HITACHI

Train-borne vision systems for infrastructure monitoring

Maintaining railway infrastructure is crucial, especially with aging tracks and a shortage of skilled workers.

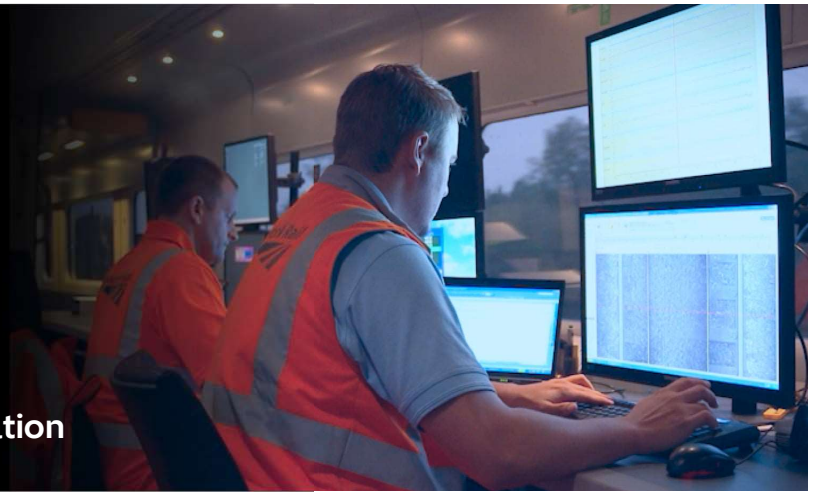
HMAX by Hitachi Rail uses sensors on fleets of trains to monitor track health, ride quality, and more, integrating data into a single platform. Leveraging machine learning and AI, HMAX reduces operating costs and enhances railway reliability.

Following the acquisition of Omnicom Balfour Beatty in 2025, HMAX now offers new train-borne monitoring of rail infrastructure capabilities, including:

- **Mobile monitoring**
- **Mobile measurement**
- **Remote monitoring**

Mobile Monitoring

Advancing **infrastructure inspection visualisation** systems



By integrating camera and inertial sensors, rail engineering, and regulatory expertise, after just one pass, **we can trigger 'preventative insights' for track managers.**

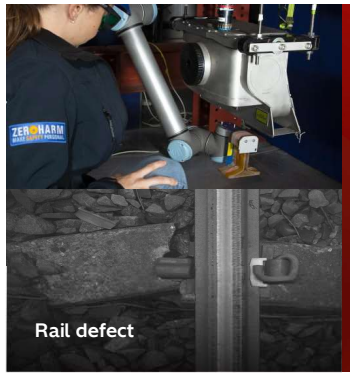
Capturing **70,000 images** per second

At speeds up to **125 mph**

At **0.8mm** resolution

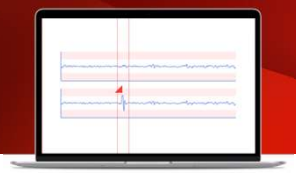
Generating **10 TB** of Data every **440 miles**

90%+ of data storage reduced by using **edge computing** in vehicle



Case Study

A passenger train found a rail defect. We used mobile monitoring to alert us of the event and the timeline that this occurred.



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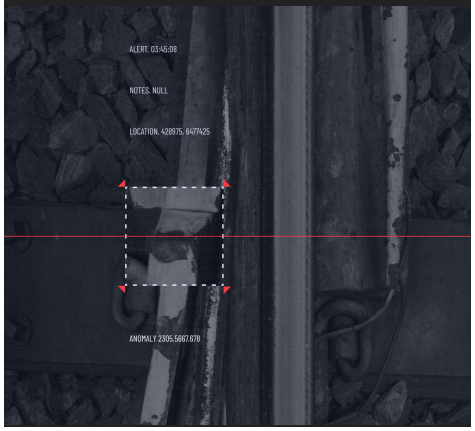
Edge Processing

We've integrated **edge** and **deep learning** with our vision systems for **near real-time** anomaly detection.

We've converted vision systems to edge—where beneficial. Track data that's too large to send wirelessly is shipped to us to identify potential defects.

We alert track managers to anomalies.

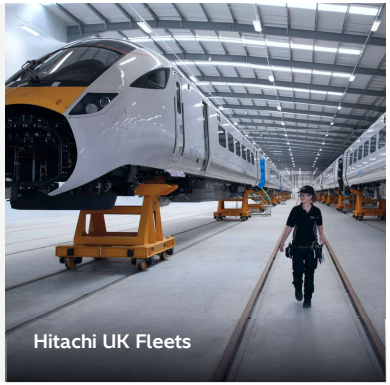


Case Study

Hitachi

Not only used for dedicated inspection trains, **our track geometry measurement systems now collect data from passenger trains**

- **16** IEP trains
- **4** Abellio EMR trains



Case Study

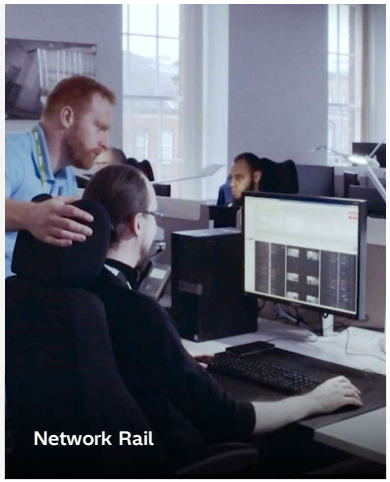
Network Rail

With 15 years of stored data, we can determine **change detection across longer timespans using AI**

25TB of images per day from each of the five inspection trains (10TB per 700km)

Each train inspects **185,000km** of track/year

300 track inspectors spend less time in trackside positions of risk



Our engineering, AI, and mathematics teams advance systems that visualise and contextualise large sets of geosensing, lidar, and track measurement and image data.

- **Automated vision inspection systems**
- **Automated Track Geometry**
- **Rail Profile**
- **Ride Quality**
- **Positioning**

We deliver maintenance efficiency through survey grade data management - at **0.8mm resolution.**

Faster. Safer.

Our cloud platform and data historian allows clients to access all their automated inspections and alerts.

"We've started fusing data in a way not possible in 2020. By combining multiple data sources over longer periods of time, we've been able to pre-empt anomalies hidden when observing just one data source."

Lianne Crooks
Head of Data Science & Maths, Hitachi Rail

Talk to an executive or schedule a demo:

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