ABB’s communication networks portfolio offers outstanding multiservice technology for rail and urban transportation providers.

Mission-critical Communications.
Let's connect.

- Connecting sustainable mobility
- Digital connections for a reliable data flow for rail operators
- Making e-bus transport go further with ABB Ability enabling communication networks
Connecting sustainable mobility. ABB is helping to write the future of fast, safe and low-emission mobility.

From high-speed trains that improve intercity connections to light rail, metro systems, trams and eBus networks that alleviate congestion, reduce emissions and improve quality of life, the world is moving toward a new era of mobility. These days most offices grind to a halt in the face of a failed internet connection, but this isn’t comparable the failure of the telecommunication system that underpins regular and resilient transportation operations.

The digitalization of the industry relies on a robust, reliable, and predictable communication network, which is sometimes called the third utility, water and power being the first and second. It is also foundational to Industry 4.0. Only industrial suppliers with an intimate knowledge of the transportation industry can supply, and maintain, communications equipment capable of meeting that unique set of demands including the system life cycle requirements of a rail asset.

ABB’s wired and wireless communications portfolio offers long-lasting support for transportation-specific OT applications, while also delivering on the requirements of digital railways and urban transport networks of the future.

Deployed in the Arabian Desert and Siberia, our mission-critical communications equipment for transportation providers are also exposed to strong EMF (electromagnetic fields) coming from the electrical traction supply system. Furthermore the environment may be dusty or located in tunnels with challenging access for preventive maintenance, therefore fans may not be desirable. In order to maintain the high levels of availability required, especially in emergency situations, mission-critical communications equipment must offer a robust and reliable design that has proven capabilities for providing accurate functionality under extreme conditions.

Operational Technology (OT) requirements

For mission-critical communications

Proven heritage in real-world applications

Supporting European Rail Traffic Management System (ERTMS) deployments as well other services required for railway operations:

- GSM–R (communication)
- European Train Control System (ETCS, signaling)
- Operational Telephony
- SCADA for Traction Power
- Security Access / Perimeter Control
- Video Surveillance
- Other Data Services (IT, Ticketing, PIS/PAS etc)

Backbone for critical infrastructure

- Complex existing infrastructure - Support for legacy applications while providing access to more modern systems in an efficient way
- High availability and long active lifetime required for rail asset supporting Operational Technology and lowering the OPEX of the network
- High MTBF and ease of maintenance to support high availability and lower OPEX
- Long supplier support (15 years or more) - different to the fast changing public telecom environment where typical system life cycle is 5-7 years

Challenging railway and urban transport environments

- Extreme temperatures, magnetic and electrical fields
- Robust, reliable and proven capabilities needed for resilient functionalities under all conditions
- Dusty and remote environments, where regular maintenance is challenging and costly

Guaranteed connections for critical applications

- Digital transport of analogical signal requires extra care in delay, jitter, as well as time synchronization of the network
- Highest availability for command and control systems including signaling, track switching
- Quantum-safe cyber security for the transmission system without compromising the overall availability of it

ABB mission-critical communications solutions

Proven heritage in real-world applications:

- Signaling
- GSMR
- SCADA
- Operational telephony

Backbone for critical infrastructure:

- Highest availability
- Long Lifecycle
- High MTBF

Challenging railway and urban transport environments:

- Extreme temperatures
- Dusty locations and remote environments
- Tunnels

Guaranteed connections for critical applications:

- Sensitive to delay, jitter and time synchronization
- Quantum-safe cyber security
- Futureproof
Digitalization can't happen without communications. Proving robust, secure and reliable communications in a rapidly changing world takes ability.

ABB has been at the forefront of mission-critical communications for more than 140 years. Take a look at some of the transportation projects ABB has already delivered.

**Ligne Grande**  
**Vitesse LGV, France**  
High speed railways in France

The two latest high-speed lines in France rely on ABB's mission-critical communications backbone to carry command, control, safety and operational application data including signaling, SCADA, CCTV, and other voice and data services critical to the safe and reliable operation of the railway.

**Gotthard tunnel, Switzerland**  
Making the base tunnel safer

With its multi-service access platform XMC20, ABB ensures reliable signal transmission in the tunnel area and to the operating centers in the new Gotthard Base Tunnel - the world's longest railway tunnel.

**Deutsche Bahn, Germany**  
German rail network

Whenever you use a DB train in Germany, you are likely to be relying on an ABB solution to ensure you arrive on-time and safely to where ever your journey takes you.

**North South Railway project, Saudi Arabia**  
World's longest ETCS L2 line

Supplying mission-critical communications to the North South Railway (NSR) project in Saudi Arabia – the world’s largest railway construction undertaking, a 2,400 km passenger and freight rail line built from Riyadh to Al-Haditha. ABB XMC20 support all safety, control&command, security and communication systems along the track, at five stations as well as at the new passenger station in Riyadh.
Ready for the challenges of tomorrow

ABB mission-critical communications solutions for rail and urban transportation connect your asset-based operations and ensure a high-resolution perspective of your networks and operations for revolutionary efficiencies.
Mission-critical communications.
Providing reliable data flow for rail operators.

Digital connections for a reliable data flow. The communication needs for transportation and infrastructure providers.

Railway signaling (ETCS and other)
The European Train Control System (ETCS) is the signaling and control component of the European Rail Traffic Management System (ERTMS). It is a replacement for legacy train protection systems and designed to replace the many incompatible safety systems currently used by European railways. The standard is also adopted outside Europe and is an option for worldwide applications.

GSM-R
GSM-R, Global System for Mobile Communications – Railway is an international wireless communications standard for railway communication and applications. A sub-system of ERTMS, it is used for communication between train and railway regulation control centers.

Railway operational telephony
In order to operate, Railways use fixed telephony with many different types of users. The station master will need one or more lines to manage the operation of the station. The power dispatcher (controlling the high voltage power on the line) needs to be able to talk with the substations. Most railways also have track side telephones that are used by track workers or train drivers in case of emergency. There will also be telephone services offered to the general public, e.g. an emergency phone on a station platform or in a tunnel.

Customer service applications
With the pressing need for railways to be ever more customer-centric, ticketing systems, various visual and audio customer information systems as well as Internet access for passengers in stations are very important and visible services that the network need to deliver.

SCADA data for traction power
SCADA (Supervisory Control and Data Acquisition) monitor and control the Traction Power distribution, with a number of Remote Terminal Units (RTUs) and/or Programmable Logic Controllers (PLCs) track-side and operator terminals at the Control Center. SCADA Systems achieve protection and automation of power supply, acquisition and storage of parameters of power supply, monitoring and controlling the entire power supply system, alarm and logging system, load management, load shedding, power quality monitoring and management. There is also a separate SCADA system to control stations automation.

CCTV, access and perimeter control
Across rail networks, security has become a more pressing issue. The trend is towards a digital infrastructure for physical security applications, allowing us to take one camera and view it in one or 100 positions without affecting the quality of the video stream. This allows railways to distribute the management of control operational centers and create buddy systems, back-up control rooms and extra viewing positions by using a digital network infrastructure. This also pave the way for video analytics. In the past there would have been numerous separate access control, video surveillance and intercom systems, but now they tend to be managed as single security systems through the use of hypervisors.

Wireless connectivity for rail staff and asset monitoring
Wireless connectivity in stations and train yards makes business support systems always available and optimize staff workload. With the digitalization of more and more systems, reliable connectivity is a crucial enabler for an efficient asset management policy. ABB Wireless solutions provide that extra connectivity layer.
Mission-critical communications. Providing digital connectivity for your electric bus network.

ABB Ability™ is enabling industrial strength mission-critical communications network solutions, building reliable, secure, manageable and scalable foundations that provide performance for Intelligent Transport Systems.

Intelligent Transport Systems are entirely reliant on good communications; to know where vehicles comprising the network are, but also to monitor the equipment keeping the network moving. If you add the digitalization of many more equipment it can generate huge quantities of data at a high velocity, which must be transported over a robust communications network. That network needs punctuality, when the situation demands it, and redundancy to maintain connectivity in the Intelligent Transport Systems (ITS) is an umbrella term for a wide range of solutions that provide benefits to mass transit systems including buses. ITS applications for mass transit include transit signal priority, automated vehicle location, computer-aided dispatch, telemetry as well as passengers’ infotainment.

Providing robust and reliable communications in a rapidly changing world takes ability - ABB Ability™

Mission-critical networks are foundational, enabling ITS applications by providing two-way communication between sensors, controllers and people in the field, and software and supervisory personnel in the operations center. Communication technologies also facilitate interaction among drivers, dispatchers, emergency responders and other personnel involved in transit and transportation operations.

These networks cover the following characteristics:
- High reliability and availability including OT-like lifecycle
- Strong cybersecurity
- High bandwidth with low latency
- Ability to support multiple applications concurrently
- Cost effective to deploy and operate, with no dependence on high cost leased lines and cellular providers.

ABB Ability enabling mission-critical communications network solutions are industrial strength, and can be used to build a highly reliable, secure, manageable and scalable foundation that meets the performance and capacity required for ITS communications systems. ABB offers a wide range of ABB Ability enabling network technologies – from the optical backhaul to the broadband wireless communications, point-to-point, point-to-multipoint, narrowband mesh, and cellular, that can be mixed and matched to build broadband wireless networks optimized for each situation in urban areas.

ABB communication networks products are aggregated by an enterprise-class network management platform, providing network wide visibility and simplifying operations and troubleshooting.
XMC20, mission-critical communications for transportation.
Ready for the challenges of tomorrow.

ABB’s mission-critical communication solutions for transportation offer a broad range of world leading products for local and wide area communication networks.

XMC20
Nothing is more important in mission critical networks than guaranteeing the highest availability of each connection and the highest security for transferred data against attacks from outside. With mission-critical data, downtime and manipulation can mean risk to life and limb. The systems developed and produced by ABB stand apart due to their extreme reliability. From the outset, ABB developers in Germany and Switzerland have placed the highest priority on achieving this goal.

Key attributes were confirmed during the developmental phase of the manufactured systems. These included top availability, maximum service life, simplicity of operation, easy maintenance, a good eco footprint, as well as being thoroughly future-proof in nature.

ABB products, based on decades of experience, bring solutions that meet the stringent access & transport networks requirements for mission critical networks in the areas of clock synchronization, scalability, protection, reliability, ultra-long lifecycles and backward compatibility.

In addition, they are highly flexible providing multi-service access for a wide range of applications and the simultaneous availability of circuit-based and packet-based technologies e.g. PDH/SDH and MPLS-TP. The full hybrid concept allows for the co-existence of native TDM and packet-based access services within the same node, providing a perfect future-proof solution for MCS applications.

Highlights
- Full hybrid concept for coexistence and interworking of native TDM and packet services within the same node as well as gateways between TDM and packet worlds
- Protection, redundancy and encryption functions for secure data transmission and highest availability
- Wide range of applications and access interfaces supported
- Support for various transmission interfaces and protocols, including 10 Gbps, SDH STM-16, MPLS-TP and many others
- Guaranteed long lifecycles due to state-of-the-art FPGA technologies and careful lifecycle management
- Wide array of services which include 3rd party equipment integration and maintenance
- All ABB equipment and selected 3rd party equipment are managed under one Network Management System

Quantum-safe cyber security solutions for mission-critical communication

The rising threat of cyber-attacks to mission-critical infrastructures and new threat vectors, like a quantum computer, means that these networks urgently need improved protection.

This is leading to a re-thinking of security. ABB offers the industry’s first quantum-safe solution for highly secure MPLS-TP end-to-end encryption and, taking into account the specific needs of mission-critical applications in terms of communication performance (e.g. jitter, wander, latency), but also considering the availability and long-term protection of the communication infrastructure. Quantum technologies improve the overall safety of critical infrastructure by improving cryptographic key generation with Quantum Random Number Generators (QRNG).
Intelligent transportation systems
Traffic signal management, transit signal priority, variable message signs and cameras (red light enforcement, traffic monitoring). With TropOS, a single network has the capacity to support all of these applications and more and replace use of costly, low capacity leased lines.

Mass transit passenger information systems
In stations and on board trains can provide riders with up-to-date information about train schedules, weather, and events; transit vehicles can leverage the network to communicate with other operators, mass transit personnel, and the control center both while the vehicle is stationary and when it is moving at high rates of speed; on board video security cameras can be centrally monitored; and stationary video cameras at stations for security monitoring. A TropOS wireless network can even deliver reliable access transit system wide including in places such as tunnels and remote mountainous areas which are challenging for wireless communications.

Mobile workforce automation
Workers have secure access to the Intranet and Internet, extending office applications into the field including access to up-to-date information (GPS, maps, databases, etc.); the ability to create and submit information from the field (work orders, reports, email, etc.); video camera feeds (live and recorded) can be accessed in the field.

Video surveillance
Video cameras can be monitored centrally or accessed by officers in the field in real time providing them with insights before arriving on site; serving as a crime deterrent and irrefutable court evidence.

Public Internet access
a valued amenity for the community around town that enables the public to easily access email and the Internet without having to find a local hot spot. It can also deliver public service information such as local events, bus schedules, as well as increase commerce with advertisements for local businesses.

Highways
Traffic influencing systems, fog & ice sensors as well as video surveillance systems are applications that are typically handled by EDS500. This includes the attachment of traditional serial as well as modern Ethernet based systems.

Benefits
Redundant connections, Power over Ethernet, encrypted management, predictive failure notification, mix of copper and fiber optical media, support for legacy interfaces and interworking with XMC20 equipment are only a few benefits making EDS500 the ideal solution to extend large networks down to field elements. EDS500 can be managed via XMC20s’ UNEM or any other SNMP compliant 3rd party management tool.

Ruggedized Ethernet Switching for transportation applications
Whenever high availability, robust design, enhanced feature set and small factor count, EDS500 is the perfect fit for these kind of transportation applications.

Railways
The connection of signaling and control equipment for track and train monitoring and supervision like point control or axle counting are one of the core railway applications for EDS500. In addition, its small form factor enables EDS500 also to function as serial and Ethernet extender to attach secondary services like train service indicators, ticket machines and video cameras.
The future is agile and collaborative.
We assess your needs, implement solutions and sustain your operations.

ABB are your strategic partner for a changing world, through our six dedicated packages we provide ongoing technical and functional support for your transportation projects.

Rapid Response
We guarantee fast and flexible response to maximize your equipment uptime.

Preventive Maintenance
We employ powerful tools and knowledge to optimize and extend your equipment life.

Software & Firmware Lifecycle
We optimize connectivity, reliability and efficiency of your assets to increase speed and yield.

Cyber Security
We enable smarter system protection to make your operations more efficient, more productive, and more economic.

Spare Parts
Guaranteed fast and flexible service response to maximize your equipment availability.

Training
We offer training courses to develop your in-house capabilities. Achieve greater levels of self-reliance and maintenance with a package that improves your own team’s ability.

We are with you around the world
ABB Service has more than 150 customer care centers strategically located around the globe. These one-stop shops are staffed by 6,000 professionals with extensive industry and service experience on a wide array of mission-critical communication systems. Our team help you address today’s toughest challenges and prepare you to meet the challenges of future.
ABB is at the forefront of technological innovation, our research and development teams are working at the cutting edge of what is possible in the communications space, continually pushing the boundaries, striving to deliver a truly connected system of products giving you detailed insight, efficient operation and greater control of your business.

Let’s connect.