

# GSM-R, your ticket to enhanced railway communications





How the world shares ideas.

## GSM-R, a pan-European radio railway system, fully supported by Nortel Networks

GSM-R has been developed as an answer to the inefficient use of radio frequencies, high operation & maintenance costs and the limited interoperability between railway networks.



GSM-R is tailored for railway operators to achieve the goals of interoperability with other railway networks, increased operational efficiency and reduced operational costs.

GSM-R utilizes standard GSM technology and additional features customized for railway operations. General Packet Radio Service (GPRS) is a major part of GSM-R for data transport serving applications such as Automatic Train Control (ATC) and remote control.

## AUTOMATIC TRAIN CONTROL

ATC allows the control of train movement without the influence of any driver's action. Position information messages and movement authority messages are communicated between the train and train control center continuously, ensuring reliability and safety.

#### **TRAIN RADIO**

Controller to driver communications as well as driver to driver communications are supported to enhance performance and safety with advanced speech features such as Location Dependent Addressing, Voice Group Call Service (VGCS) and Voice Broadcast Service (VBS).

## Enhanced railway communications for more efficiency and security

## SHUNTING TEAM COMMUNICATION SYSTEM

Shunting aims to align the coaches of a train together via a locomotive pushing at the back of a train with the driver receiving instructions from the head shunter at the front of the train. Shunting teams are able to enhance their efficiency and safety using GSM-R advanced features such as VBS, VGCS, emergency area broadcast and enhanced Multi-Level Precedence and Pre-emption (eMLPP) allowing pre-emption for priority calls.

### LOCAL SERVICE TEAM COMMUNICATION

This GSM-R application supports voice communications for a wide range of personnel at a single site in stations and depots to report train composition data, brake tests, station conditions and other information between station managers and drivers as well as within teams of trackside staff.



# Your global **partner** for unique **GSM-R end-to-end** solutions

Nortel Networks, one of the world's largest developers and suppliers of telecommunications systems, is the only company able to deliver complete GSM-R end-to-end solutions to railway organizations and railway operators. Our extensive experience in railway communications has allowed us to create a product portfolio that covers the full range of GSM-R infrastructure, from switches to radio base stations, plus integration of terminals, supported by an extensive set of planning implementation and project management services, all tailored specifically to the unique needs of the rail environment.

Within our GSM-R portfolio, Nortel Networks' products deliver a number of unique advantages. Our complete portfolio of coverage solutions provides the best receive sensitivity to minimize the number of cell sites and improve performance at those sites. Our customized GSM-R Base **Transceiver Station (BTS) ensures** constant availability for trackside coverage under adverse environmental conditions. Redundant core components and industry leading upgrade procedures provide maximum reliability across the radio and switching sub-systems. For high-speed train operations, we have specially adapted radio algorithms to allow error free voice and data communications at speeds up to 500 Km/h.

## Anticipating the needs of your passengers, today and into the future

As the world's number one supplier of high-reliability Intelligent Network systems, the rich variety of voice and data services needed to support railway operations can quickly and easily be created, deployed and managed. And due to our commitment/ to open systems, our networks can be readily integrated with existing infrastructure from other vendors. Access to train schedules, fax, Internet news and information services as well as onboard ticketing greatly enhances passenger satisfaction and brings extra revenue to railway operators on top of the traditional coin operated telephone for onboard passengers. Nortel Networks supports the full range of existing GSM features, plus we offer an extensive list of new and innovative services using our ServiceBuilder Intelligent Network Node.



GSM-R is opening the door to advanced applications for passengers and new services are being explored, including on-line information and onboard entertainment and communications. As a key part of our GSM-R offering, Nortel Networks is finalizing a full GPRS capability to support highspeed voice and data transmission. By leveraging the extensive data expertise of Bay Networks, acquired in 1998, with our full portfolio mix covering all radio technologies, Nortel Networks is the only company ideally placed to partner railway operators into the next generation of mobile communications.



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