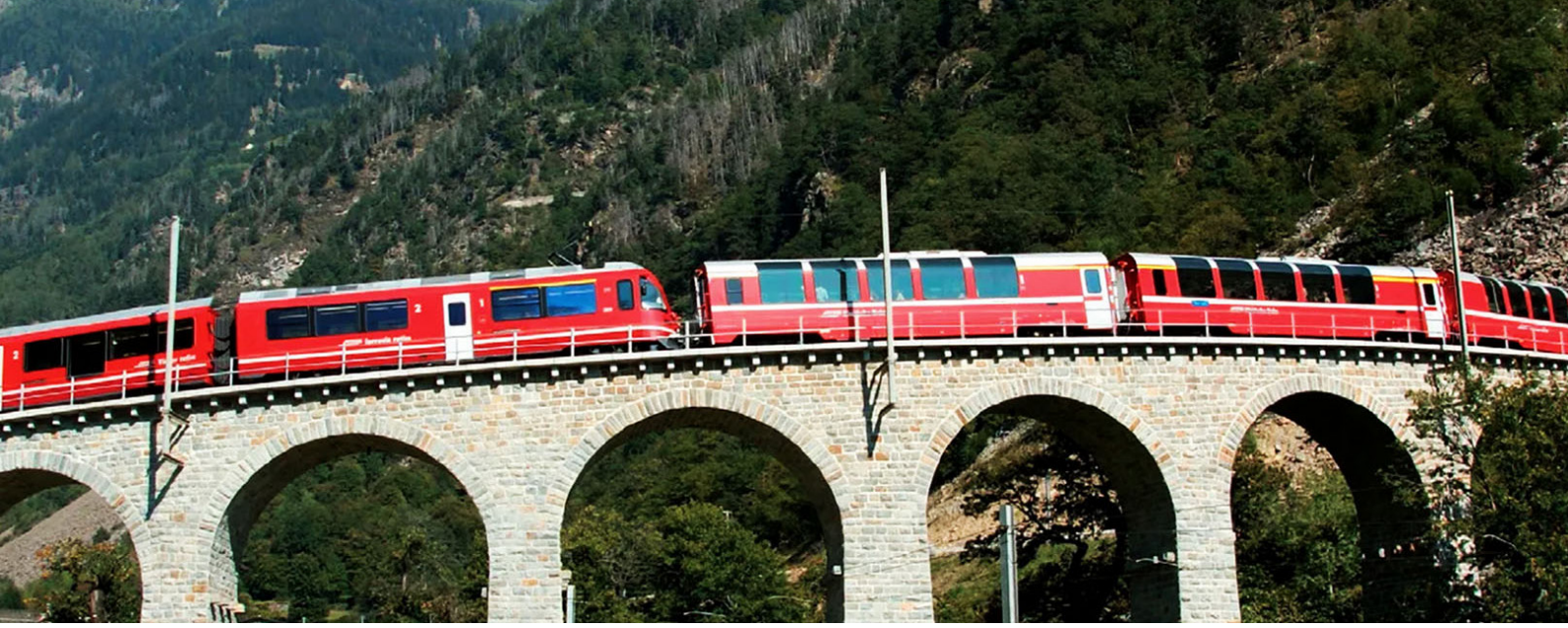
The Solution

RhB chose Trapeze/IMS as its partner for devising and implementing a completely new, fully integrated operatio- nal communication system and radio console based on the proven technical solution PA-R-I-Ty. All voice com- munication devices of RhB are connected to PA-R-I-Ty, i.e. PA-R-I-Ty operates like a hub for voice communication.

Why did RhB choose this solution? Decisive were the references of Trapeze/IMS and the high level of coopera- tion, flexibility and fast response times of the Trapeze/ IMS teams.

Ten route radio channels are currently connected to PA-R-I-Ty. The newly deployed route radio systems are made by an Italian manufacturer. They are equipped with IP-capable technology and are connected to PA-R-I-Ty via gateways (radio controllers). To ensure constant avai- lability, two radio controllers operating in parallel have been installed.

The 52 radio channels for shunting assistance were inte- grated using interface cards. These controller modules convert analogue radio signals into digital IP data packages and vice versa, thus permitting communication right across the various media, in a proven solution already frequently used by Trapeze/IMS for robust connection of analogue radio channels. RhB's own VoIP switchboard OSV-Unify has its own VoIP gateway connecting it to the PA-R-I-Ty system. An external voice recording facility has also been integrated with the system.



OSV-Unify has its own VoIP gateway connecting it to the PA-R-I-Ty system. An external voice recording facility has also been integrated with the system. For voice communication RhB dispatchers and train- dispatchers have multifunctional operator consoles available. These are based on commercial PCs with touchscreen.

Close collaboration with all stakeholders

Right from the start, the technical managers at RhB worked together closely with the consultants, the manufaturer of the digital radio system and those responsible for installation, in the interests of targeted implementation of the project. Furthermore, representatives for the dispatchers were involved in the process of devising the solution to ensure that the new system would cope with the responsible tasks being performed by the dispatchers.

Well prepared for the roll-out

Extensive tests and simulations were carried out in the phase leading up to system integration so that any faults could be detected and remedied early on. This was to guarantee a smooth roll-out, which was of particular importance in this project. Any corrective tasks would have necessitated highly time-consuming journeys, given the remote mountainous locations of RhB's rail network.

Convenient user interfaces with touchscreen

The fully integrated operational communication system and radio console lets users talk to train drivers, shunting workers, colleagues and external persons. Voice connections from the phone network can also be put through to the radio network and vice versa, thanks to the intelligent design of the call number plans and with the use of an IVR (Interactive Voice Responder).

"The fully integrated opera- tional communication system and radio console lets users talk to train drivers, shunting workers, colleagues and external persons."

Several different user interfaces are available at the dispatcher workstations, each tailor-made to the tasks being performed by the users. The main communication subscribers and functions are visible for the employee at all time and can be reached or handled conveniently with the touchscreen. The picture shows an example of the user interface being used by the dispatchers.

Role management in the PA-R-I-Ty system is used for communication at Rhätische Bahn in the very best sense of the word, voice communication has been organised as follows: Both calls from radio subscribers and phone subscribers are always routed only to those dispatchers who are responsible for the respective call and who have to deal with the related tasks. If under exceptional circumstances a call arrives at an unmanned workstation, it is automatically forwarded to the workstation stipulated in the role management, thus ensuring that no call gets lost. Integrated with the system is a central phone book which is used by the dispatchers at their operator consoles.

This is always up-to-date; the entries are regularly and automatically synchronised with Outlook and the Active Directory of RhB.

Interface with SBB permits loudspeaker announcements In addition to operational communication, dispatchers from the Landquart control centre can also make loudspeaker announcements in Chur and Landquart stations. The loud speakers belong to the system operated by the Swiss railways SBB, so that an interface has been developed and installed between PA-R-I-Ty and SBB's own operational telecommu- nications system, as specified by SBB.

System expertise and high-tech for reliable operation

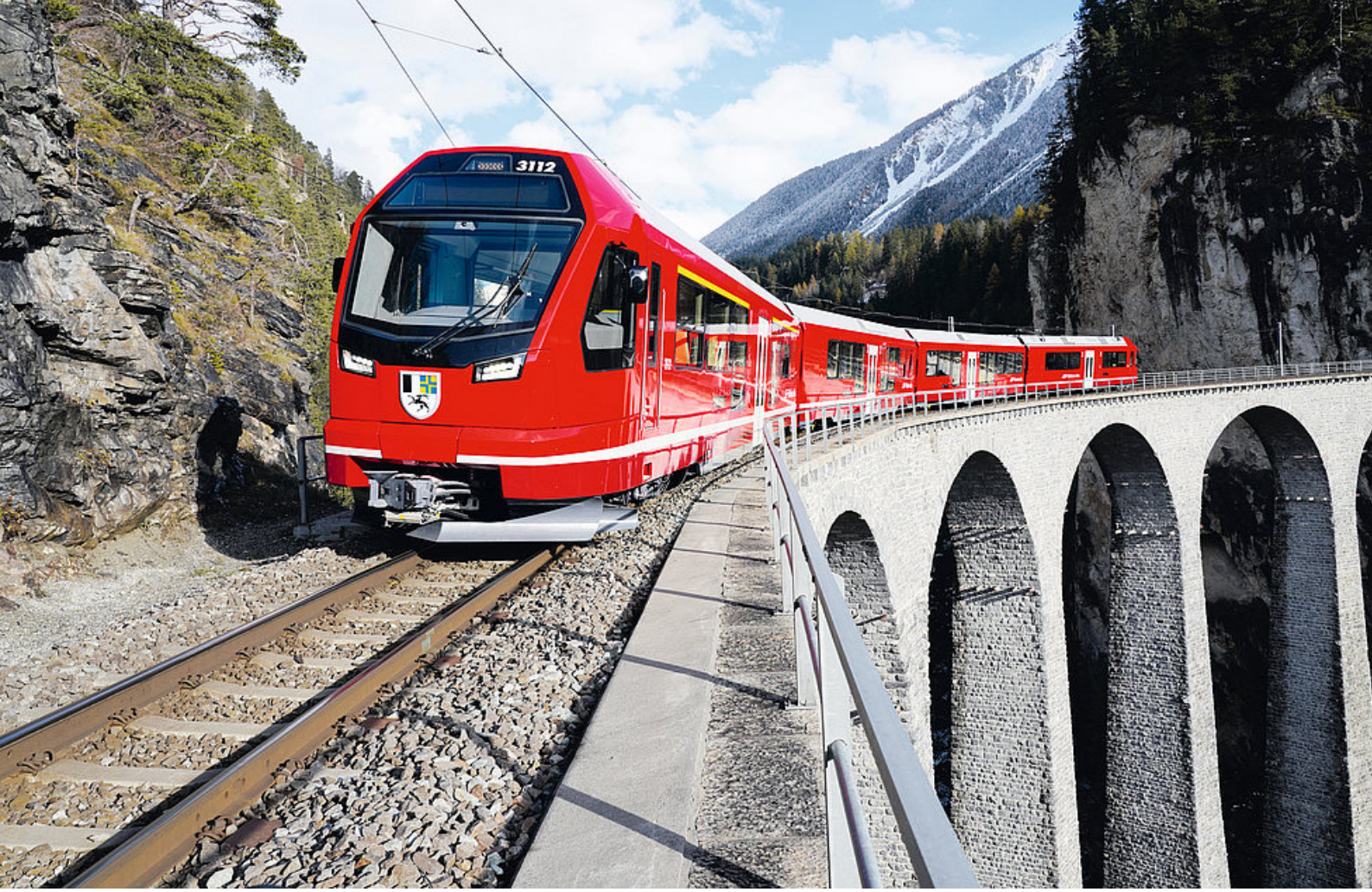
On their sometimes highly demanding routes, the trains of Rhätische Bahn achieve a punctuality of more than 95 percent. Fast availability and reliable communication between staff in the control centres, in the trains and along the tracks make an essential contribution to this achievement. It is all possible thanks to RhB's PA-R-I-Ty-based operational communication system and radio console with standard operation across all the various communication media.

The new system was rolled out on the ten lines operated by Rhätische Bahn in 2015 and 2016. Equipping a route took normally six to eight weeks. This included the installation of the new system components and the associated work, such as test trips, system tests and integration with the central system.

PA-R-I-Ty in action

Landquart has altogether 13 operator consoles, with another three in Klosters where another five are to be added soon.

The intelligent concept uses state-of-the-art technology with far more



functions than the previous system, while being fully integrated in RhB's IT infrastructure.

Safety first

All central components of the system are of redundant design. Servers have been installed in Landquart and in Klosters to cope with the following exemplary scenario: Between Klosters and Landquart, or at any other point of the extensive data network connecting the various system components, a network interruption occurs. In this case the remaining interconnected system components would remain functional with at least a slightly reduced functional scope.

Top communication performances thanks to pa-r-i-ty

System integration of radio, telephony, PA and voice recording integration of analogue and DMR radio base stations via IP interfaces Multifunctional operator consoles comfortable operation using a uniform interface Rapid selection of subscribers and reliable communication bridging conversations between different communication channels intelligent role management automatic synchronisation of the phone book with Outlook PA-R-I-Ty enables efficient commissioning thanks to the timely detection of incidents

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