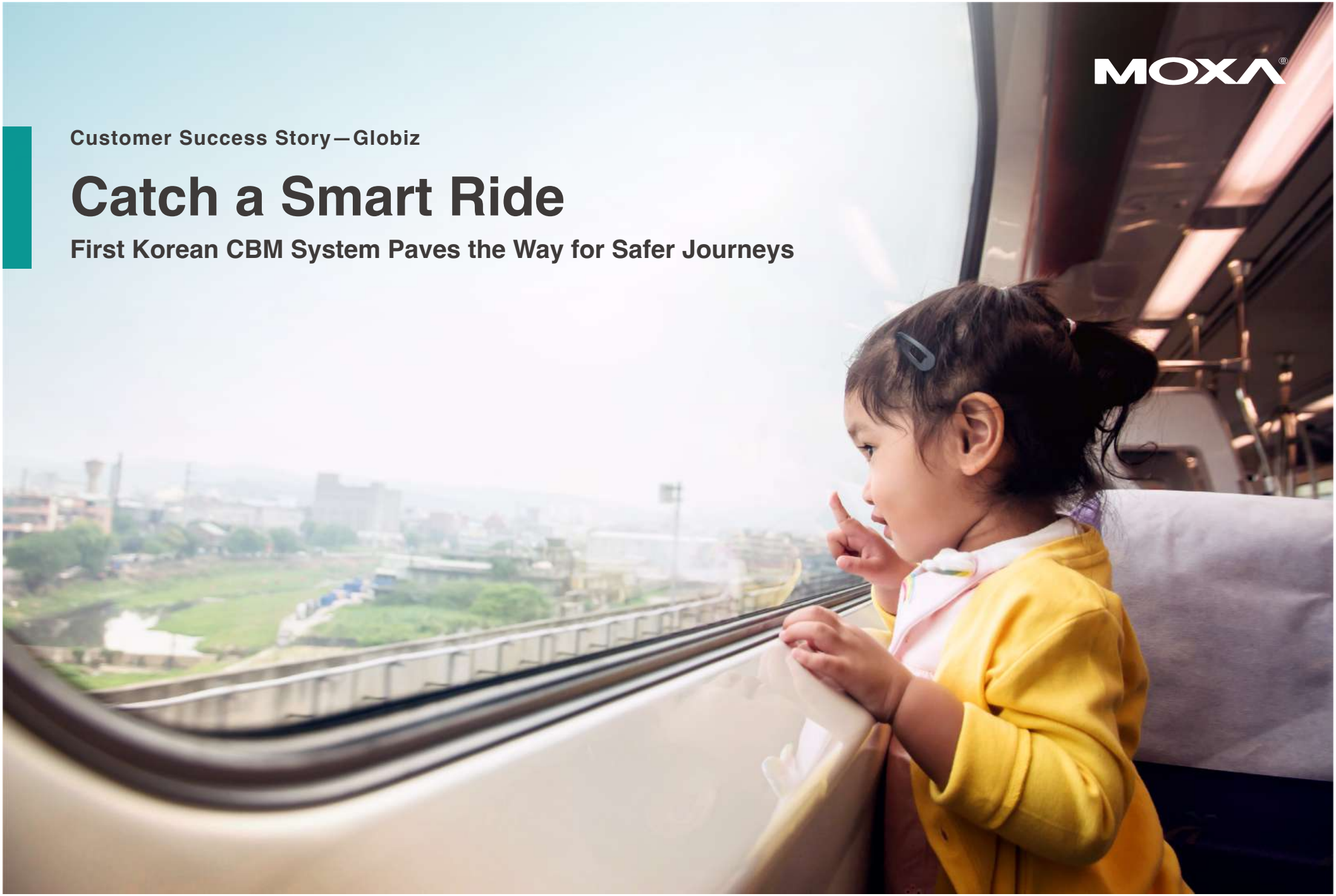


Customer Success Story—Globiz

Catch a Smart Ride

First Korean CBM System Paves the Way for Safer Journeys

At a Glance

The Quest to Improve Rail Safety With Innovative Technology

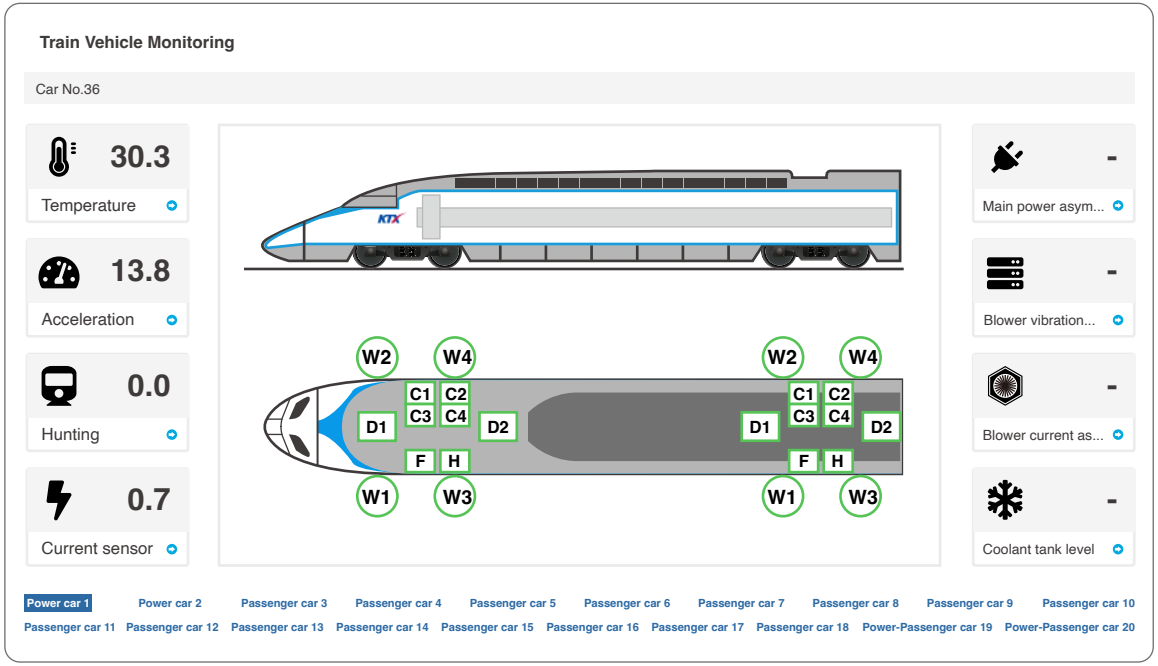
South Korea has set an ambitious target to reduce rail accident fatalities by 50% by 2027. Previously, maintenance staff periodically had to conduct time-consuming and expensive inspections of vehicles, taking them out of operation. Additionally, the lack of real-time monitoring and diagnosis of critical parts presented significant challenges, leading to difficulties in detecting defects that pose risks to railway safety and reliability.

To improve railway safety, the Ministry of Land, Infrastructure, and Transport sprang into action by launching a drive to improve the visibility of critical parts on trains. Subsequently, advanced monitoring technology was rolled out to bolster rail security across the country. In this article, we'll delve into how the use of intelligent condition-based monitoring (CBM) maintenance technology has revolutionized the industry and has boosted railway safety.

Business Challenge

Developing a Smart Maintenance System From Scratch

In the railway industry, CBM is a maintenance strategy that uses data from sensors and other sources to monitor the condition of railway assets. It detects potential issues before they become major problems, allowing for more efficient maintenance. Globiz saw an opportunity to make a difference to rail safety with CBM. The problem was, while the concept of CBM carried value worldwide, its operation and standards were still underdeveloped. As a result, regulation bodies, operators, and solution providers had to navigate uncharted waters and figure out CBM implementation on their own. However, Globiz fearlessly took on the challenges, and despite difficulties, such as almost no guidelines, managed to successfully develop a CBM system.



The CBM system of Globiz gathers different sets of train data and integrates them to present on the user interface.

Globiz Pte Ltd

Founded in 2008
Headquarters : South Korea

Industry : Rail
Website : http://globiz.kr/

Business Challenge

The Long and Winding Road to Building a Successful CBM System

1 **Identify issues**

Knowing which critical train parts to monitor:

The first step in developing a reliable Onboard CBM project in Korea was to identify which critical assets required monitoring. Globiz identified critical train parts per vehicle to collect data from.

2 **Data collection**

Home-grown innovation ensures accurate data collection:

Collecting data actually proved to be a difficult task. Developers had to send personnel on-site to install sensors on various parts of the trains. Furthermore, the installed sensors rendered low-quality data as the success of the project depended on accurate, complete, and timely data. Repeated failures with commercially available sensors led Globiz to develop their own hardware sensors and a data acquisition (DAQ) system to collect the required data.

3 **Data modeling**

Finding all-round specialists in railway operations and machine-learning algorithms:

Once the data collection issue had been addressed, the focus shifted to the development of predictive models. This task called for specialists in machine-learning algorithms and who also have a deep understanding of railway operations for CBM modeling. Given the complexity of this project, these experts were essential to ensure the successful development of precise predictive models.

4 **Deplolyment**

Ensuring a complex new system integrates smoothly into traditional maintenance environment:

Implementing a CBM system for real-time and continuous monitoring posed another challenge. The CBM system needed to be integrated with existing software, hardware, and communication networks. Also, as train operators were accustomed to traditional maintenance and inspection methods, Globiz had to continuously offer robust support to ensure train operators were onboard and ready for continuous daily operation.

For over ten years, Globiz worked on developing a CBM software platform, iCMS, to conduct sophisticated analysis and fault detection. The company partnered with KORAIL and Hyundai Rotem to fulfill the first onboard CBM project in South Korea. As the development process was complicated, it required close cooperation and communication with experts and partners before successful implementation.

"Globiz has successfully installed devices on operational trains and has spent years meticulously gathering valuable data. Despite encountering failures during the early research stages, Globiz emerged as the only domestic Korean company that could accurately match real-time data with the situation at hand."

JunSik Im , Director / Principal Research Engineer of Globiz

Solution

Enabling Data Processing With Edge Computing

Preprocessing collected data onboard is crucial for efficient data analysis on a web server. To achieve real-time analysis, Globiz found a great partner in Moxa, a world leader in industrial connectivity. Moxa's industrial computer, equipped with global railway EN50155 certificates acted as the local server to preprocess the collected data onboard. Data from each critical part and sensor was processed by Moxa's computer before sending it to the web server. Moxa also provided customized Linux Drivers to run iCMS on the platform, and ensured easy maintenance with the design of hot-swappable SSD/HDD memory replacement.

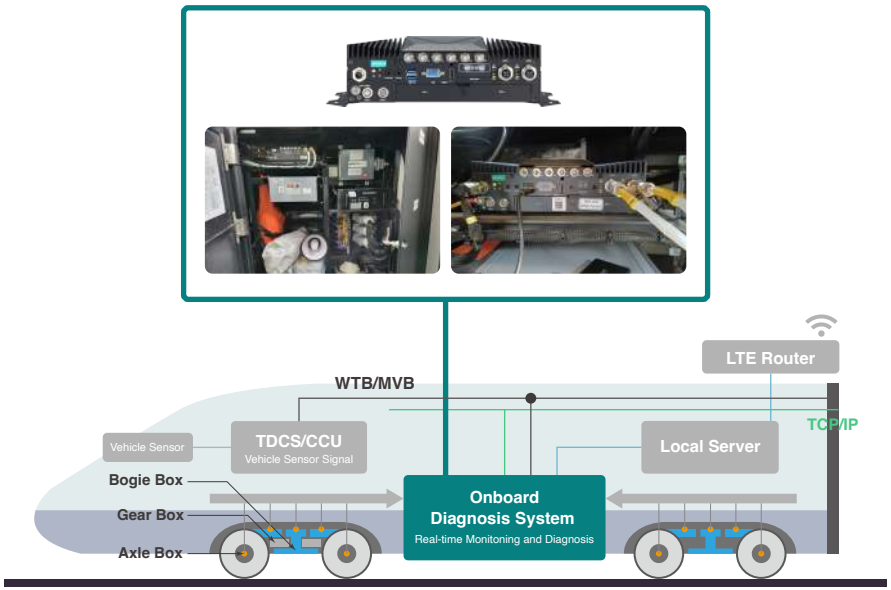
Partnering for Success: Moxa's Expert Team Provides Dedicated Support

To ensure the success of the partnership with Globiz, Moxa assembled a virtual expert team comprising technical experts from headquarters and local personnel. This team worked closely with Globiz from the POC stage to the final deployment, addressing all issues that arose along the way. Over the course of two years, Globiz and Moxa established a long-term partnership based on reliability, honesty, and sincerity, providing dedicated technical support to fulfill KORAIL's requirements and complete the Korea Laboratory accreditation Scheme (KOLAS) verification and Korea Certification (KC).

“Globiz has found a valuable partner in Moxa, who has provided exceptional local support since the early stages of their collaboration. In previous projects, relying on a computer from a different company meant enduring lengthy support calls to headquarters whenever issues arose. However, with Moxa's local team, Globiz has found a reliable and honest partner for a long-term partnership.”

JunSik Im , Director/Principal Research Engineer of Globiz

Moxa's computer aids onboard diagnostics while the train is in motion.



The onboard diagnostic system powered by Globiz's CBM utilizes Moxa's computer to enable edge computing.

Results

A Safer and Smarter Journey Nationwide

Because of the success of this project, Globiz has been recognized by Hyundai and train operators, and will continue to be a partner to help promote CBM to more cities across the country. Globiz's CBM system helped train operators reduce maintenance costs and work pressure. Globiz estimates that the benefits of the system in this project include:

- 25-30% reduction in life-cycle costs (LCC)
- 20-30% reduction in spare parts costs
- 40% increase in the lifetime of devices

> “In a bid to expand into the global market, our company recognizes the value of partnering with Moxa, whose worldwide coverage and certifications provide a unique opportunity for growth. Together, our companies have the potential to achieve great things, making this partnership a promising one.”
>
> **JunSik Im , Director/Principal Research Engineer of Globiz**

This project is a significant milestone for Globiz, being the first of its kind in South Korea. JunSik Im, Director Research Engineer of Globiz, stated: “Moxa’s extensive product portfolio for railways makes them an ideal partner. We look forward to collaborating with Moxa on future projects.”

The deployment of this solution enables Globiz to support more local train operators and expand globally, ensuring the safety of passengers and routes through continuous data collection.