MISSION EMBEDDED
AI for Predictive Maintenance

Christof Pitter, 23.11.2023

KEY FACTS

- Member of FREQUENTIS GROUP

- Established

- Headquar

- 75+ Highly

- IRIS Silver Level Certificate

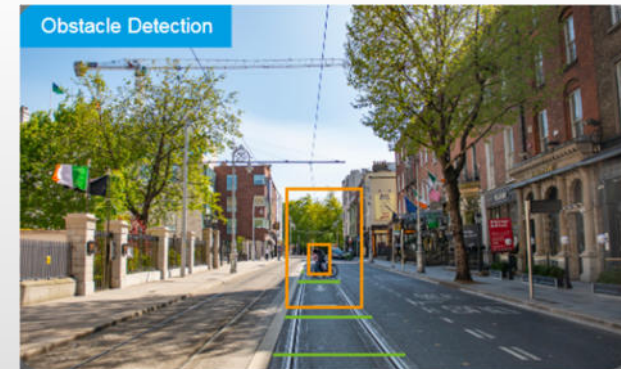Specialist for innovative system solutions for safety-critical industrial applications.

SOLUTIONS & OFFERINGS

Continuously advancing cutting-edge technologies for safety & security applications
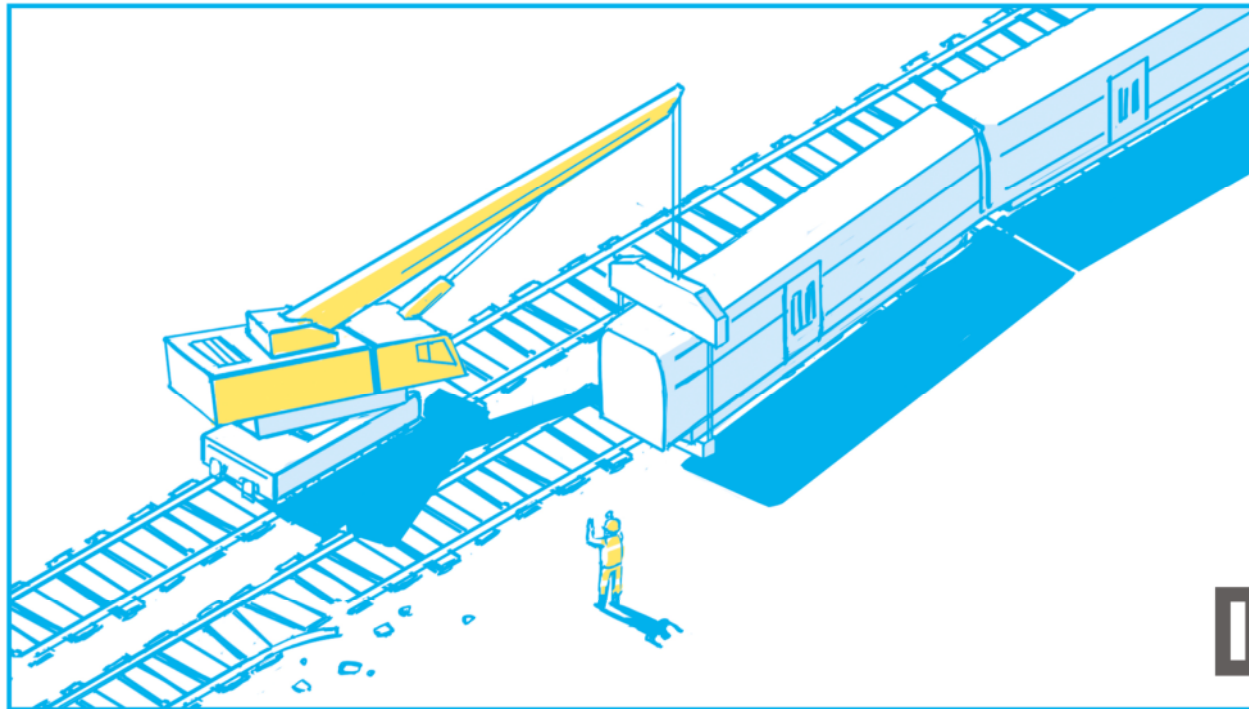
ON-BOARD SOLUTIONS

- GNSS-independent sub-meter & track-precision Localization

- Driver Assistance Systems
  - Obstacle Detection & Collission Avoidance; Overspeed Prevention Assistance Systems;
  - Switch State Detection; Signal Interpretation

- Predictive Track Maintenance

- Intelligent on-board CCTV-Systems

- Software-defined on-board Networking
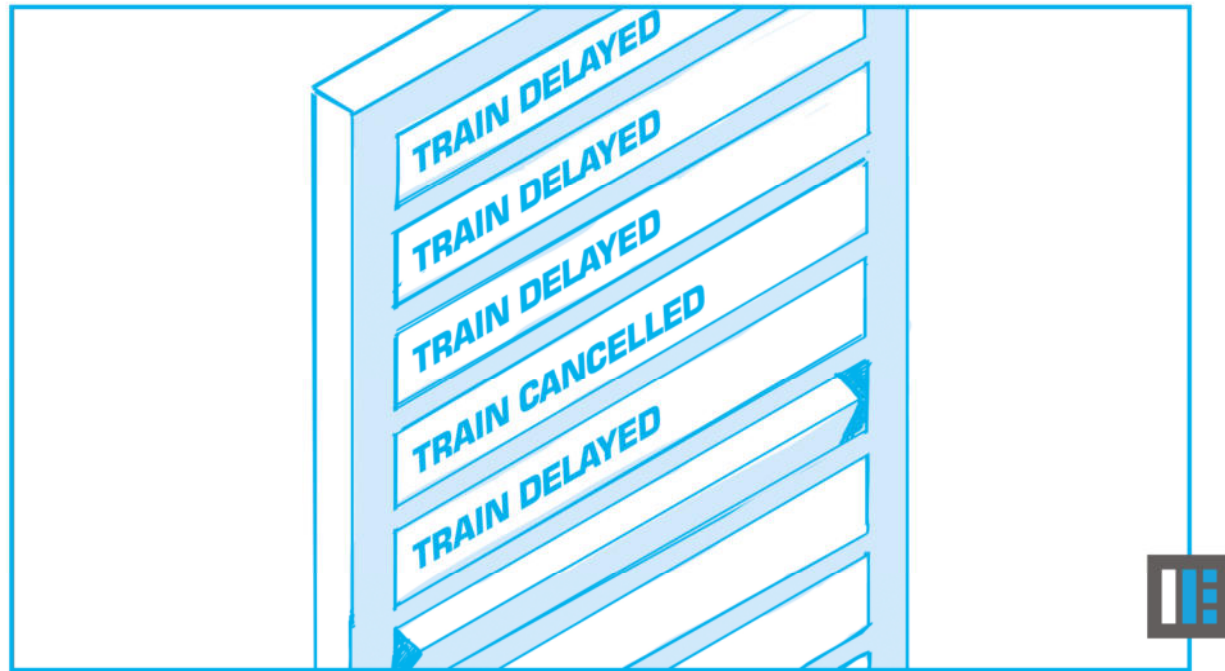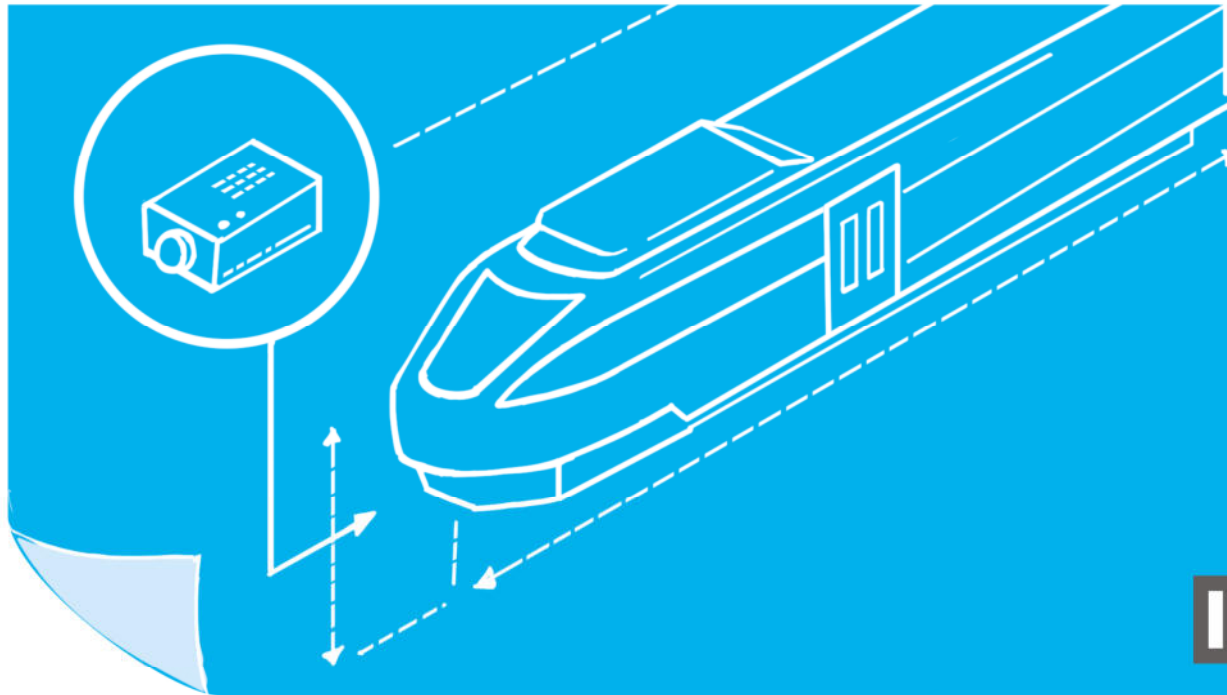
- Safe Teleoperation

PROBLEM: UNPREDICTED MAINTENANCE

Imagine there being a defect somewhere in the track network, ...
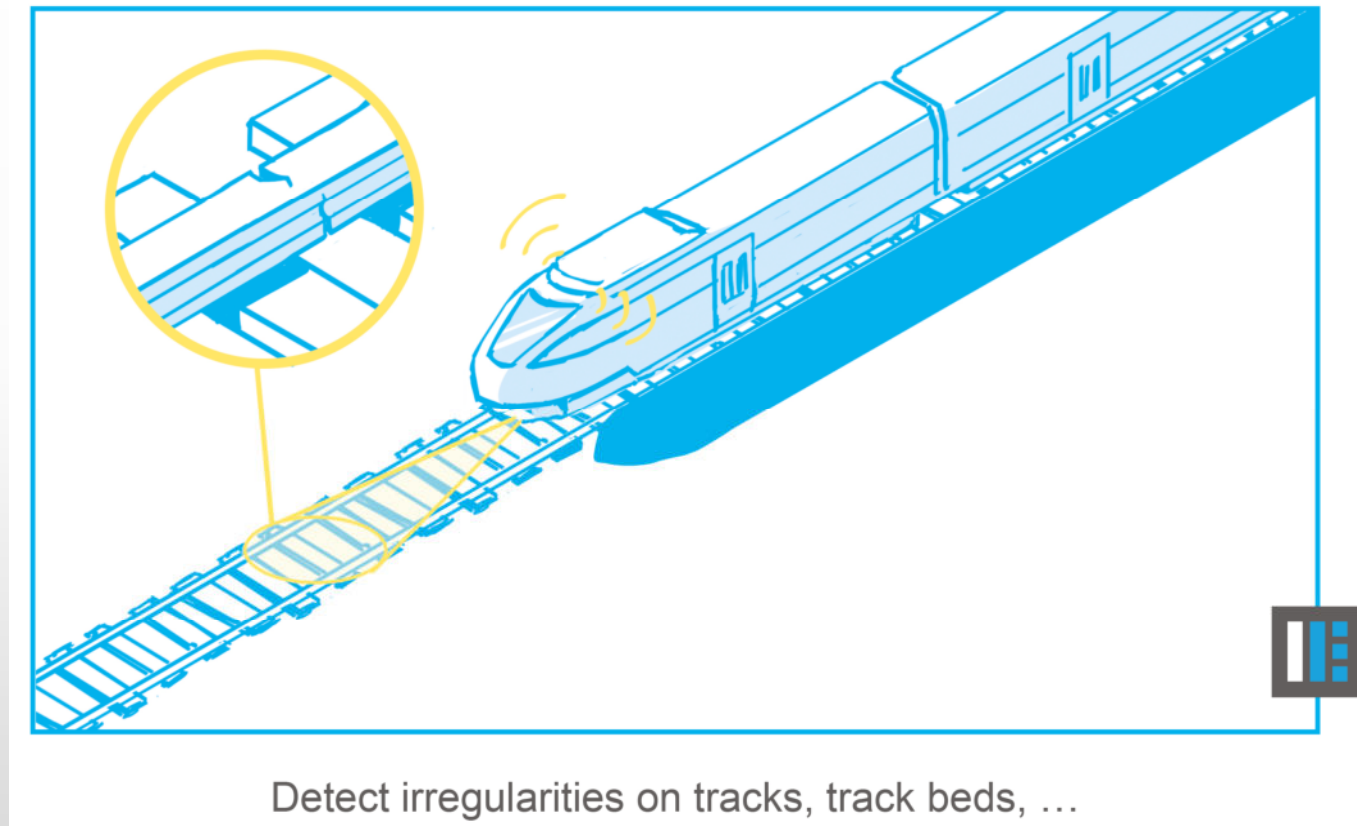
RESULT: DELAYS & COSTS

… resulting in delays and service interruptions.

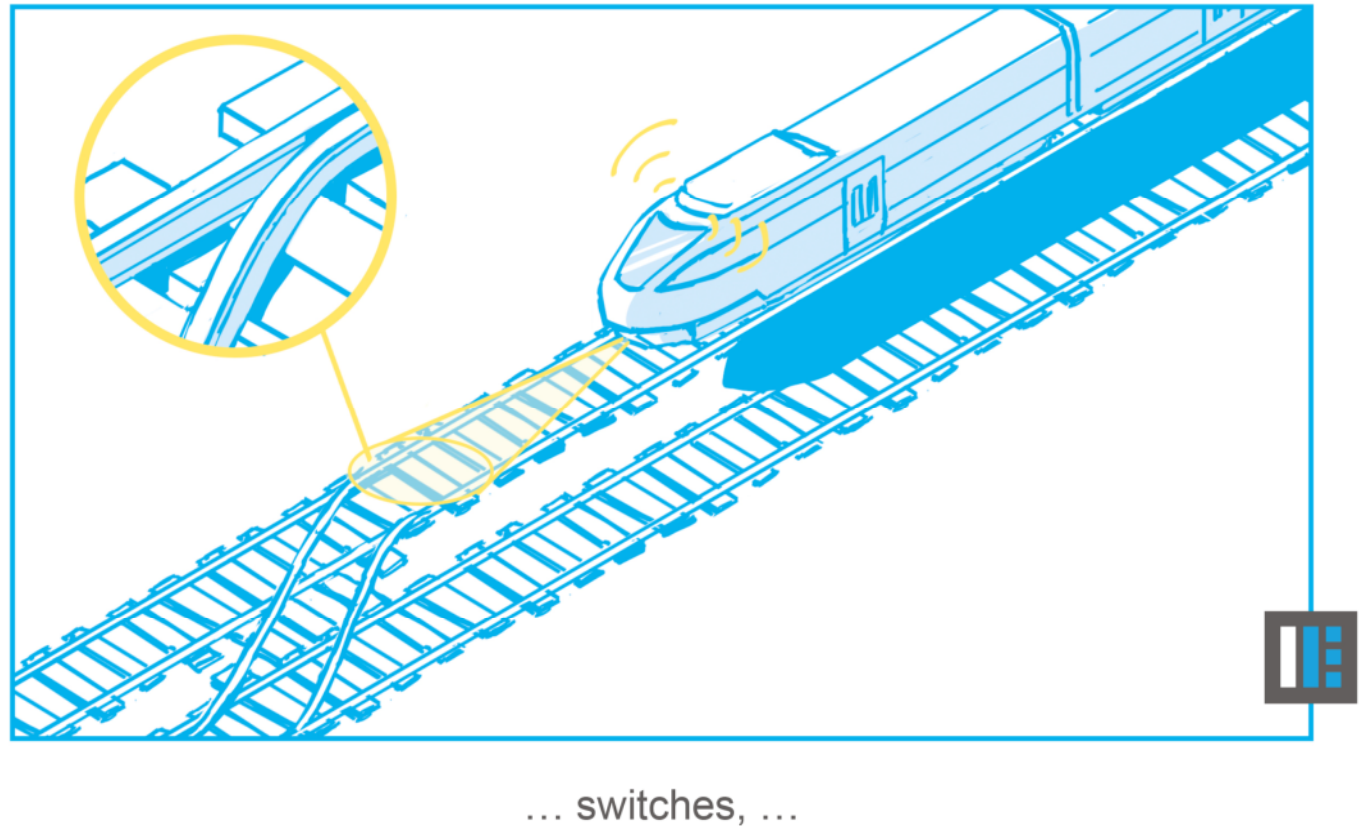# HARMONY ADDED VALUE

Low-cost on-board system by detecting ad-hoc issues secures operational availability & operational safety.

DETECTION OF ANOMALIES
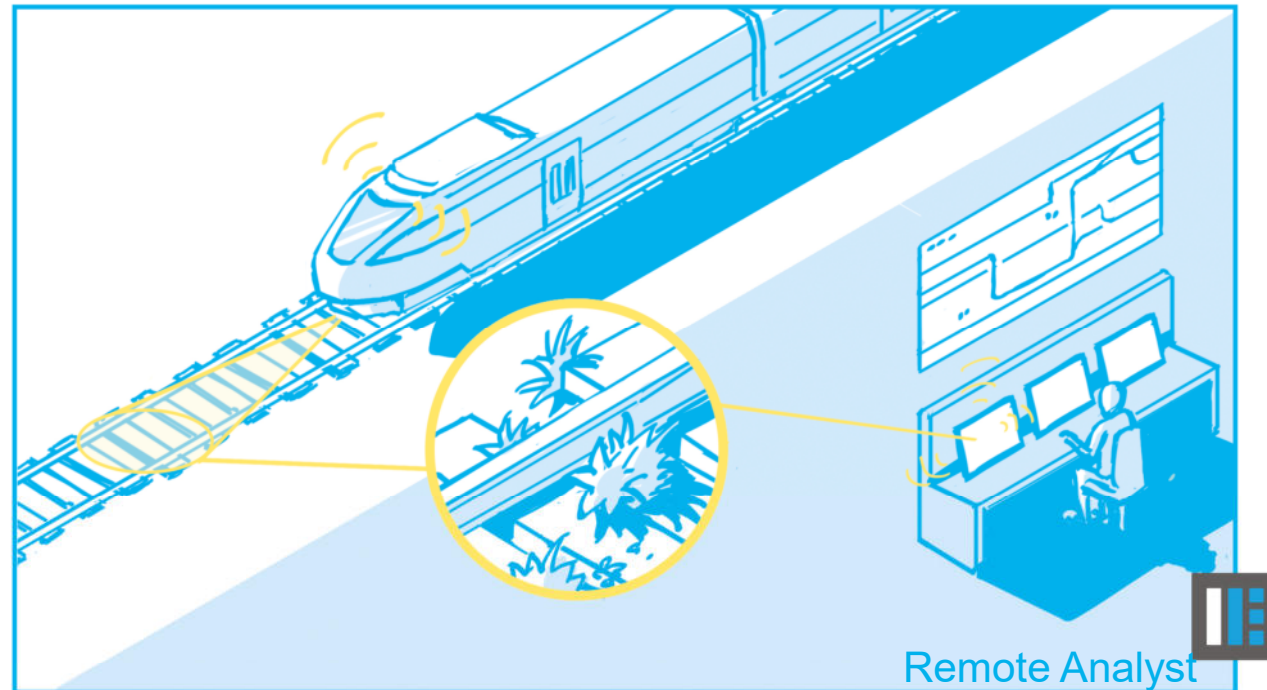

Detect irregularities on tracks, track beds, …

DETECTION OF ANOMALIES

… switches, …

DETECTION OF ANOMALIES

Remote Analyst

… and even vegetation growth. Potential problems are sent directly to the control centre for further action …
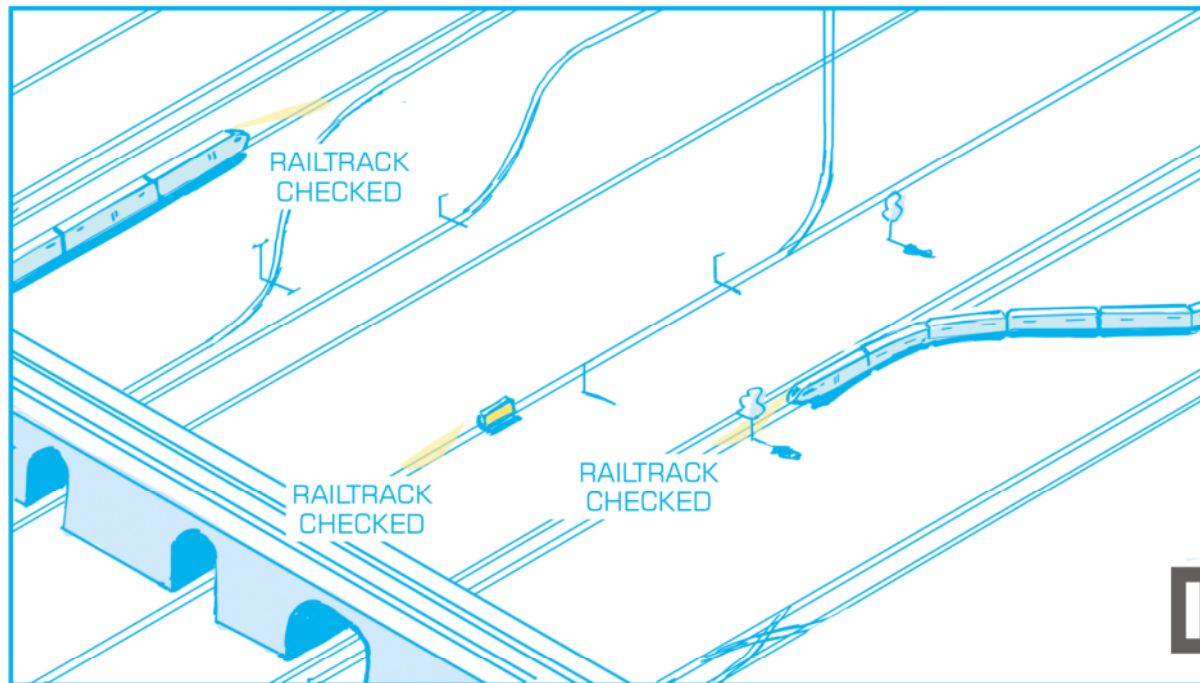
EDGE ANOMALY DETECTION

Typical regular track bed

Anomaly Example

Works in real-time, using minimal bandwidth, sophisticated backend & edge AI and high-precision GEO information.
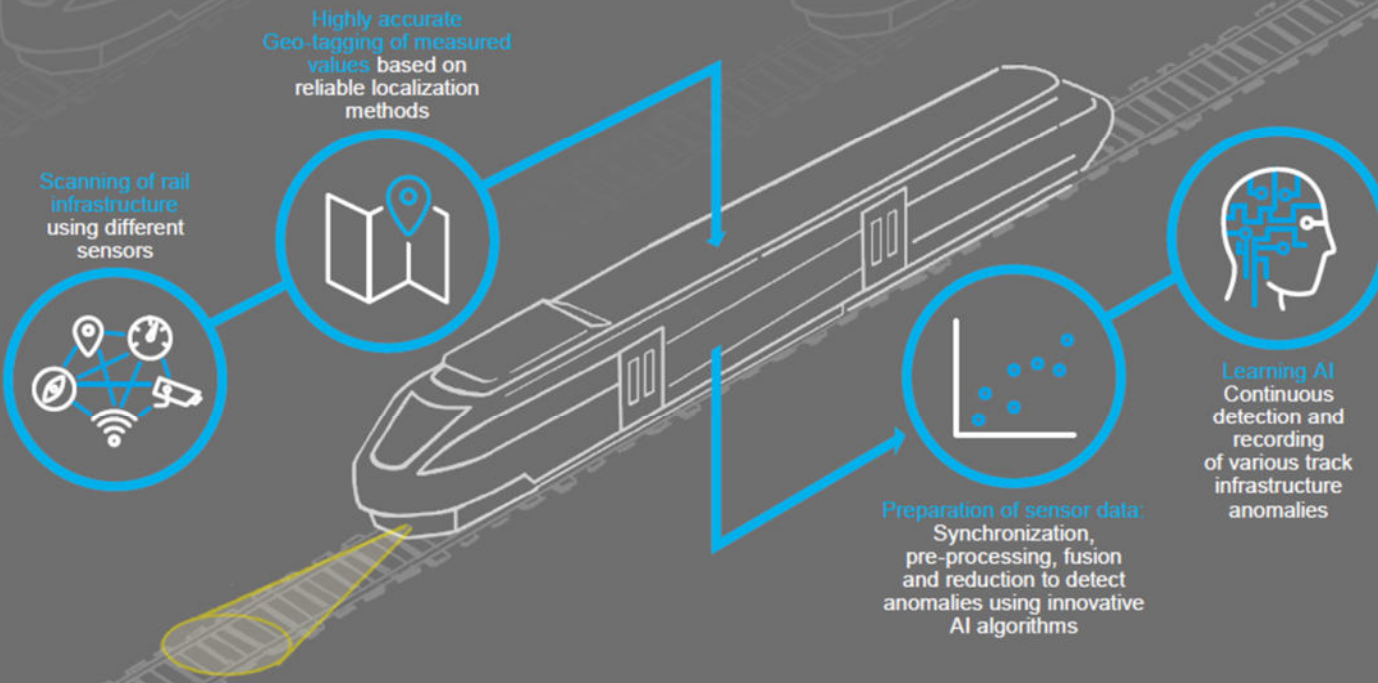
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RAILTRACK CHECKED ALL THE TIME

… helping to increase safety by monitoring more miles in less time.

HARMONY SOLUTION

REAL-TIME DATA PROCESSING ON BOARD

Highly accurate Geo-tagging of measured values based on reliable localization methods

Scanning of rail infrastructure using different sensors

Preparation of sensor data: Synchronization, pre-processing, fusion and reduction to detect anomalies using innovative AI algorithms

Learning AI Continuous detection and recording of various track infrastructure anomalies
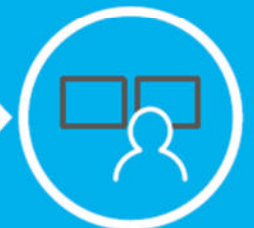
AI BACKEND PROCESSING

AI-based data aggregation and time series analysis for optimized maintenance operation

UI/UX FRONTEND DESIGN

Human-machine interaction Transmission of relevant data to Remote Analyst
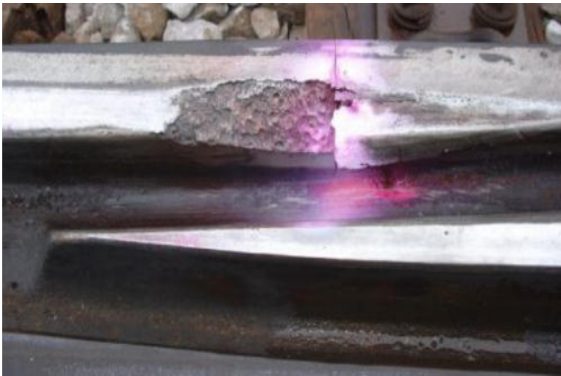
THERE IS ALWAYS A **MISSION EMBEDDED**

INTERESTED?
LET'S HAVE A MEETING!

Backup

HARMONY - USE CASES

MEASUREMENT CARS ARE IRREPLACABLE

- Comprehensive Data Collection: equipped with specialized sensors / devices to check deviations from the norm

- Specific diagnostic purposes

- Accuracy and Precision

- Regulatory Compliance: mandated by safety and regulatory standards.