



The 360° no contact survey for Railway and Underground Environment

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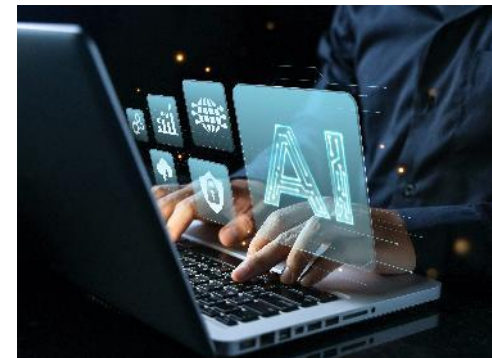
WHO WE ARE

Founded in 2013, **ADTS** is an **Italian company** specialized in the development, production and integration of advanced **diagnostic systems for railway infrastructure**.

We design high-precision, **non-contact technologies for inspecting rails, tunnels and overhead lines**, supporting safer and more efficient rail operations worldwide.

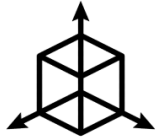
Our expertise lies in combining hardware reliability with intelligent data acquisition and processing.

From inspection trolleys to onboard vehicle systems, we provide modular solutions tailored to diverse operational and customer needs.



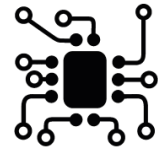
CORE BUSINESS SECTOR

Structured into specialized departments, **ADTS** combines **several years of experience in electro-optical systems** with **shared values of reliability, precision and trust**.



Design & Production

Complete control from concept to integration, with continuous feedback between design, prototyping and testing.



Artificial Intelligence

Proprietary AI models for anomaly detection, defect classification and automated diagnostics beyond traditional methods.



Electronic Department

In-house design of electronic boards ensures performance, integration and long-term maintainability.



Research & Development

Scientific modeling and simulation to drive innovation in railway dynamics and infrastructure monitoring.



Mechanical Department

Robust mechanical design for easy installation, field reliability and long-term durability.



Software Development

Advanced platforms for data acquisition, analysis and reporting, intuitive and scalable by design.

OUR STRATEGY

At **ADTS**, every tailored solution is the result of a unique formula: **a combination of multidisciplinary competence, expertise and the specific needs of our clients.** Through a continuous control chain over development and engineering, we guarantee uncompromising quality and reliability.



OVERHEAD LINE MONITORING

Real-time monitoring of overhead line infrastructure, including catenary and poles

TUNNEL SCAN

Captures very high-resolution images that, with the help of AI, provide automatic defect recognition.

CLEARANCE SCAN

Automatic measurement of the clearance on the railway line.

THERMAL IMAGING

Automatic detection of humidity presence in tunnels.

RAIL CORRUGATION MONITORING

Measures longitudinal rail wear to reduce stress on the rail and on the wheels.

RAIL PROFILE MEASURING SYSTEM

Measures transversal wear.

THIRD RAIL SYSTEM

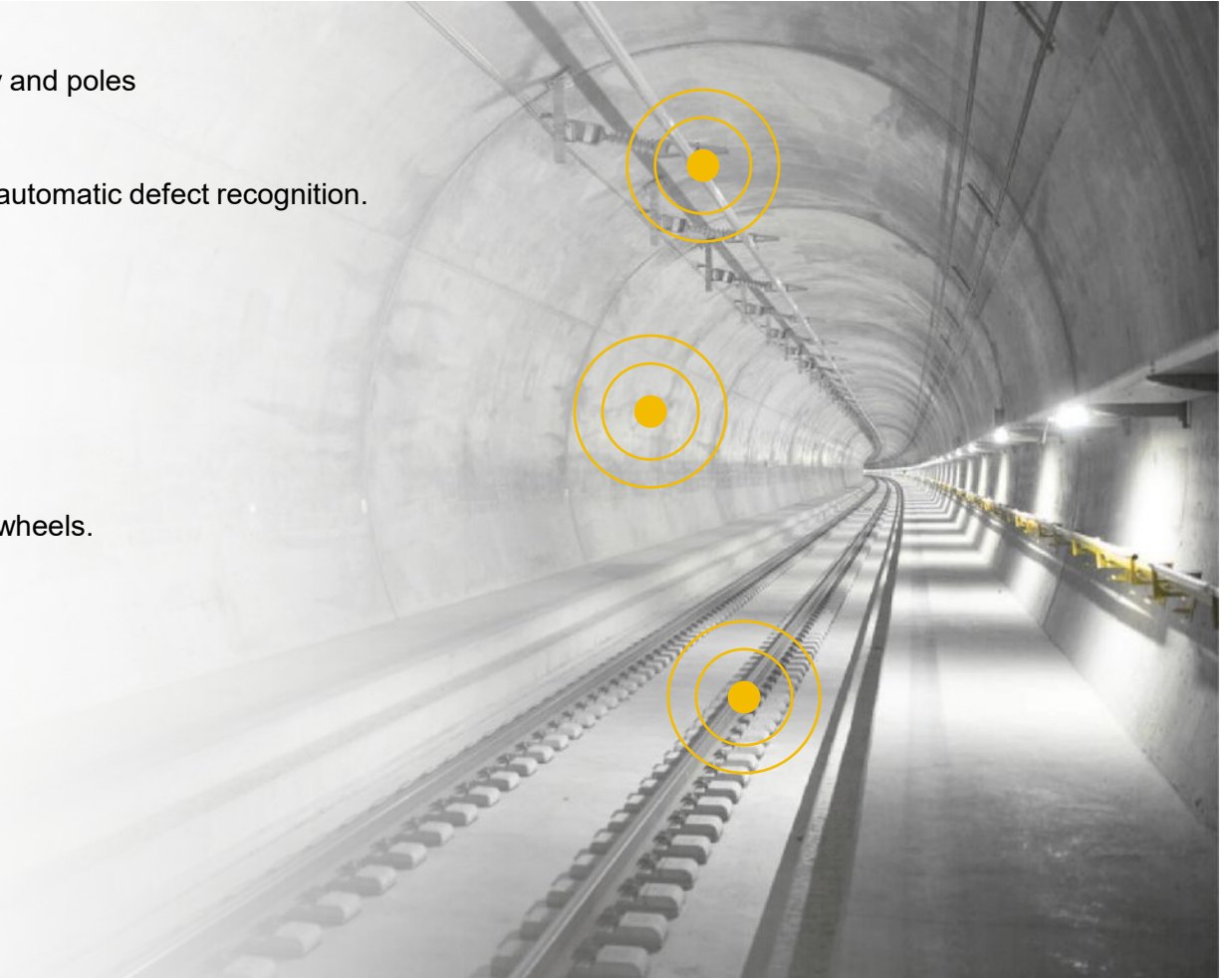
Measures the geometrical position of the 3rd rail

TRACK IMAGING

For the detailed inspection of railway track surfaces

RAIL CRACK DETECTION

For addressing both internal flaws and surface defects



TRACK IMAGING

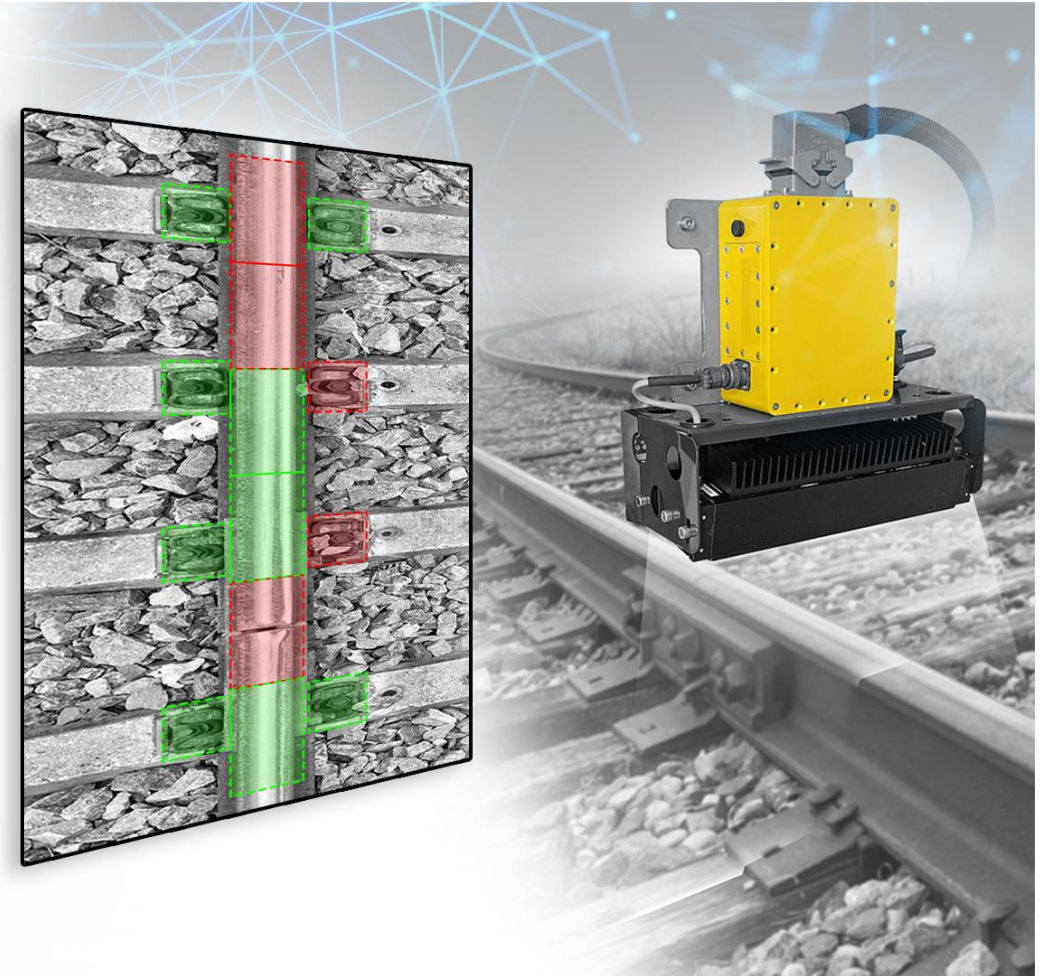
The **Track Imaging system** combine **high-resolution cameras and dedicated lighting** to capture detailed images of the rail and track environment.

The system enable **surface inspection, automatic AI defect detection and visual documentation** with exceptional precision and reliability.

Depending on the specific surface to be inspected and the required level of detail, ADTS provides different models: **HRS, HRS-W and V3DS**.

Performance

Measurement Speed	Up to max operational speed
Resolution	Up to 0,05 mm/px
Target Distance	Up to 1000 mm
Camera resolution	4096 pixels
Lighting Power	100.000 Lux



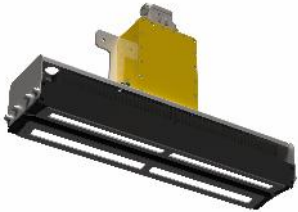
TRACK IMAGING – Models And Configurations

Models



HRS

Resolution	0,05 mm/px
FOV	Ca. 300 mm



HRSW

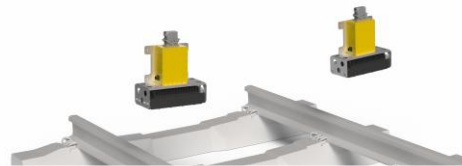
Resolution	0,1 mm/px
FOV	Ca. 600 mm



V3DS

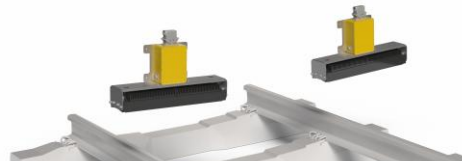
Resolution	0,1 mm/px
FOV	Ca. 600 mm

Configurations



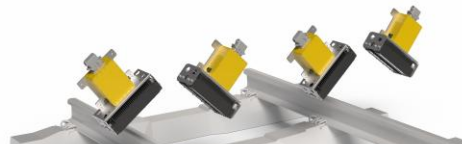
Rail Surface Configuration

Devices	2 x HRS
Defects detection	Rails



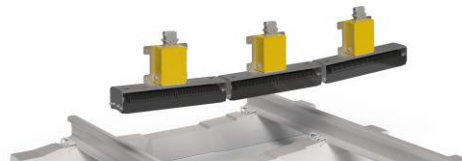
Rail View Configuration

Devices	2 x HRSW
Defects detection	Rails, Fasteners



Rail View Configuration

Devices	4 x HRS
Defects detection	Fishplates

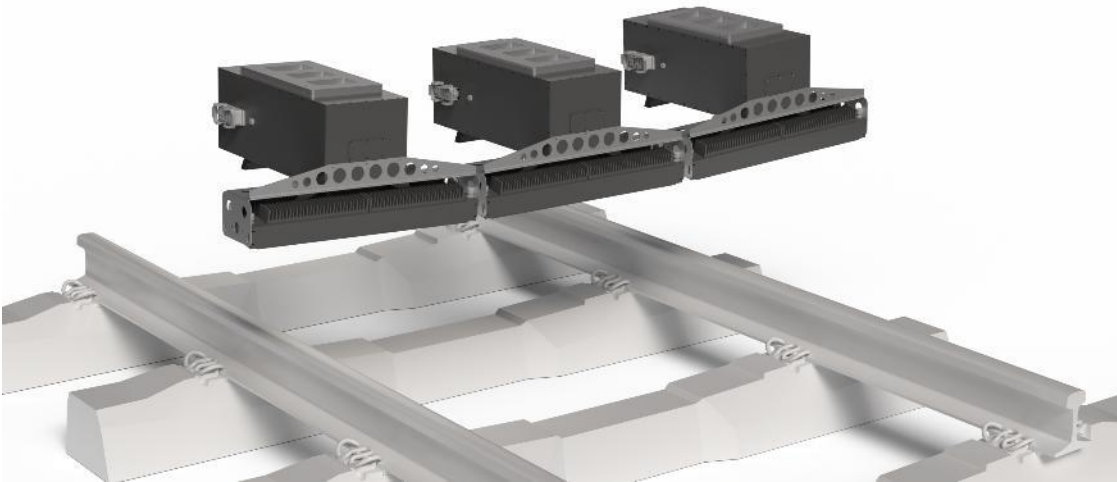


Full Track Configuration

Devices	3 x HRSW
Defects detection	Rails, Fasteners, Sleepers

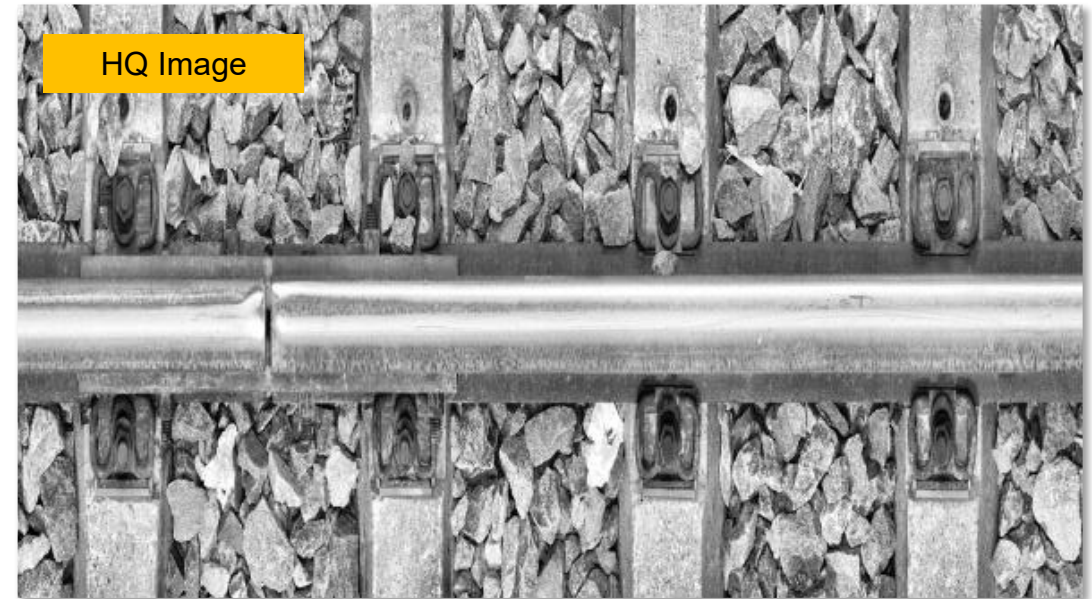
TRACK IMAGING – 3D Full Track Configuration

The **3D Full Track 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.

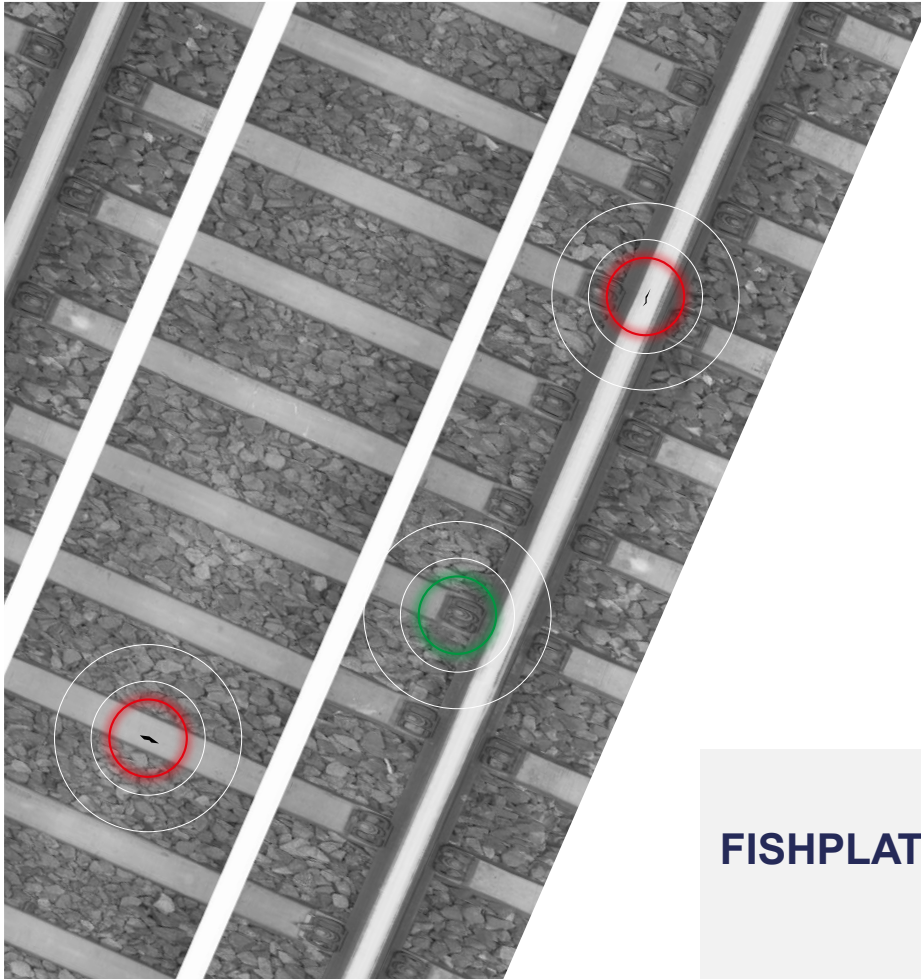


3D Full Track Configuration

Devices	3 x V3DS
Defects detection	Rails, Fasteners, Sleepers, Ballast

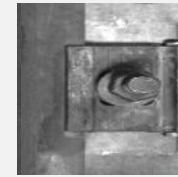


TRACK IMAGING – AI Enhanced inspection



Integrated **Artificial Intelligence** autonomously detect cracks and surface defects, presence and alignment of components, deformations and wear and other structural integrity indicators.

FASTENERS



Fastener Lost



Rotated Fastener



Bolt Lost



Fastener Absent

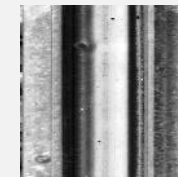
RAIL



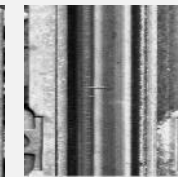
Big Holes



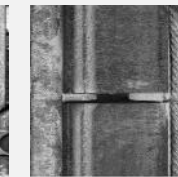
Wheelburns



Black Spots



Cracks

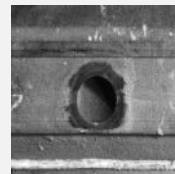


Big Rail-Gaps



No Rail-Gaps

FISHPLATES



Missing bolt



Loosening bolt

SLEEPERS



Cracks

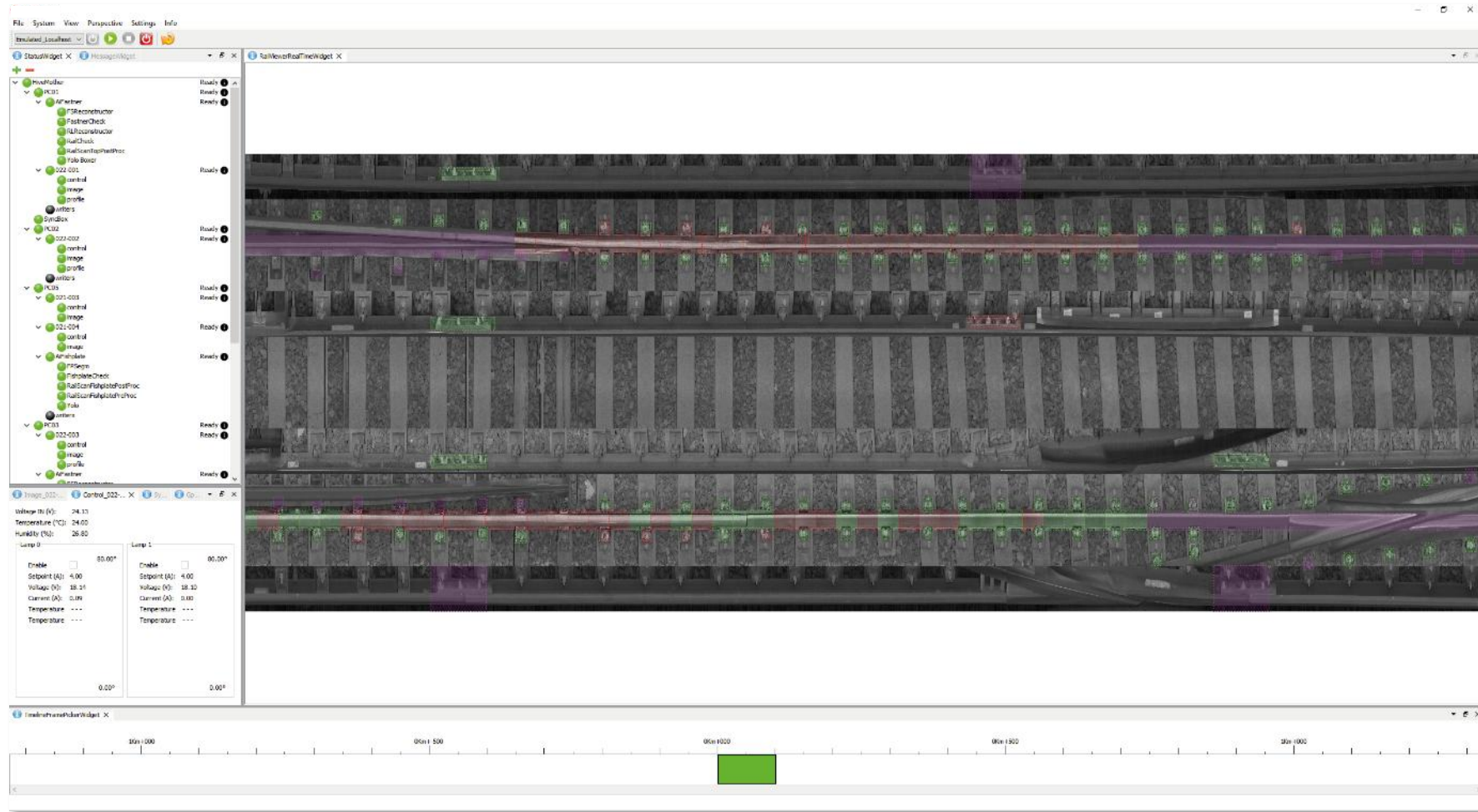


Material Lost

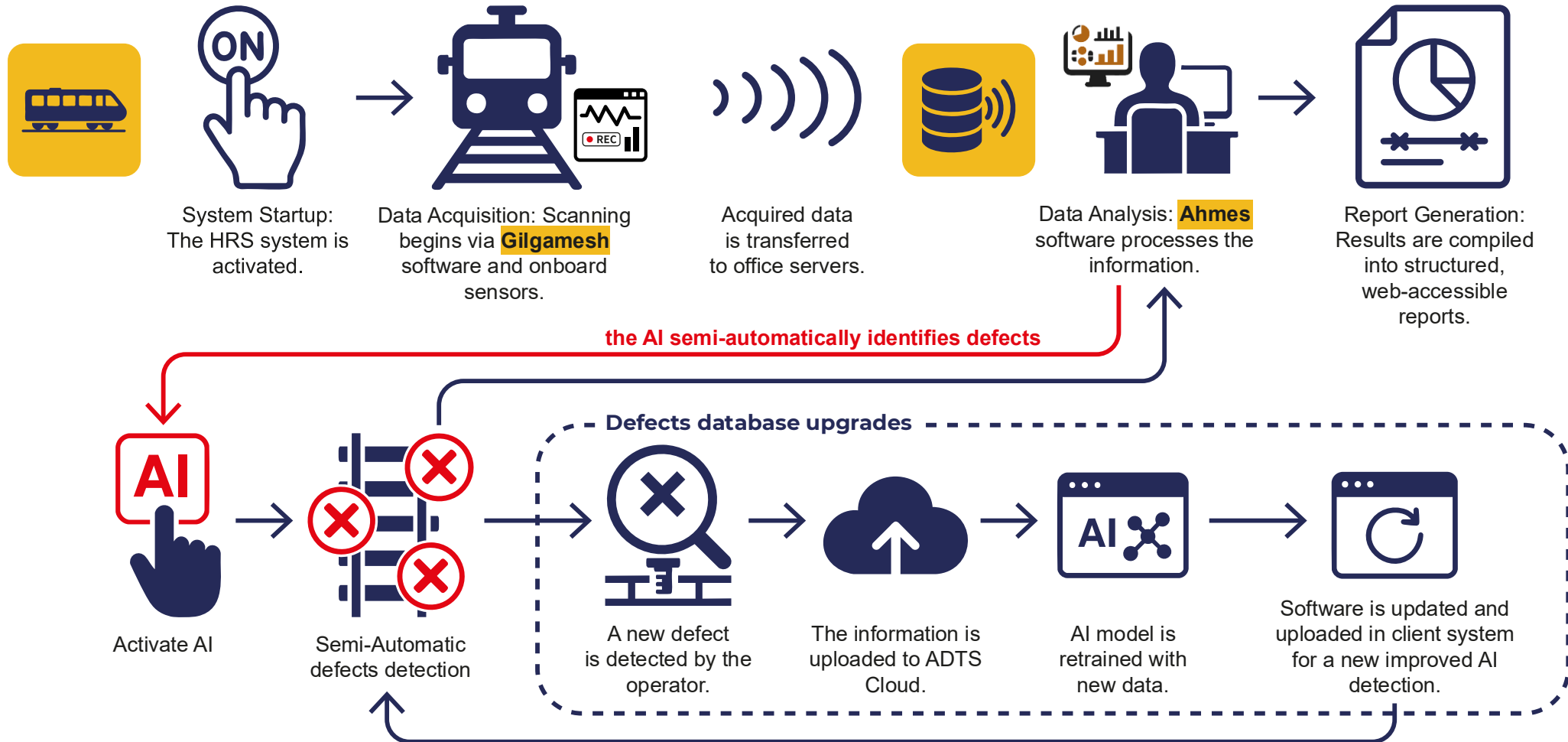


Foreign Material

TRACK IMAGING – AI Enhanced inspection



TRACK IMAGING – How The System Works



TRACK IMAGING – [Web](#) and Video



TUNNEL SCAN

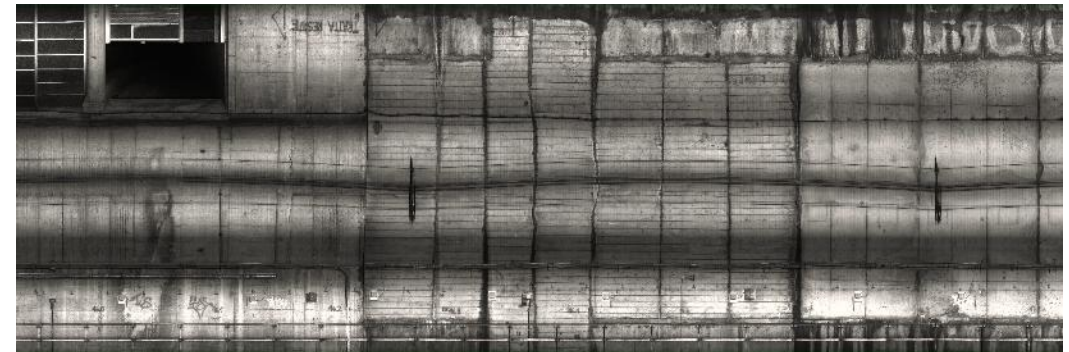
Tunnel Scan is a comprehensive solution for monitoring railway tunnels, metro systems, bridge underpasses, underground passages and galleries.

It is ideal for routine inspections, maintenance planning, dimensional analysis, or post-event structural assessments.

Equipped with **cameras, illuminators and a profiler**, the system provides **high-resolution imaging and 3D profiling** in a single acquisition pass.

Performance

Measurement Speed	up to 60 km/h
Longitudinal Resolution	1 mm
Transversal Resolution	1 mm
Vision System	18,000 pixels
Illuminating power	1,600 W
Profiler max target distance	9 m



TUNNEL SCAN – Image Acquisition

Using **five high-speed line scan cameras**, the system captures tunnel walls at **1 mm resolution**, both longitudinally and transversally, **at speeds up to 60 km/h**. The entire structure is acquired in a single pass, ensuring **fast, accurate, and complete data acquisition**.



TUNNEL SCAN

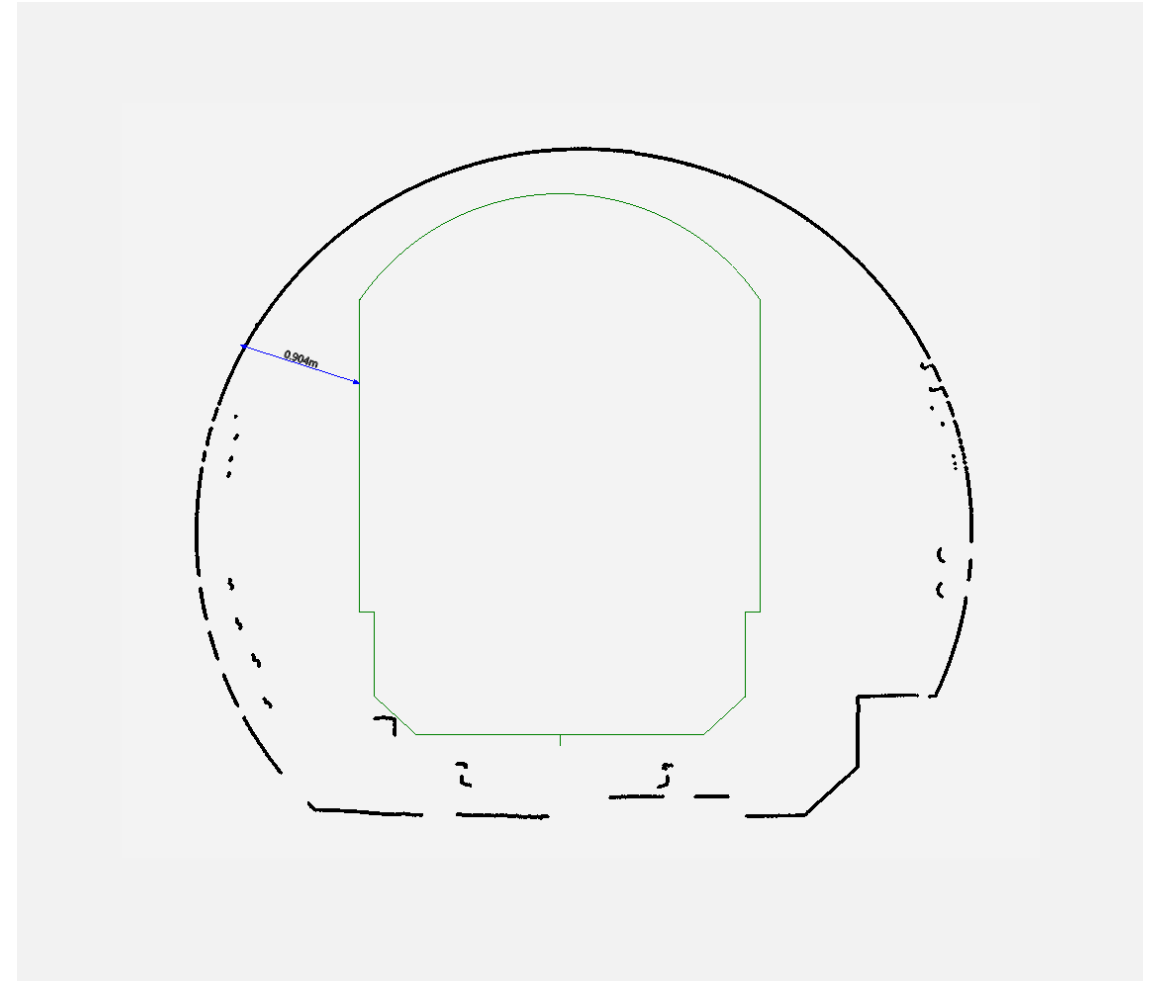
Custom high-power LED bars are arranged along the vehicle profile to ensure **uniform, high-intensity illumination**, enabling sharp image capture even in **low-visibility environments**.



TUNNEL SCAN – 3D Profiling

The profiler performs a full 360° scan of the tunnel's transverse profile, allowing:

- **Automatic clearance and gauge analysis**
- **3D reconstruction** of environment surfaces
- Early **detection of potential structural threats** through data correlation

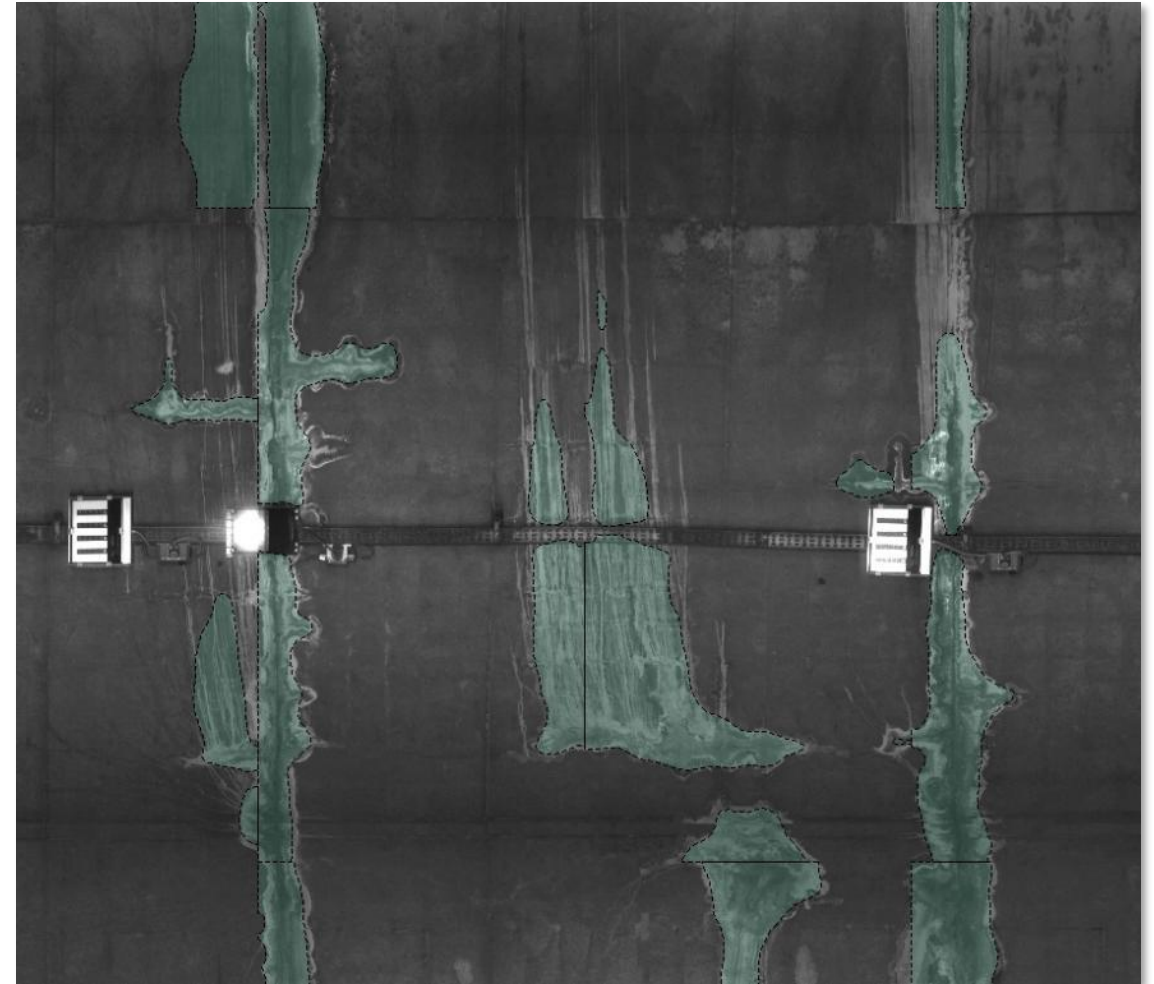


TUNNEL SCAN – AI Powered Defects Recognition

Automatic Defects Recognition

By combining high-speed linear cameras, laser scanners and AI diagnostics, **the system automatically detects and classifies:**

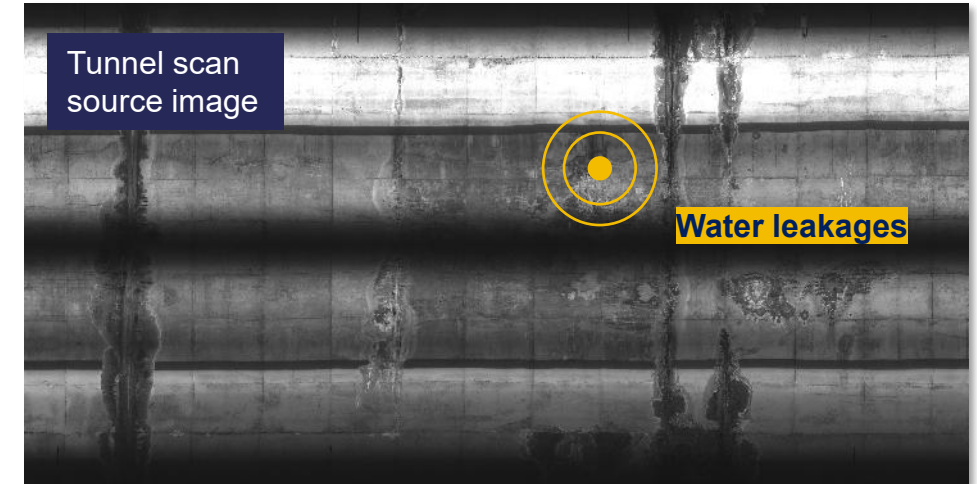
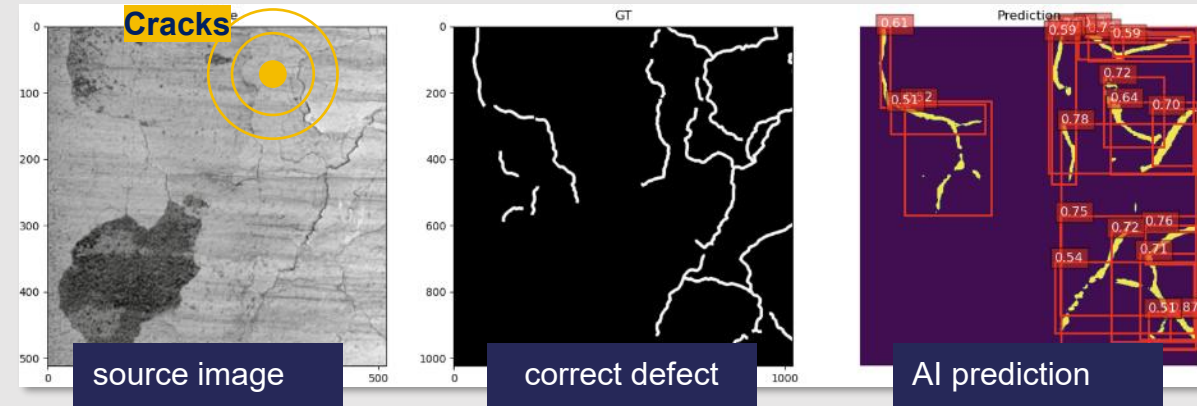
- **Water leakage and wet surfaces,**
- **Cracks,**
- **Aggregate exposure,**
- **Pop-outs,**
- **Joint percolation,**
- **(Optional) Thermal anomalies via the Thermal Inspection System (TIS).**



TUNNEL SCAN – AI Powered Defects Recognition

The ability to collect data that is not influenced by the speed and/or position of the defect, allows for a **consistent processing system**.

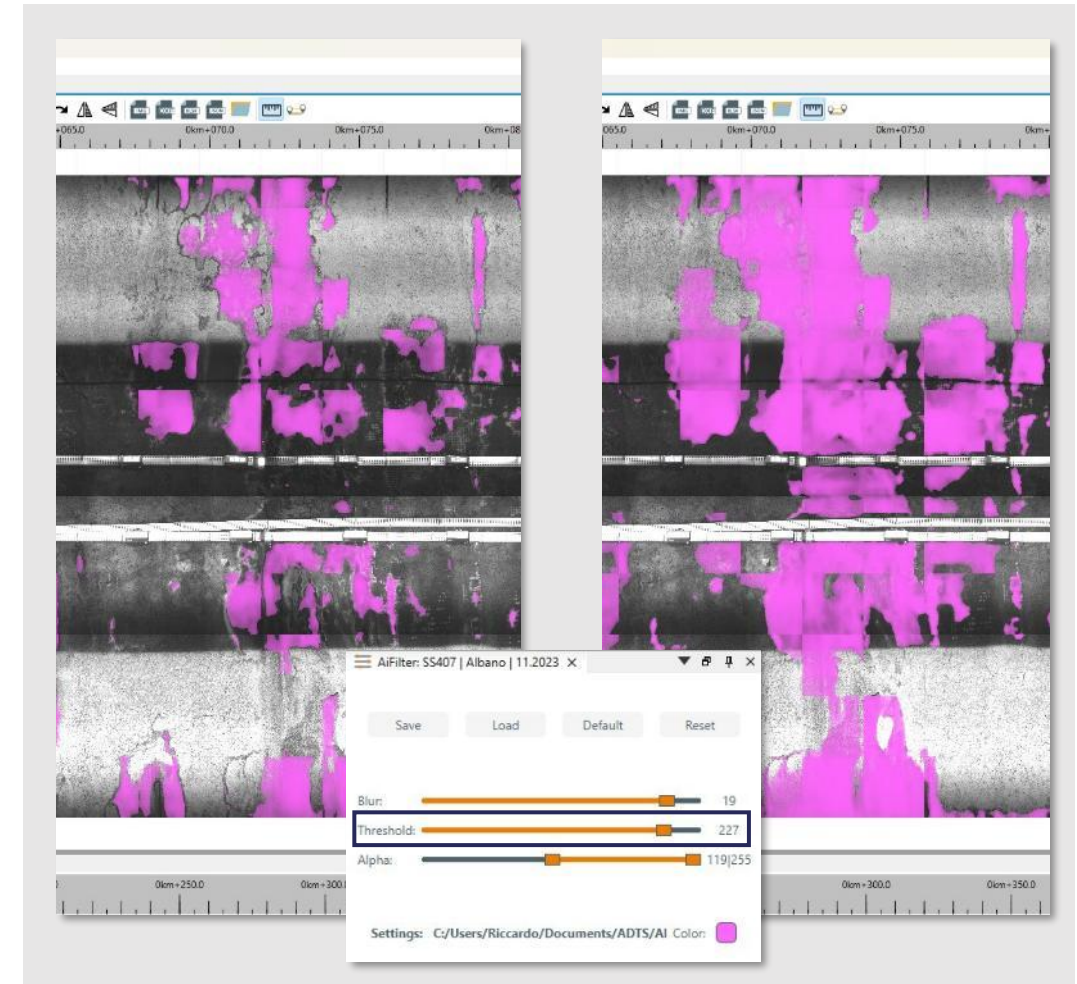
The **Artificial Intelligence** networks, thus built in recent years, have achieved **increasingly complex and reliable recognition capabilities**.



TUNNEL SCAN – AI Processing

Along with recognition, **the system also evaluates the severity of each defect.**

This enables the user to **define threshold levels and automatically prioritize the most critical issues**, streamlining maintenance planning and intervention scheduling.

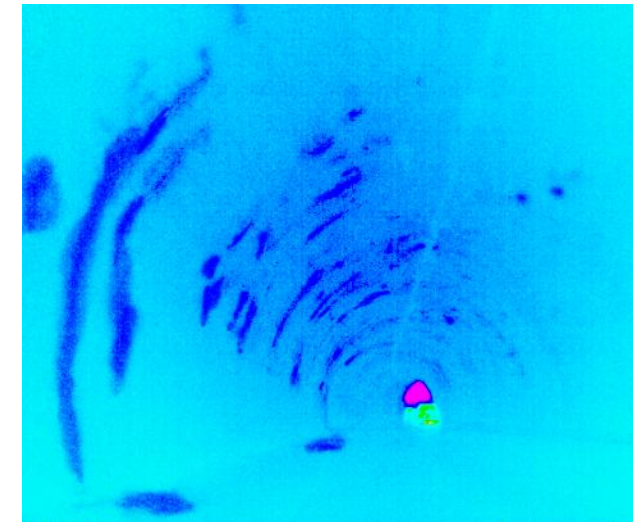
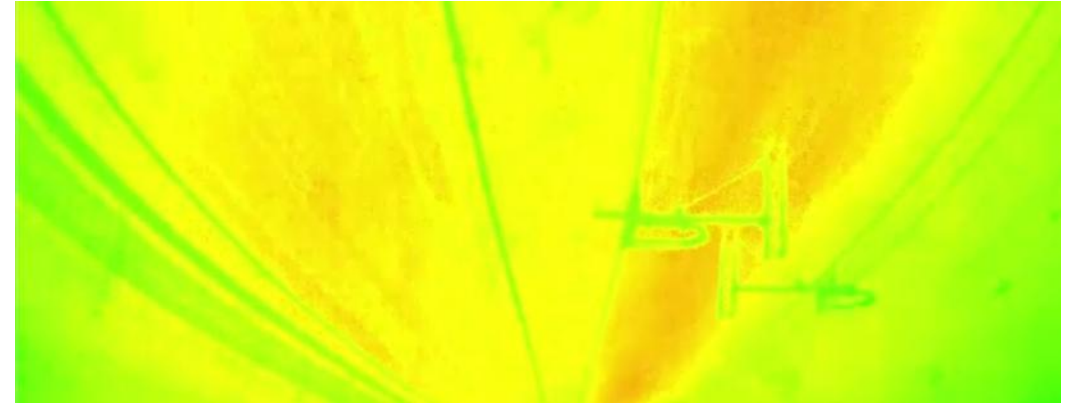


TUNNEL SCAN – Thermal Imaging

ADTS has also developed a **compact and lightweight Thermal Inspection System (TIS)** capable of detecting the presence of humidity in the roof of tunnels.

At the core of the system is a **thermal camera**, that **operates at 30 Hz with up to 640×480 thermal image resolution**, able to detect subtle temperature variations in real time.

By combining thermal (infrared light) and visible imaging, the system offers an advanced non-contact solution for detecting anomalies invisible to standard cameras.

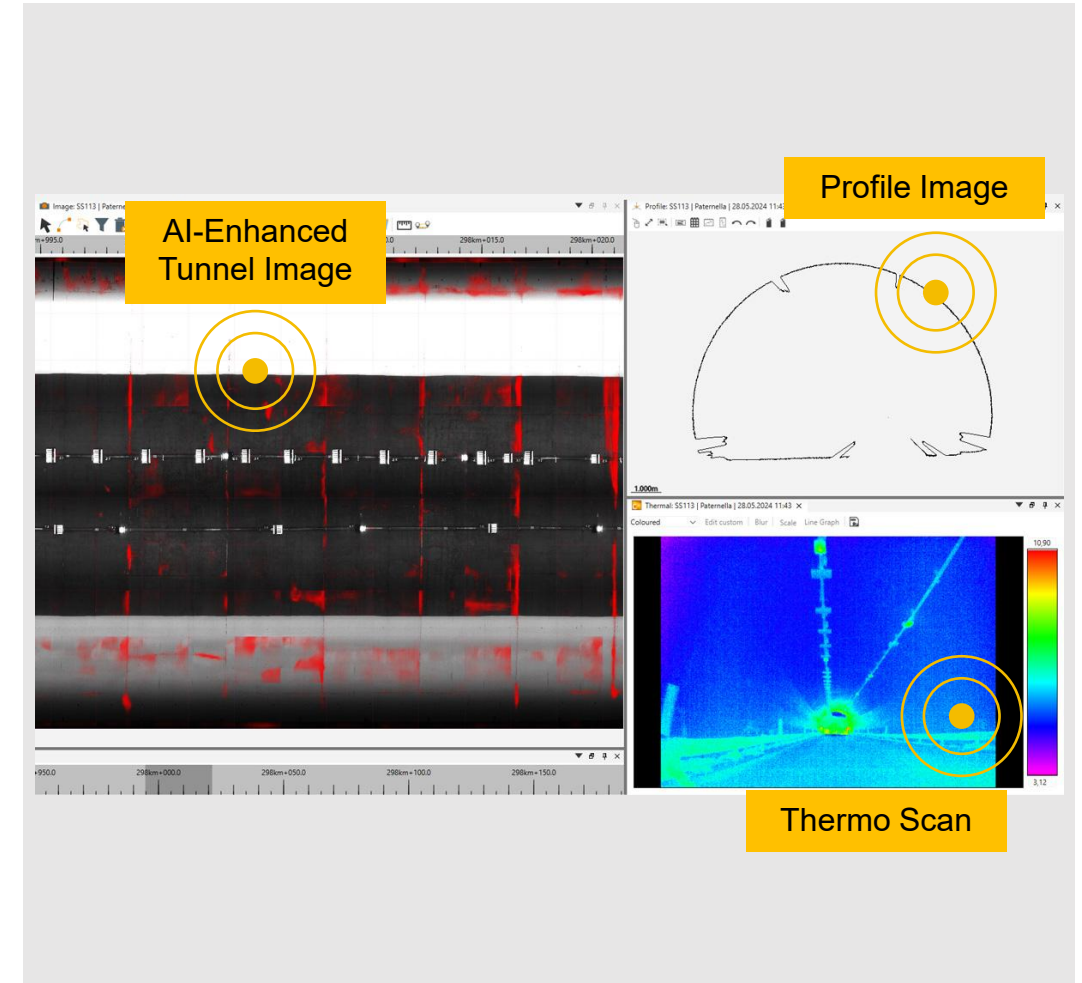


TUNNEL SCAN – Acquisition and Analysis

Acquired data management software allows for a **correlated analysis of all acquired data**.

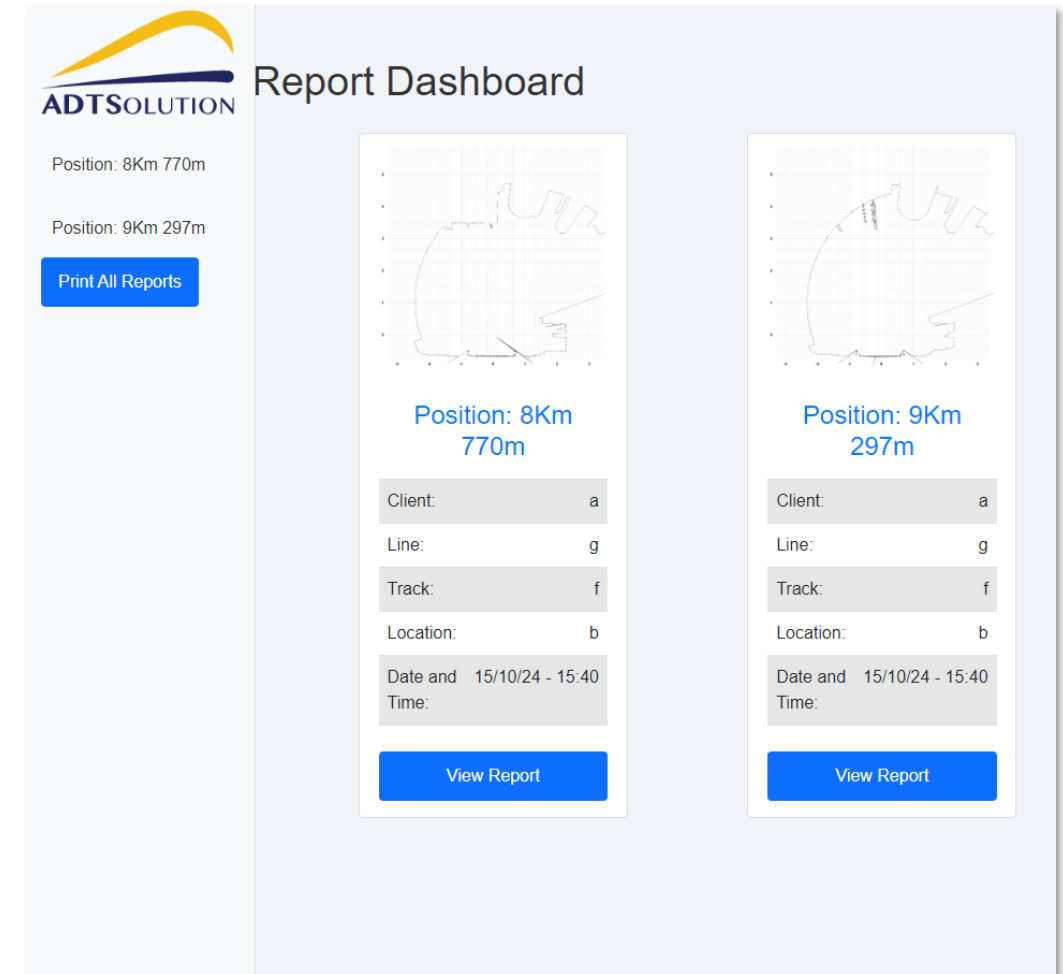
The progress metric links the different types of acquisitions together.

All analysis results can be exported into detailed reports, including images, coordinates, and severity indicators.



TUNNEL SCAN – Analysis Report

The Software also generates **web-accessible reports** that **clearly highlight critical areas and anomalies**, providing stakeholders with **immediate insights and actionable information**.



Tunnel Scan

Comprehensive Diagnostics for Tunnel Infrastructure

← View all Monitoring Systems

Tunnel Scan

Tunnel Scan is a **comprehensive solution** for monitoring railway tunnels, metro systems, bridge underpasses, underground passages and galleries. It is ideal for routine inspections, maintenance planning, dimensional analysis, or post-event structural assessments.

The Tunnel Scan (TS) system by ADTS sets a new standard in **tunnel inspection**, providing **high-resolution imaging and 3D profiling in a single acquisition pass**.

ADTS Tunnel Scan captures tunnel walls at **1 mm resolution**, both longitudinally and transversally, **while operating at speeds up to 60 km/h**. The entire structure is digitized in one pass, ensuring fast, accurate and complete data acquisition.



APPLICATION CASES

Rail vehicle

Client: **ETS** Country: **Italy**

Integration of the **Tunnel Scan System** into a rail vehicle for tunnels mapping and inspection.



Rail-Road IVECO vehicle

Client: **ETS** Country: **Italy**

Integration of the **Tunnel Scan System** into a dual-mode (road/rail) vehicle for tunnels mapping and inspection.



APPLICATION CASES

Railway Inspection Vehicle

Client: **Noble Rail** Country: **China**
Mount a **3D Full Track System** for the detection of defects on rails, fasteners, sleepers and ballast.



Tunnel Scan on rail vehicle

Client: **Rail Technology** Country: **Germany**
Integration of the Tunnel Scan system into a rail vehicle for tunnels mapping and inspection.



APPLICATION CASES

Clearance and Video Inspection Vehicle

Client: **Taiwan Railway Administration** Country: **Taiwan**
Clearance Measuring Profiler and Video Inspection Systems.



Railway Inspection Vehicle

Client: **Metro Taipei** Country: **Taiwan**
Tunnel Scan System, comprising Clearance Measuring Profiler and Video Inspection Systems.



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