

CBTC Communication Based Train Control





Simply a Higher Standard of Experience



Communication Based Train Control (CBTC) is leading a new era of rail transit control, enhancing flexibility, reducing maintenance costs and improving interoperability. When it's time to decide on a CBTC solution, choose the experience of a proven leader in integrated Mass Transit signalling and turnkey systems.

For over a century, the worldwide family of Hitachi Rail STS has set the pace for developing innovative, reliable mass transit solutions. Today, Hitachi Rail STS is applying its unique knowledge, developing advanced rail transit control systems that build upon traditional signalling systems with a new generation of innovative technologies.

Since the inception of CBTC, Hitachi Rail STS's leadership has shaped the foundation of this powerful new rail transit technology. As an initial member of WG2, Hitachi Rail STS helped to develop the IEEE Standard 1474.1™ for CBTC performance and functions.

Hitachi Rail STS is also an active participant in European Union sponsored working groups, writing the standards for future Mass Transit systems in Europe.

From driver-based to driverless and unattended driving modes, and from new to refurbished lines, Hitachi Rail STS's CBTC solution, based on moving block technology, overcomes the limitations of conventional fixed block systems.

Leveraging its experience in turnkey systems, maintenance and operation of driverless metros, Hitachi Rail STS's CBTC solution is the best choice for customers demanding high levels of performance, automation, functionality, maintainability and reliability for their transport systems.

Mixed mode operation

Hitachi Rail STS leverages in-depth technical expertise to provide customized solutions that meet diverse operating requirements.

Hitachi Rail STS's CBTC solution fits any type of rolling stock and is scalable to meet the needs of any operator, whether they are an overlay system or a brand new line. When used as an overlay solution, Hitachi Rail STS's CBTC system allows simultaneous CBTC and non-CBTC equipped vehicles to share the same tracks. In this way, the upgrade of non-equipped vehicles can be staged to fit the operator's needs while maintaining the highest level of safety and without causing disruptions. Before investing in CBTC, make sure the system is dependable and built on solid and proven experience.

Be sure to choose Hitachi Rail STS.



Zone Controller (ZC)

The Hitachi Rail STS Zone Controller uses safe and reliable 2 out of 3 logic to manage the movement authority limits of all trains. The ZC architecture guarantees immediate transfer of control with no impact on the availability of the system in the unlikely event of a failure. More importantly, maintenance operations can be carried out during revenue service with no impact on the performance of the system.

Each ZC unit is integrated with adjacent ZC's and communicates with interlockings and carborne controllers to guarantee that all aspects of operation and controls are safely managed. In addition, Hitachi Rail STS's ZC is designed to be easily interfaced with an existing central office and/ or existing interlockings (CBI or relay based).

Carborne Controller (CC)

Hitachi Rail STS's Carborne controller uses safe, reliable and compact 2 out of 3 architecture, which vitally determines the vehicle position with the highest accuracy. This information is then relayed back to the ZC. Based on the moving authority limits received from the ZC, the CC calculates its braking curves and enforces speed restrictions. The Carborne controller also integrates two ATO processors to provide full automatic operation.

Communications

Hitachi Rail STS's CBTC is designed to use industrial standard protocols, assuring interoperability with current and emerging standards. It employs commercial, offtheshelf equipment that is easily upgradeable and maintainable.

This technology provides superior bandwidth capacity, which allows real-time data, video and audio-over-IP from the field to the control center. With a click of a mouse the control room is aware of what is happening on board any vehicle or at any critical point along the line.

Maintenance

Hitachi Rail STS's CBTC automated centralized maintenance server continuously receives and analyzes alarms and diagnostic data to detect failed or degraded equipment.

When failures occur, a "maintenance action" is automatically generated.

Problem resolution is automatically expedited, minimizing the effect on operations.

CBTC Delivers

Reliability

- Proven technology and components from a global leader in Mass Transit signalling and turnkey systems
- Compliance with the IEEE Standard 1474.1™ for CBTC Performance and Functional Requirements
- Central Office System used by major Rail and Mass Transit operations around the world
- Distributed architecture ensuring redundant operations
- Encrypted wireless communications providing secure data transmission.

Flexibility

- Modular, component-based architecture that easily adapts to existing systems
- Scalable solution accommodating future growth and network modifications
- Interoperable system compatible with other supplier's devices
- Overlay solution for upgrading existing systems
- Optimized vehicle energy consumption.

Results

- Highest standard in passenger satisfaction
- Increased traffic capacity and improved on-time performance
- Improved operational headway down to 60 seconds and lower, constrained only by turnbacks and line layout
- Reduction or elimination of track circuits and signals
- Less and easier maintenance.





Flexible Design and Implementation

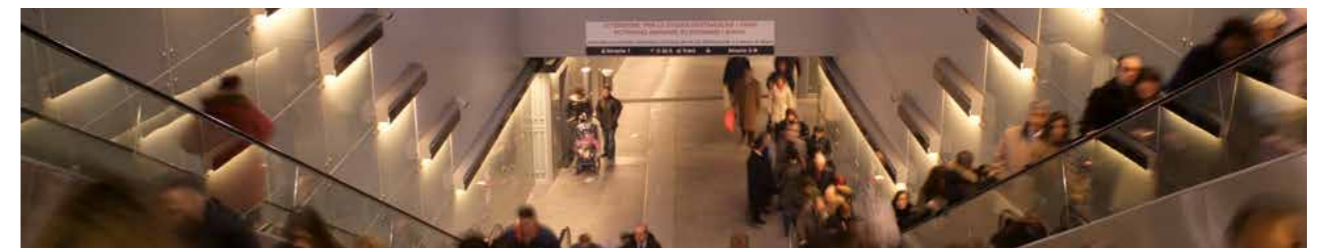
Hitachi Rail STS's CBTC solution employs an "open architecture" that is both flexible in its modular assembly and adaptable as an overlay solution to existing systems.

Hitachi Rail STS's solution and customizable operation rules allow optimized headways and power consumption savings and reacts to specific operational needs, such as peak traffic flow after a special event like a sporting event or concert.

Control Center

From a single-line metro installation to a complex, multiline city network, Hitachi Rail STS's Control Center subsystem is the industry's first choice for dependable operational control.

Control Center standard functions provide advanced Computer-Aided Dispatch and Centralized Traffic Control capabilities, regulating traffic to schedule or headway, even when unexpected events occur. Allowing Central or Local operating modes with different levels of automation, the system instantly adapts to failures or anomalies within the network, protecting transit lines against outages and service disruptions.



Our CBTC references

GoA 1 & 2

In service

- Paris OCTYS Line 3 (France) - 2010
- Shenyang line 1 (China) - 2010-2012
- Chengdu line 1 (China) - 2010-2012
- X'ian line 2 (China) - 2011-2013
- Shenyang line 2 (China) - 2012-2013
- Hangzhou line 1 (China) - 2012-2013
- Chengdu line 2 (China) - 2013
- Zhengzhou line 1 (China) - 2013
- Hangzhou line 2 (China) - 2014
- Hangzhou line 4 (China) - 2015
- Dalian line 1 (China) - 2015
- Dalian line 2 (China) - 2015
- Ankara M1, M2, M3, M4 (Turkey) - 2013-2018

Commissioning phase

- Tianjin line 5 (China) - 2018
- SEPTA CBTC (USA) - 2019
- Wenzhou (China) - 2019
- Noida (India) - 2019
- Kolkata (India) - 2019

Design phase

- Baltimore (USA) - 2021
- Brussels (Belgium) - 2021 - 2022
- Paris OCTYS Line 6 (France) - 2023-2024
- Panama Monorail (Panama) - TBD
- Navi-Mumbai (India) - TBD

GoA 4 (Driverless & UTO)

Commissioning phase

- Taipei Circle Line (Taiwan) - 2019
- Copenhagen ring (Denmark) - 2019
- Riyadh line 3 (Saudi Arabia) - 2019

Design phase

- Thessaloniki (Greece) - 2020
- Glasgow (UK) - 2020
- Brussels (Belgium) - Subsection of line - 2022
- Milan line 4 (Italy) - 2023
- Sanying Line (Taiwan) - 2023
- Lima (Peru) - TBD

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