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< Data & Information

Sintrones

Data and Information Systems Usher in the Era of the Smart Railway

The global rail industry has long needed modernisation and system upgrades.

Legacy equipment and networks strain under the pressure of increased demand for capacity, in addition to changing expectations and regulations from passengers, industry associations and governments alike.

Challenges continue unabated. The industry is working towards more sustainable practices, which, for example, involve electrifying lines, searching for ways to improve energy efficiency and conservation, and investing in new greener solutions such as hydrogen-powered trains.

Then there's the rise of digitalisation. Passengers now expect reliable connectivity

when they travel, in addition to technical solutions that improve their customer experience – from real-time updates on the status of their journey through to hands-free payment options.

Uptake of the latter was accelerated by the arrival of Covid-19, the impact of which rocked the global railway industry. As people were told to avoid crowded spaces and keep

contact to a minimum, interest in smart solutions grew as the sector looked for new ways to keep passengers safe while ensuring services continued to run smoothly.

Technology's Driving the Future of the Rail Industry

All these factors have led to the emergence of the smart railway system.

Smart railways use the latest technologies – such as 5G, edge computing, Internet of Things (IoT), big data, cloud computing, analytics, artificial intelligence (AI), machine learning (ML) and global positioning systems (GPS) – to improve safety and quality of service.

This technology is used to manage rail operations more efficiently by sharing data across rail infrastructure components. Today's smart railway solutions

include, but aren't limited to:
- Passenger information
- Safety and security monitoring
- Rail communication
- Real-time geolocation tracking
- Smart ticketing
- Rail and freight operations management

Sintrones' In-Vehicle Computing Systems

Sintrones is a leading supplier of onboard computers for the rail sector. The company's rugged in-vehicle computing systems meet the rigorous EN50155 requirements for vibration, shock, input voltage range, electrical isolation and extreme temperature, humidity and EMC. This ensures its solutions provide safe and stable operation in harsh environments such as high-speed trains.

Sintrones understands the bespoke needs of rail operators and with the support of its experienced R&D team, provides a

flexible configuration service and offers tailor-made systems that meet specific requirements.

Bespoke Design

Take Polish train manufacturer PESA Bydgoszcz SA, which had some specific requirements when looking to upgrade its on-board computers. Requisite capabilities included isolated digital I/O design to protect against environmental noise and transient signals and ensure system reliability, and on-board network video recorder (NVR) functionality that could provide real-time recording, analysis and tracking.

PESA also wanted the computer to be able to connect with a wifi router in order to provide a reliable on-board internet service to passengers, in addition to functioning as the on-board display control system.

In response, **Sintrones designed a custom-made, next-generation VBOX-3600-ISO-embedded**
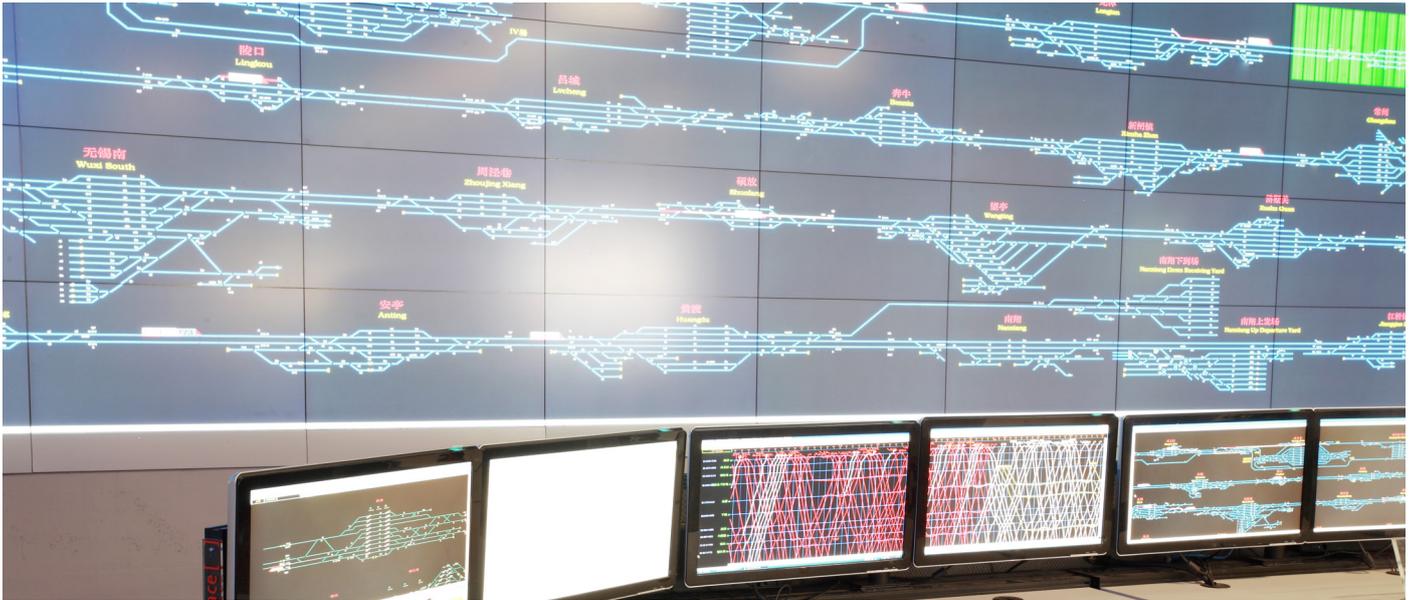
system that met PESA's exact requirements, with the manufacturer ordering over 1,000 units.

Wireless Communications Back-Up System

Another example comes from **Italia Rail**, which wanted to implement a new wireless communications back-up system to ensure the safety of maintenance workers spending time working alongside high-speed rail tracks. Sintrones was chosen due to the company's ability to provide a customised supply input design and satisfy the project's wireless communication requirements.

Its VBOX-3620-M12X in-vehicle computer was installed on Italia Rail's rolling stock, enhancing the efficiency of the operator's wireless network communication and the safety of its track-side workers.

Rail Safety Computing Solutions

Sintrones' solutions also improve safety. After an incident between a high-rail vehicle (road-rail vehicle) and moving train highlighted the weaknesses of its existing high-rail limits compliance system, one American freight railroad company knew it must upgrade its existing solution. This needed to have a reliable authority limiter that couldn't be disabled by users,

guaranteeing that vehicles could only travel where they were safely authorised to do so.

This required a bespoke computing solution that would seamlessly integrate with the company's existing software and equipment, consolidating into a single hardware platform that would meet its specific needs – the **ABOX-5210 fanless box computer**.

Railway Application

Alert System | Announcement System | 4~8ch Video Input Camera | Passenger 22" Display for Digital Signage | LED message board | Dual Ethernet for Video Streaming & Diagnosis

Isolation I/O Port | Battery backup | GPS | LTE | Bluetooth | WLAN | Smart Power Management 9~36V DC Input

SINTRONES

Intelligent Transportation Systems

- **AI GPU Fanless Rolling Stock Computer**
- **Intel Gen 10 Comet Lake + Nvidia GPU**
- **Certified EN50155 Rolling Stock Standard**

intel CORE i9 10TH GEN | NVIDIA GEFORCE GTX | EN50155

ABOX-5210-M12X

ABOX-5210-M12X is specifically designed for railway rolling stock applications that guarantee reliable performance, withstanding environmental disturbances such as severe shock and vibration in railway vehicle applications. It features 8 x M12 X Coded Connectors for GbE and certified Rolling Stock EN 50155 & EN 50121-3-2 that cater to rolling stock's application including traffic safety systems, passenger information systems, broadcasting systems as well as surveillance systems and so on.

NVIDIA CUDA **NVIDIA®GeForce Option**

NVIDIA® GTX-1650/ 4G
896 CUDA Cores

NVIDIA® GTX-1060/ 6G
1280 CUDA Cores

0   200   400   600   800   1000   1200