HRS
High-resolution surface

High-resolution imaging systems for high-speed railway inspection

[AI Integrated]

ADTSolution

HRS is a high-resolution imaging system designed for **detailed inspection of railway surfaces.**
It uses **high-definition cameras** to capture submillimeter images **at high speed**, making it ideal for analyzing rails, fasteners, sleepers, slabs and other components.

Mountable on virtually any vehicle and orientable toward the target, HRS ensures **precise acquisition even at full speed**, thanks to its proprietary **lighting and synchronization system with microsecond-level accuracy.**
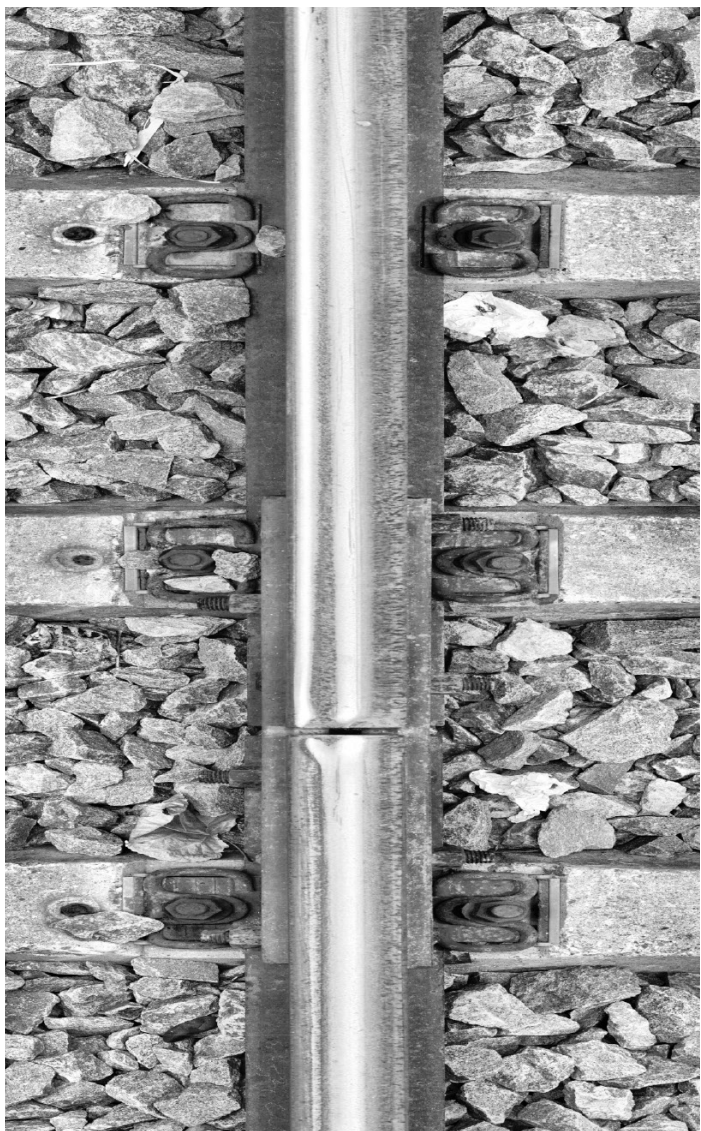
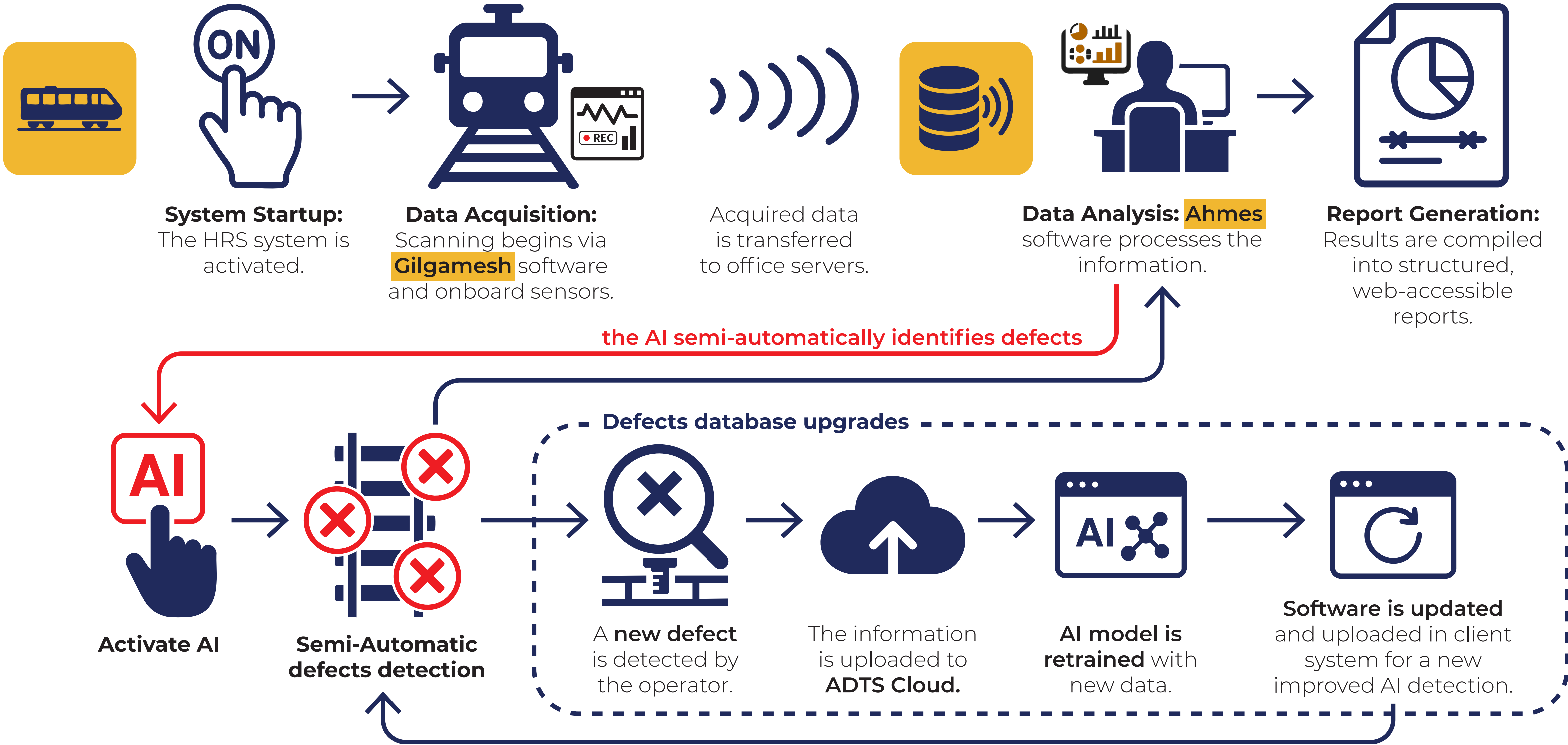| Ultra High Resolution	AI-Powered Diagnostics	High-Speed Operation	Extreme Environment	Energy Efficient

Performance

Resolution	Up to 0,05 mm/px
Image Type	Color (RGB) or Mono
Max Speed	Up to max operational speed
Target distance	Up to 1000 mm
Operating temp.	-20°C / + 50°C
Humidity	15 to 85%
Lighting Power	100.000 Lux
Voltage	24 VDC or 220-110 VAC

How it works

System Startup: The HRS system is activated.

Data Acquisition: Scanning begins via Gilgamesh software and onboard sensors.

Acquired data is transferred to office servers.

Data Analysis: Ahmes software processes the information.

Report Generation: Results are compiled into structured, web-accessible reports.

the AI semi-automatically identifies defects

Activate AI

Semi-Automatic defects detection

Defects database upgrades

A **new defect** is detected by the operator.

The information is uploaded to **ADTS Cloud.**

AI model is retrained with new data.

Software is updated and uploaded in client system for a new improved AI detection.

AI-Enhanced Inspection

Integrated artificial intelligence empowers the **HRS system to autonomously detect and assess**:
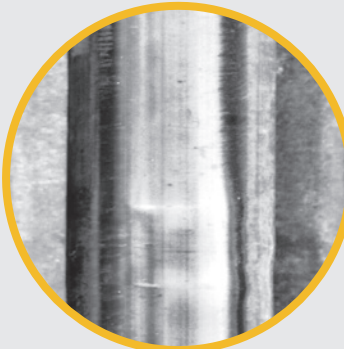· Cracks and surface defects;
· Presence and alignment of components;
· Deformations and wear;
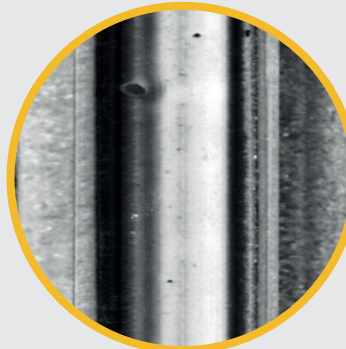· Structural integrity indicators.

Defects Catalogue
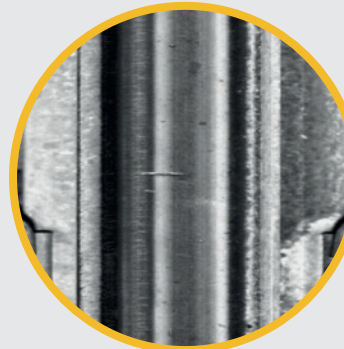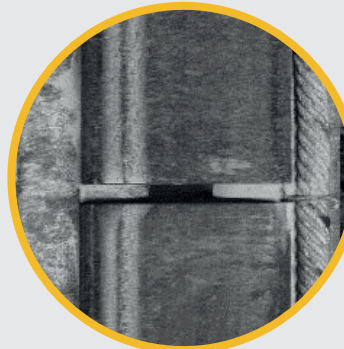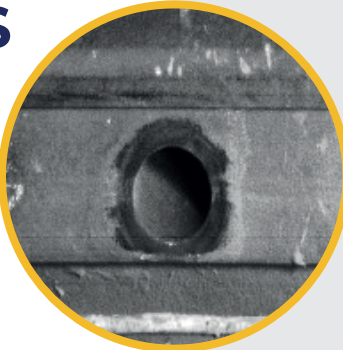
RAIL
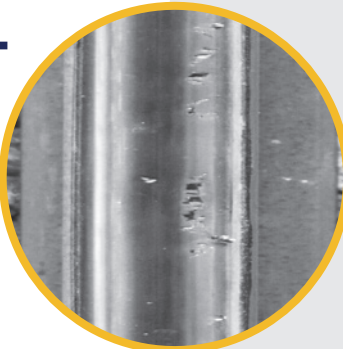
Big Holes

Wheelburns

Black Spots

Cracks
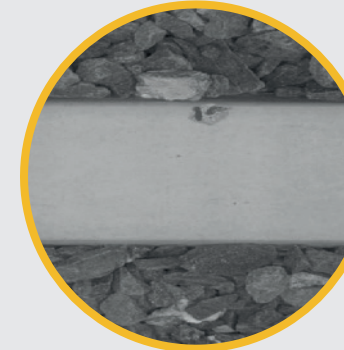
Big Rail-Gaps

No Rail-Gaps
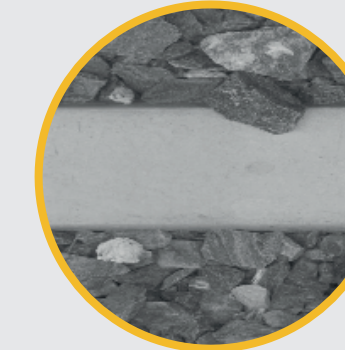
FISHPLATES

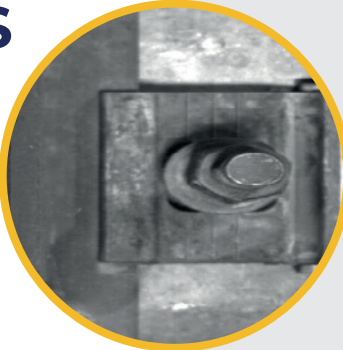Missing bolt

Loosening bolt

SLEEPERS
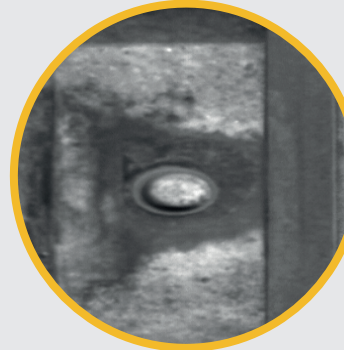
Cracks

Material Lost

Foreign Material

FASTENERS
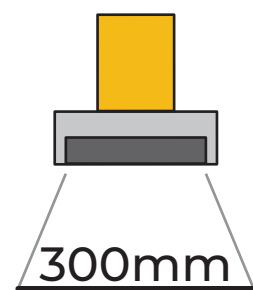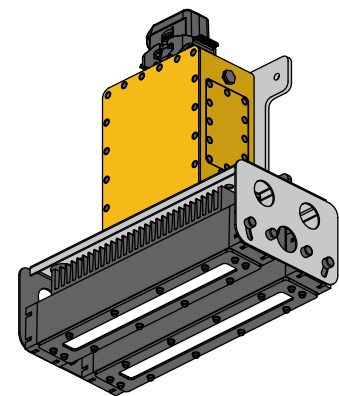
Fastener Lost

Rotated Fastener

Bolt Lost

Fastener Absent
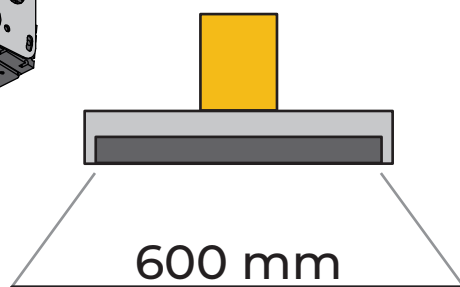
And many more in development...
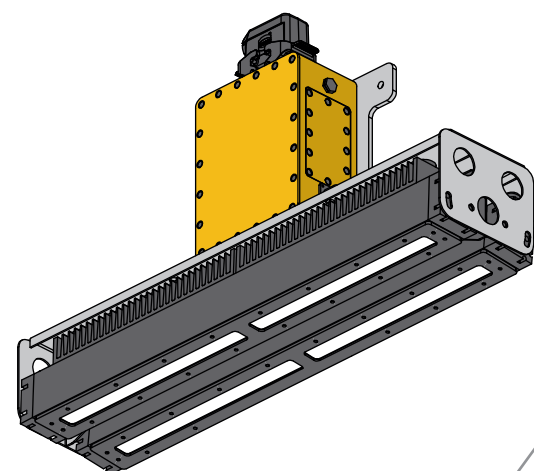
Models and Configurations

HRS

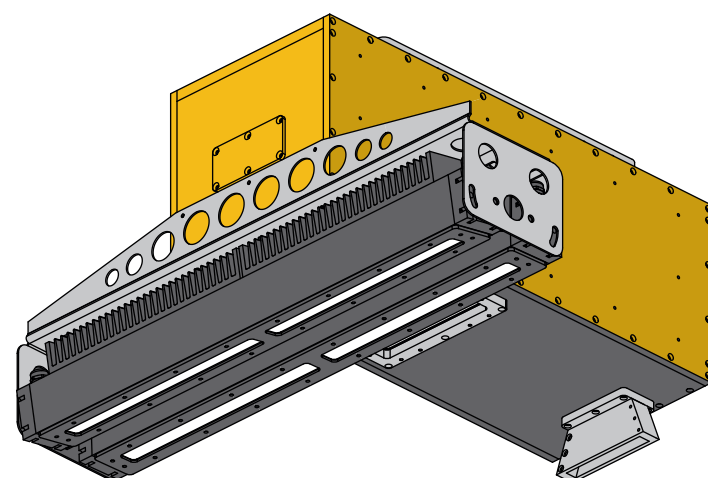High-resolution imaging for targeted rail inspection

Resolution	0,05 mm/px
FOV	300 mm

HRSW

Full-track coverage with multiple synchronized units.

Resolution	0,1 mm/px
FOV	600 mm

V3DS

Integrates laser triangulation for enhanced 3D imaging

Resolution	0,1 mm/px
FOV	600 mm

Rail Surface Configuration

Devices:
• **2 x HRS**

Defects detection:
• **Rail**

Rail View Configuration
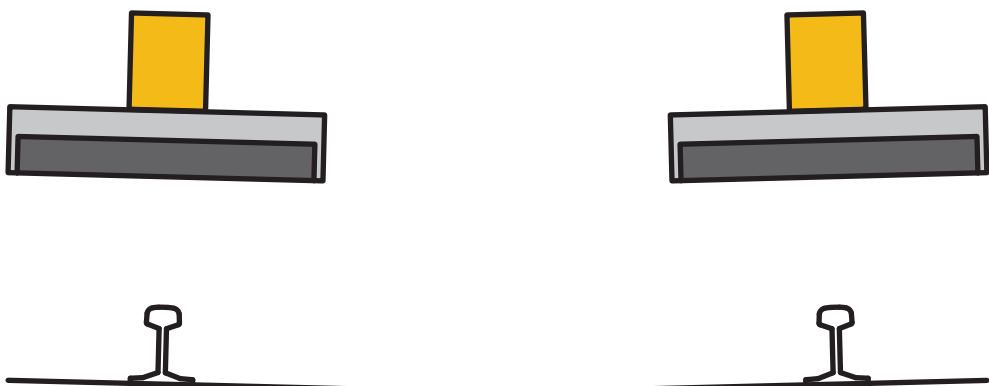
Devices:
• **2 x HRSW**

Defects detection:
• **Rail**
• **Fasteners**

Side Rail Configuration
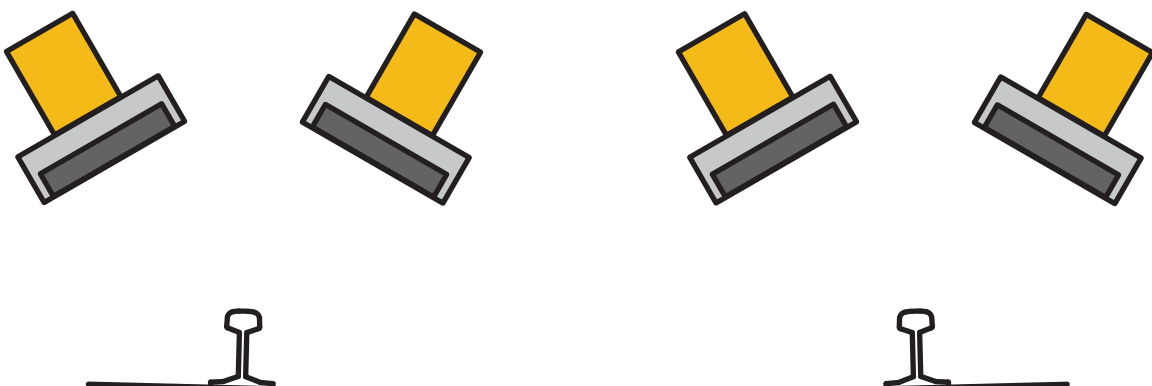
Devices:
• **4 x HRS**

Defects detection:
• **Fishplates**

Full Track Configuration
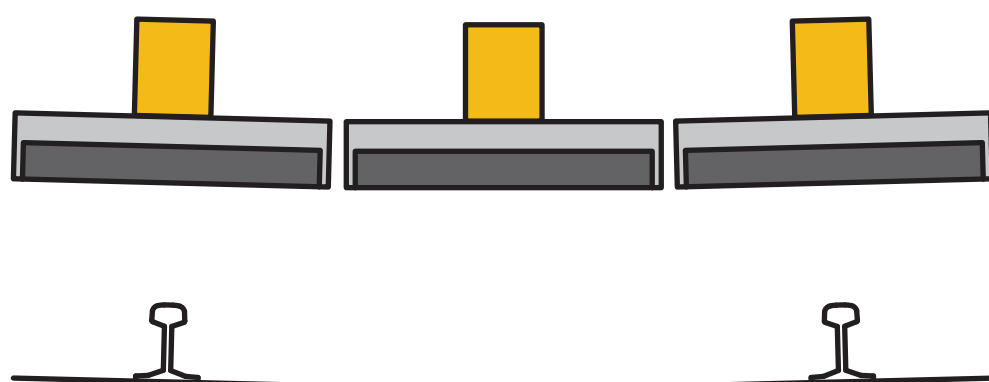
Devices:
• **3 x HRSW**

Defects detection:
• **Rail**
• **Fasteners**
• **Sleepers**

3D Full Track Configuration
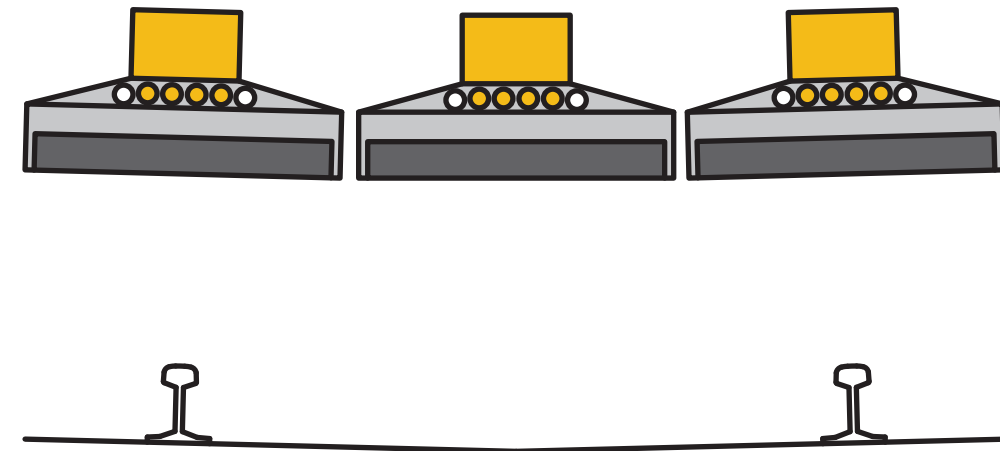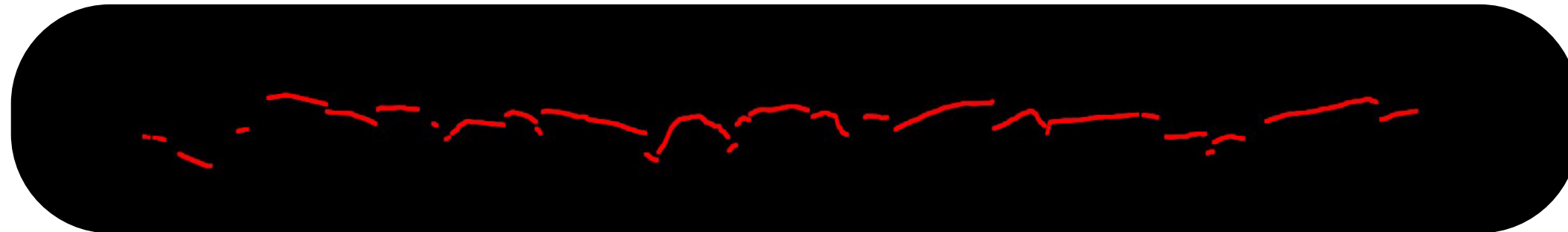
Devices:
- **3 x V3DS**
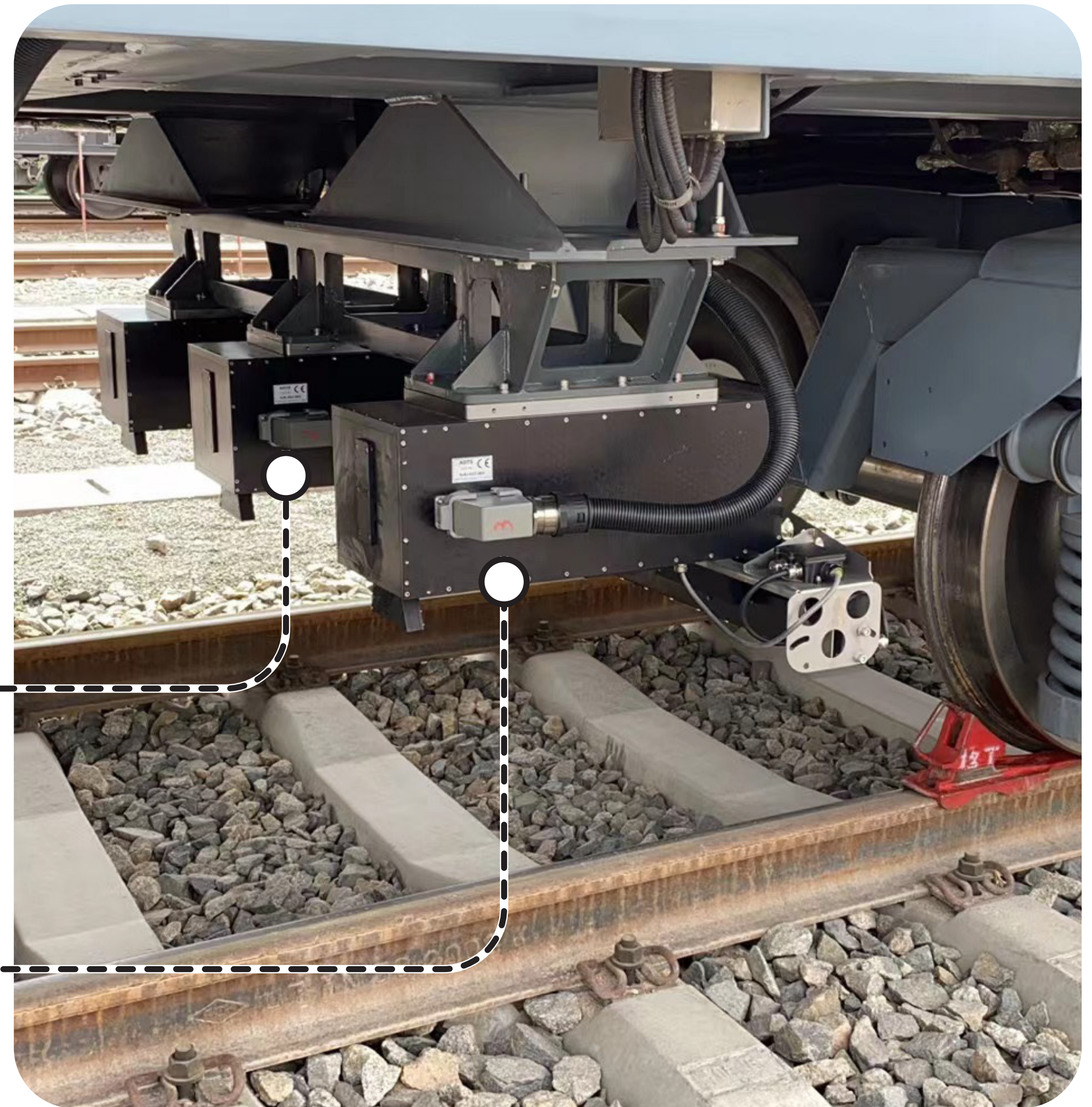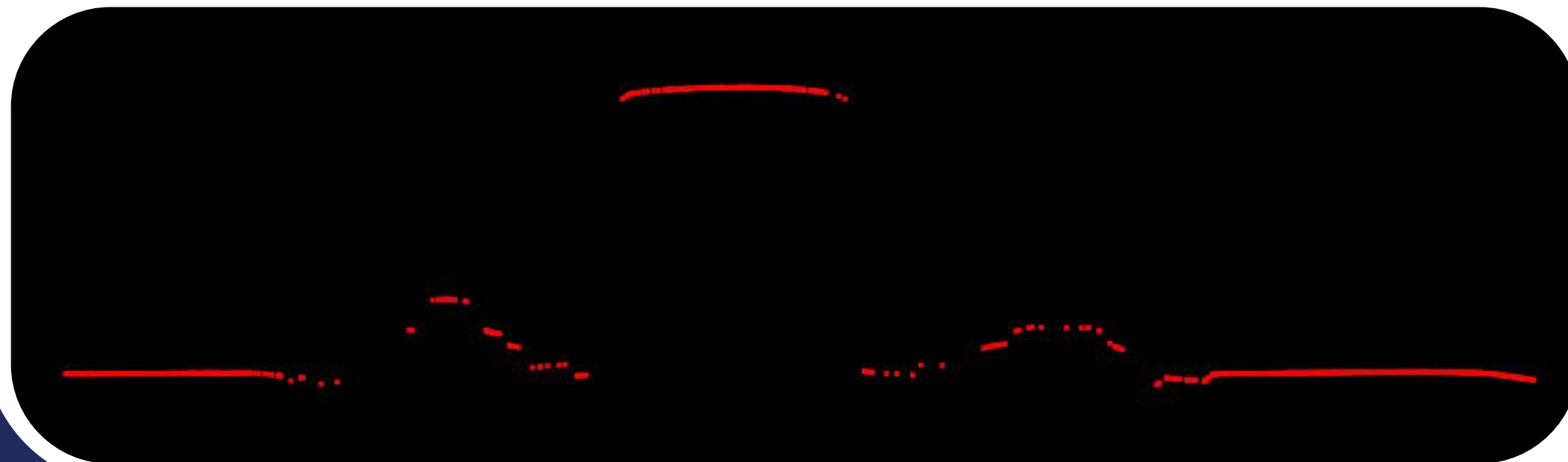
Defects detection:
- **Rail**
- **Fasteners**
- **Sleepers**
- **Ballast**

The Track Surface configuration with **three V3DS units** enables the simultaneous acquisition of the **railway track's 3D shape and high-resolution images**, which are then **correlated through dedicated analysis software**.

Typical Ballast Profile

Typical Railway Profile

Acquisition and Review

Proprietary software allows **data to be collected and analyzed** either directly from the vehicle's control cabin or remotely from a separate location.

ADTSOLUTION