

GETTING ON THE RIGHT TRACK

INCREASE WORKER EFFICIENCY,
PASSENGER INFORMATION AND
SAFETY FOR ALL WITH CRITICAL
COMMUNICATIONS SOLUTIONS



“We know we can rely on Motorola Solutions’ Dimetra IP TETRA system whatever the circumstances. Excellent communications help to keep all our buses and trains running on schedule.”

– **Reinhard Renja, Project Manager,
Rheinbahn AG**



OVERCOME OBSTACLES WITH SAFETY AND EFFICIENCY

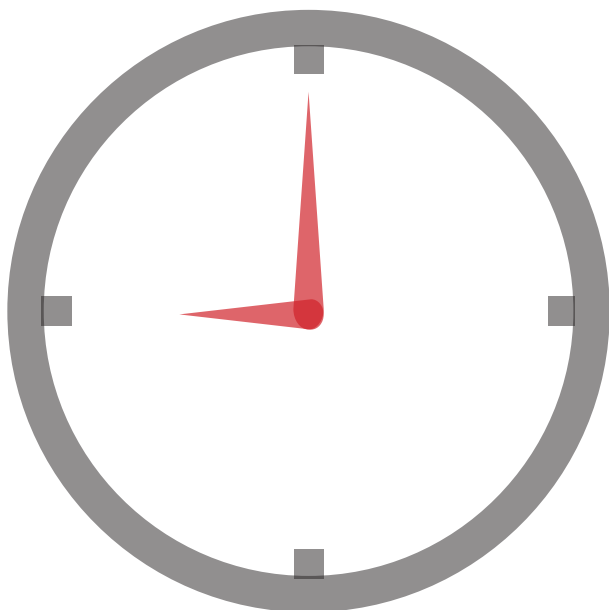
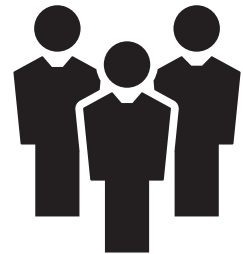
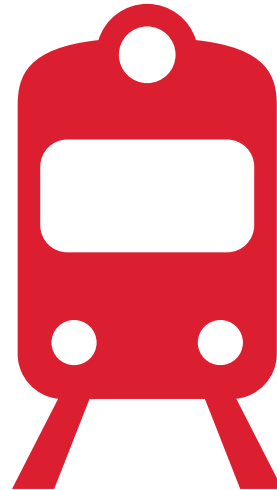
The challenge facing all rail operators is the ability to transport passengers and goods to their scheduled destinations – safely and on time.

With rising urban populations and increased climate change legislation, safety and efficiency have become more critical than ever. And while demand for public transportation is growing, passengers’ expectations are also on the rise. Rail operators are expected to operate with fewer resources – all while meeting the expectations of passengers who have a choice of transportation options.

That is why a reliable communications network is imperative. Whether you are keeping the trains running on time or responding to an incident on the platform, your communications network needs to support the full scope of daily operations and unpredicted situations. The right equipment for real time monitoring and management of your system ensures you are anticipating issues before they become emergencies. The right communications empower employees with greater safety and efficiency, while delivering the level of service passengers now expect.



The ability to
TRANSPORT PASSENGERS



AND GOODS TO
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**SAFELY
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TIME.**



WHEN YOUR OPERATION IS ON THE LINE AND YOUR COMMUNICATIONS MUST GO THROUGH

COMMUNICATION SOLUTIONS FOR RAIL DEPLOYMENT

Where train systems run smoothly without delays and where passengers are well informed and reach their destinations safely, two-way communication is the solution that bridges the information flow between the control and train.

VOICE AND DATA COMMUNICATION

You need a comprehensive range of devices that offer not just superior voice communications but also real time information transfer, on and off trains. Operating in challenging environments, devices must stand up against loud background noise and severe weather whilst also providing timely access to critical information. Accomplish this and your workers will hear and be heard no matter what environment they

are in and they will be responding to live information to keep operations running as smooth as possible. From rail-certified two-way radios to LTE handhelds, our devices are customised for professional use and characterised by excellent audio clarity, durability and reliable performance.

DEVICES

- Portable Radios
- In-Vehicle Fixed Radios
- LTE Handhelds and Modems
- Data Terminals/Personal Digital Assistant (PDA)
- Dispatch Consoles/Computer Aided Dispatch (CAD)
- Sensor Integration
- Body-Worn Video Cameras

OPERATIONS-CRITICAL DIGITAL COMMUNICATIONS NETWORKS

A secure, dedicated radio network will provide reliable and efficient communications no matter the circumstances. Rail operators gain the confidence that they have the necessary foundation to build upon in the future – with LTE, productivity applications and video surveillance.

CHALLENGING ENVIRONMENTS

REAL TIME INFORMATION

TETRA MISSION CRITICAL NETWORK

TETRA is the communication network that you can trust for secure, reliable and efficient communications during daily operations and emergency response. Relied on by public safety agencies, transportation and logistics companies worldwide, TETRA networks have been deployed in more than 120 countries with more than 2 million users.

Because TETRA is a dedicated network, it helps ensure voice and data is available during emergencies and peak demand. TETRA provides the capacity you need for day-to-day interoperability and large-scale events. It helps minimise response times with intuitive dispatch solutions and accurate record-keeping of critical communications.

MOTOTRBO™ and DMR tier iii

Systems to connect professionals effortlessly and efficiently, wherever they work. Engineered to meet the needs of businesses around the world, MOTOTRBO provides voice and data functionality for lower capacity rail operators. A wide range of business applications, such as alarm management and personnel tracking, will increase the level of efficiency, safety and productivity throughout your network. MOTOTRBO systems are easily scalable, so they can meet your needs in the days ahead and expand if necessary in the years beyond.

“We have been delighted with the quality of radio communications and coverage along the line. The MOTOTRBO system is reliable, cost-effective and easy to manage. The radios are robust and user-friendly”

– Arch. Andrea Vignaroli, Head of Purchasing, Minimetrò S.p.a

**VOICE
AND DATA
COMMUNICATIONS**

**SECURE,
DEDICATED
RADIO
NETWORK**

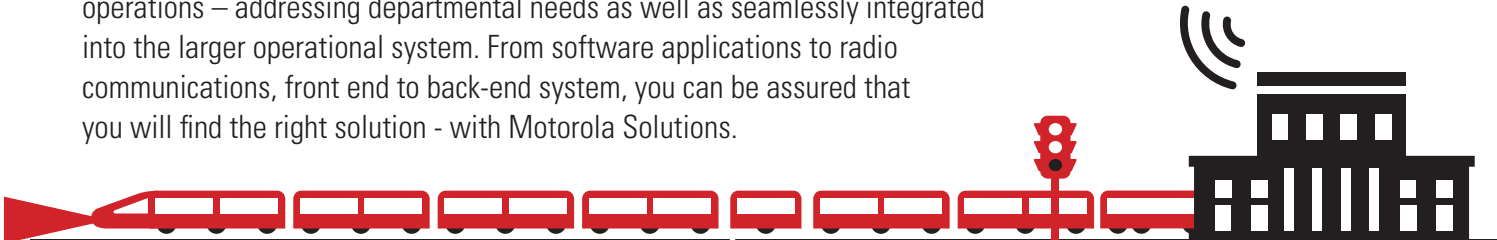
WAVE WORK GROUP COMMUNICATIONS

Today's extensive and geographical dispersed network of employees can make communication a challenge, especially with the vast range of apparently incompatible devices in use. WAVE leverages and extends existing device portfolio and connects them across broadband.

WAVE connects to virtually any device – smartphones, laptops, tablets, landlines and more – on any public or private mobile data network, including Wi-Fi. For example, if a train conductor notices a problem on the track that could cause a delay they are able to use their mobile radio to inform workers in the control room using PCs to those on the platform or in the ticket booth using smartphones. You get seamless and secure connectivity, affordable Push-To-Talk (PTT), and the freedom to keep service plans and devices.

UNDERSTANDING YOUR OPERATIONS WITH END-TO-END RAIL COMMUNICATION SOLUTIONS

Each customer is unique and it is critical that your solution best fits your operations – addressing departmental needs as well as seamlessly integrated into the larger operational system. From software applications to radio communications, front end to back-end system, you can be assured that you will find the right solution - with Motorola Solutions.



OPERATIONS MANAGEMENT	PASSENGER MANAGEMENT	FREIGHT MANAGEMENT	CONTROL CENTER MANAGEMENT
<div data-bbox="89 853 352 1003"> </div> <div data-bbox="89 1032 193 1077"> <p>MAIN LINE OPERATIONS</p> </div> <div data-bbox="89 1093 268 1339"> <p>Efficient management of your train run numbers enables you to maintain close contact with the respective train operators – ensuring greater coordination with the train operators as well as enhancing the monitoring of your operations at any given time.</p> </div> <div data-bbox="89 1355 268 1489"> <p>For the efficient and safe operations of the trains, critical train status information can be sent in real time to the control center.</p> </div> <div data-bbox="89 1547 233 1630"> </div> <div data-bbox="89 1659 248 1704"> <p>SHUNTING YARD/ DEPOT OPERATIONS</p> </div> <div data-bbox="89 1720 284 1899"> <p>With heavy machinery and equipment constantly being moved around the work areas, equipping operational crew with a communication solution can expedite the co-ordination they require.</p> </div>	<div data-bbox="544 853 635 1003"> </div> <div data-bbox="544 1010 687 1077"> <p>PASSENGER INFORMATION SERVICE SUPPORT</p> </div> <div data-bbox="544 1093 722 1339"> <p>Trainborne systems such as the Passenger Information and Public Address systems provide passengers on-board with information support through display messages from the control center or through broadcast transmissions of up-to-date news.</p> </div> <div data-bbox="544 1391 651 1563"> </div> <div data-bbox="544 1570 687 1637"> <p>PASSENGER EMERGENCY SERVICE SUPPORT</p> </div> <div data-bbox="544 1653 722 1787"> <p>In emergencies, it is of critical importance that passengers have the service support needed to alert the control center for assistance.</p> </div>	<div data-bbox="807 931 919 999"> </div> <div data-bbox="807 1032 967 1077"> <p>PRODUCTIVITY AND COST EFFICIENCY</p> </div> <div data-bbox="807 1093 986 1227"> <p>Efficient management of goods and cargo enables you to provide customer confidence in your service – resulting in greater customer satisfaction.</p> </div> <div data-bbox="807 1243 986 1422"> <p>As train systems becomes more complex and require more information to operate efficiently, many are turning towards an integrated solution approach to address these enhanced requirements.</p> </div>	<div data-bbox="1062 909 1153 999"> </div> <div data-bbox="1062 1032 1214 1077"> <p>COMPUTER-AIDED DISPATCH (CAD)</p> </div> <div data-bbox="1062 1093 1241 1384"> <p>CAD systems combine both computer and mobile communications equipment, to dispatch information to train operators. Advanced CAD systems utilize both in-train radios and mobile data terminals, which enable more detailed and clearer messages to be communicated to the operator.</p> </div> <div data-bbox="1062 1400 1241 1534"> <p>With the use of free text and status messages to replace some of the common voice commands, this solution ensures clarity and reduces error.</p> </div> <div data-bbox="1062 1615 1185 1704"> </div> <div data-bbox="1062 1738 1190 1783"> <p>VIDEO SURVEILLANCE</p> </div> <div data-bbox="1062 1798 1241 2067"> <p>Frontline personnel will be empowered with increased situational awareness, enhanced operational collaboration and greater productivity. Communications centers will benefit from real-time visual updates as an incident unfolds with intelligent video surveillance solutions.</p> </div> <div data-bbox="1286 898 1417 999"> </div> <div data-bbox="1286 1032 1445 1077"> <p>AUTOMATIC TRAIN LOCATION (ATL)</p> </div> <div data-bbox="1286 1093 1465 1294"> <p>Trains are equipped with computer terminals and radio modems to derive their location from the GPS satellite constellation an in turn transmit their location back to the command and control center.</p> </div> <div data-bbox="1286 1346 1422 1458"> </div> <div data-bbox="1286 1473 1422 1518"> <p>TRAIN CONTROL INTERFACE</p> </div> <div data-bbox="1286 1534 1465 1736"> <p>Trainborne operations may require a series of information such as radio control, passenger information and train status, to be sent across the radio network to the control center for analysis and management.</p> </div> <div data-bbox="1286 1751 1474 2067"> <p>The interfaces from the radio to the various trainborne components can be efficiently handled by the Train Control interface. The applications on the Train Control Interface consolidate the various interface commands to one that can be understood by the radio system – ensuring a smooth efficient operation of the trainborne system.</p> </div>

CASE STUDIES



THE LONDON UNDERGROUND

REQUIREMENT: the creation of a single unified communications system enabling voice and text communications between drivers, line controllers, signalling and depot and an integrated alarm system for drivers and passengers.

The London Underground is one of the largest and oldest metros in the world. It carries over 3 million passengers per day covering 450 trains, 20 hours/day through 350 km of tunnels, 270 stations and covering a surface area of >1000 km². The communications network incorporates:

- A single unified network replacing separate train, station and depot systems for each of the 11 operating lines
- 218 customized dispatch consoles, 1400 train based mobile and 7000 portable radios. 2 network management systems, a trackside beacon system and voice and data logging
- More than 700 km of radiating cable ensuring extremely high levels of coverage
- A network that links train drivers, stations, depots and management into a single integrated TETRA system
- Interconnection and coverage also available to the police, fire and ambulance services tasked with dealing with emergencies in the Underground network

MADRID METRO

REQUIREMENT: to deliver increased efficiency in voice communications between train operators and controllers to improve response times to incidents that could be affecting services. The requirements included support for simple text messaging, private individual telephone calls and a reliable robust bespoke in-cab console.

- The total length of track covered is 283 km with 281 stations and is the second largest metro network in Europe after London
- Incorporating a control centre providing control of 12 lines
- Covering 91 km of track with 83 base stations

“ ...overcoming geographical and structural barriers such as tunnels and underground stations. ”



PERUGIA MINI METRO LINE

REQUIREMENT: to install a unified communications network across the metro's 3km of railway for maintenance, safety and management teams to be able to communicate, overcoming geographical and structural barriers such as tunnels and underground stations.

Perugia's minimetro opened in 2008 and carries an average of 10,000 daily passengers, cutting road traffic by 2–3 million vehicles every year. Since MOTOTRBO digital radio system with IP Site Connect was installed communication has benefited through:

- Clear voice transmissions along the 3km line
- Easy-to-use radios with automatic site roaming
- Fire and Rescue services can access their frequencies inside the tunnel
- Rapid installation



MOTOROLA SOLUTIONS

Motorola Solutions is the leader in mission-critical digital voice and data communications. Solutions include dedicated and customised communication infrastructures for metro, rail and bus service providers. Motorola Solutions works with transport operators around the world in the development and provision of advanced networks designed to support the industry priorities of safety, efficiency, improving the passenger experience and reliable, effective communication.

For more information on our communication solutions
for rail operators you can:

Visit motorolasolutions.com/transportation

Call us

In the UK: **0800 328 2424** | Outside the UK: **+420 533 336 123**

Email us

presales.info@motorolasolutions.com

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