Global System for Mobile communications - Railways

Nine members dedicated to supporting GSM-R
The GSM-R Industry Group has currently nine members, dedicated to:

- The active global promotion of the GSM-R technology.
- The supply of interoperable End-to-End systems.
- The minimization of integration efforts and railway migration costs.
- The continued development of the EIRENE standards in line with railway requirements.
- Supporting UIC, ERA and the ERTMS users group.
- The smooth evolution and migration to a Future Railway Mobile Communication System (FRMCS).

Industry Group together with the associated organisations UIC (International Railways Association) and ERA (European Railway Agency) are committed to long-term support of GSM-R.
GSM was chosen as the best technology because:

- widely proven
- highly interoperable
- a hugely successful global standard.

Railway operators, institutes and industries have established common activities to specify, to test and to approve the systems needed. The GSM-R standard and its continued development are managed by the European Railways under leadership of UIC (International Railway Association) and ERA (European Railway Agency) and it benefits from the support of the European Commission and railway bodies.

GSM-R is the wireless communication standard for railway networks. It has been developed under European Union sponsorship to assist railways in achieving their goals of network interoperability, reduced operational costs, improved safety at higher speeds and delivery of new services for the benefit of the railway operating companies and their passengers.

GSM-R is built on GSM technology and benefits from the economies of scale of its GSM technology heritage. It is a cost-efficient digital replacement for existing incompatible in-track cable and analogue railway radio networks.

The standard is the result of over ten years of collaboration between the various European railway companies, with the goal of achieving interoperability using a single communication platform. GSM-R, standardised in EIRENE, is part of the European Rail Traffic Management System (ERTMS) standard and carries the signalling information directly to the train driver, enabling higher train speeds and traffic density with a high level of safety.

GSM-R Success:
Proven interoperability and border crossing (European Corridor)
Its stability and popularity have led to its acceptance outside Europe.
Our members offer fully interoperable EIRENE compliant solutions. Very sophisticated network design using highest quality and reliability subsystems and components guarantees voice and data communication at vehicle speeds of up to 500km/h.

**Kapsch CarrierCom ATCA Platform**

The GSM BTS 9000 is the latest base station generation designed by Kapsch CarrierCom. The BTS 9000 is a medium-capacity base station that supports up to nine radios in a single cabinet, with high level of performance and safety for railways applications. The ATCA platform delivers an excellent architecture and performance. In addition to the MSC Call Server function, Kapsch CarrierCom also deploys the HLR Function for GSM-R.

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Second generation geo-redundant ATCA based R4 core architecture paired with state of the art, award winning Flexi BTS gives Railways the ultimate in functionality, flexibility and reliability. The core system with embedded enhanced railway functionality also includes HLR/HSS and GPRS. All components support the 2G and 3G standards.
Our members offer a complete selection of EIRENE compliant Voice / ETCS and GPRS Data radio terminals for fixed installation on the Trains. Portable and transportable solutions are also available for various applications.

Alstom provides a complete GSM/R portfolio for on-board ERTMS solutions. More than 1500 ERTMS L2 applications on over 70 different types of train are in service today inside and outside Europe. The third-generation EDOR (ARBE-C-3) based on improved ETSI professional radio module features:

- Support for ETCS over GPRS(EDGE) applications
- Support for both the ER GSM-R band and the UIC band (873-880 ; 918-880 MHz)
- Integrated Enhanced Duplexer/filter (H-MFA) for reducing interference from public use of GSM and UMTS

The position of Funkwerk has been steadily strengthened by focusing on the world-wide introduction of mobile equipment for voice and data communication via GSM-R by providing a wide range of Handhelds under the branding "focX", Cab Radios under the system name "MESA" and EDOR systems under the "RIU-ETCS" branding.

Funkwerk has delivered more than 30,000 GSM-R Cab Radio units to customers in 25 European and 9 Overseas countries. Due to the manufacturing in Germany in Funkwerk’s own facilities, Funkwerk is able to cover the required demanding flexibility and high quality. Funkwerk equipment is tested and certified for all GSM-R networks.

The products provide strong robustness against interferences due to the implementation of the new own 2-watts and 8-watts-module generation.
Kapsch, as end-to-end supplier of railway telecommunications, provides state-of-the-art voice and data GSM-R cab radios and EDOR which supports ETCS over GPRS with improved ETSI professional radio module features.

The RC 900, our flagship cab radio, offers the full spectrum of features, from superior redundancy and high availability to supporting the extended ER GSM-R band, a built-in Wifi module which makes room for additional applications that require higher data bandwidth, a GPS receiver, additional external storage and an optical connection between Rack and MMI which allows an easy installation and is robust against electrical interference on cabling.

SELEX ES proposal ranges from on-board to ground based solutions and can be categorized as follows:

- Solutions to improve the safety and efficiency of the rail traffic management, performed mainly by data transmission over a high reliable telecommunication system.
- Solutions that make more efficient the voice communications related to the management of the transport service.
- Solutions to improve security and comfort of the passengers, increasing the competitiveness of the service.

SELEX ES provides specific applications and advanced technologies embodied in proven products to satisfy the requirements from these demanding markets. SELEX ES has a hybrid and flexible approach as ‘systems integrator’, differentiating from a vertically-integrated company. This approach emphasizes the advantages of specialization and modularity in component supply, utilization of the best performing component with standard interfaces, and the ability to specify and integrate multi-vendor sources of technology and product available on the market.
Siemens cab radio operates in a vast range of environmental conditions. With a demonstrated MTBF of 83,500 hours, minimising down time and total lifetime costs. A unique gland box system allows fast installation and replacement, with a built-in universal voltage power supply, permitting fitment across all rolling stock.

Suitable for use across the world using 900 MHz or 1800 MHz frequency bands. To maximise the customer investment in GSM-R, Siemens is also developing the use of alternative applications e.g. Driver Advisory Systems, Remote Conditioning Monitoring, Passenger Information and Driver Notification Systems. Siemens has also developed the Cab Radio Management Terminal (CRMT) which allows software upgrades, inventory data, download of alarm logs, also providing updates to alternative applications.

Sierra Wireless offers a complete range of handhelds as well as 8 w MRM for Cab Radios and 2 w modules for M2M products.

GPH, OPH and OPS handhelds are available with the support of two SIM cards for easy switch between GSM-R and public subscription.

A new version of the MRM features extensive built-in radio-blocking to eliminate unwanted emissions from commercial cellular networks even under the most severe channel interference conditions.

Upward compatible with all the previous versions, it provides quick, cost effective and instantaneous fix to existing network blocking issues.
Dispatcher Systems

Our members offer EIRENE-compliant dispatcher systems with a wide range of fixed terminals and associated station equipment.

Migration to an IP based system is also now a reality with the definition of UIC IP guidelines and upcoming EIRENE FRS 7.4.0/SRS 15.4.0.

The IP migration will future proof the railway investment while bringing new benefits:

- One multi-service network for different types of applications
- Increase of reliability & availability
- Increase capacity efficiency
- Reduced cost of ownership

The Frequentis FTS 3020 Dispatcher system is a converged operational communication solution integrating existing legacy infrastructure with GSM-R and state-of-the-art SIP technology. It is proven with more than 5000 controller positions in operation in GSM-R networks in over 20 countries worldwide. Hot standby and load sharing geo-redundant configurations are part of our FTS 3020 product line. It includes an integrated recording system and 3 different types of DICORA controller terminals featuring enhanced rail features such as dynamic role management, extended messaging or location based services. The future-proof FTS 3020 Dispatcher system covers all needs for operational communication in Command & Control Centres as well as in local train stations.
The Wenzel-MACS-R is a modular IP dispatcher system, outstandingly suited for use in Train Control Centres. Legacy interfaces facilitate the migration of existing systems. The Wenzel-MACS-R ensures high reliability due to its fully redundant architecture and is available even as a geo-redundant two-site solution. By means of an efficient role management calls are notified to all dispatchers registered for the related role. No role can be left unmanned and no calls get lost. The offered variety of GSM-R dispatcher terminals, in combination with touch screen or monitor, can be easily tailored to operational customer needs and is internationally successfully used.

Siemens provides a complete range of fixed and wireless GSM-R dispatcher terminal solutions, which can include touch screen, handset, audio unit with goose-neck microphone or headset options for a truly hands-free operation. The integrated controller server takes care of the critical function of dispatcher terminal role management, ensuring that the right dispatcher always has the right information and provides dynamic train lists at the dispatcher terminals.
GSM-R Support

GSM-R Industry Group members are committed to a Long-term support for this technology.

Our members offer a complete selection of Service Level Agreements that include at least:

- Repair Support
- 2nd & 3rd Line Support
- Training Courses

End-to-End Services

Beyond pure GSM-R support, several members of the Industry Group offer end-to-end solutions and have extensive experience as general contractors for entire GSM-R projects.

An end-to-end solution usually includes all implementation tasks from network planning, network infrastructure installation to the complete operation, maintenance and performance monitoring of a GSM-R network. The services of an end-to-end solution are easily adaptable to the customers’ needs.

Furthermore, it includes the entire core and access network infrastructure and necessary know-how for installation, such as the Network Switching Subsystem (NSS) the Base Station Subsystem (BSS), as well as the Operation, Administration and Maintenance (OAM) of entire networks.

The end-to-end solution services offered include radio planning and optimisation of GSM-R networks, such as planning and engineering of network coverage on lines and in tunnels, as well as integration of dispatcher solutions and cab radios within the GSM-R network and legacy systems. Railways opting for this will have one single point of contact with easier overview of the project and its progress.
Future Evolution

- Safeguarding the Railways’ investment is at the heart of the GSM-R Industry Group strategy.

- All the GSM-R IG members are committed to the long term support and development of the supplied technology while actively participating in the study and selection of the FRMCS (Future Railway Mobile Communication System).

- The above in combination with the single system adoption approach achieved by GSM-R and the currently ongoing IP migration of the GSM-R core systems, terminals and applications will be a guarantee that the implementation of FRMCS will be a migration rather than a total replacement.