

Hitachi Rail
In Europe.

SIGNALLING

NETWORK CAPACITY

With a 60% share of digital signalling solutions* to Japanese railway operators and the highest reliability, Hitachi's proven cab signalling technology is plain for all to see. We're currently developing such signalling solutions for the future of Europe, Asia and the rest of the world. Hitachi has over 40 years of experience in interoperability of our onboard and wayside signalling equipment with other suppliers' systems.

Our Automatic Train Protection (ATP) with digitalised track circuit is the train control system of the 21st century, sending the Movement Authority (MA) through the rail and achieving better ride comfort and shortened train headway to increase overall network capacity, such as 24 trains per hour.

Taking this one step further, we have joined ETCS Level 3 equivalent projects, called ATACS in Japan with East Japan Railway Company. The world's first passenger service for a radio-based train control system without track circuit on the mainline commenced in March 2012.

We supply onboard signalling equipment for intercity trains run by China's Rail Ministry, experiencing no major failures since our operations began in April 2007.

As well as reliability, this contract demonstrates our ability to work alongside and integrate with other suppliers' equipment.

Following the success in China, we are running a trial with Network Rail (UK) to test and introduce our ETCS (European Train Control Systems) signalling system to a Network Rail locomotive. The trial is taking place on the ERTMS-fitted 'Cambrian Line' during 2012/2013. The key assurance features of our onboard ETCS system are:

- Compliant with all applicable CoCoSig TSI (Control Command & Signalling Technical Specification for Interoperability) and relevant requirements as well as UK-specific requirements
- Safety Assurance & RAM activities for CENELEC based on SIL4 (CENELEC 50126, 50128, 50129)
- NoBo: Conformity Case

*Data source: estimate of Hitachi, Ltd.
The estimated market share of D-ATP (Digital Automatic Train Protection) systems of Japanese main line.

MOVING FORWARD WITH EUROPEAN TRAIN CONTROL SYSTEM (ETCS)

The current situation

In Europe, railways are moving towards a common specification for railway equipment, with the aim of facilitating cross-border operation of rolling stock and freedom of movement of goods and services. The Technical Specifications for Interoperability specify ETCS with 3 defined levels of functionality, moving from Level 1, which overlays existing fixed trackside signals with Eurobalises to provide the Automatic Train Protection (ATP) functionality, to Level 3, which does not require trackside train detection equipment and provides a moving block signalling solution with train movement authorities and train positions provided over mobile communications.

Following the successful CTCS project delivery in China, which is interoperable with existing ETCS system, Hitachi is preparing to provide its onboard ETCS solution to Europe. High Reliability and availability are at the core of this project and of Hitachi's long history as supplier of Cab Signalling.

System architecture

The high-level architecture of the Hitachi ETCS (Level 2) onboard system consists of a number of components mostly supplied by Hitachi – including the Balise Transmission Module.

Key features

Redundant architecture

Onboard components are designed to be redundant so that a single fault does not cause the system to stop. The configuration can decrease the probability of system down exponentially.

Proven hot stand-by hardware platform

Key components, such as the EVC (European Vital Computer), is designed with redundancy in mind and includes dual components for a hot stand-by in case of failure in the master device. In the rare event of the master's failing, the hot stand-by can take over without system halt, greatly enhancing system availability.

Highly reliable long-life onboard components

SIL2 compliant DMI

Hitachi technology secures a safety equivalent to SIL2 (Safety Integrity Level 2) by external hardware and the inside SIL2 module.

Modular structure for highest level of maintainability

On-board components are designed in a modular way to be easily replaced by the rack. This modular structure can decrease the recovery time significantly, requiring only a quick replacement of the faulty rack for system recovery, greatly enhancing system availability and maintainability.

Proven Hitachi in-house technology for highest level of safety

Hitachi's ERTMS/ETCS onboard signalling system is secured by the following three Hitachi in-house proven technologies:

- ▷ Fail-safe processing
- ▷ Fail-safe input/output
- ▷ Fail-safe software

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