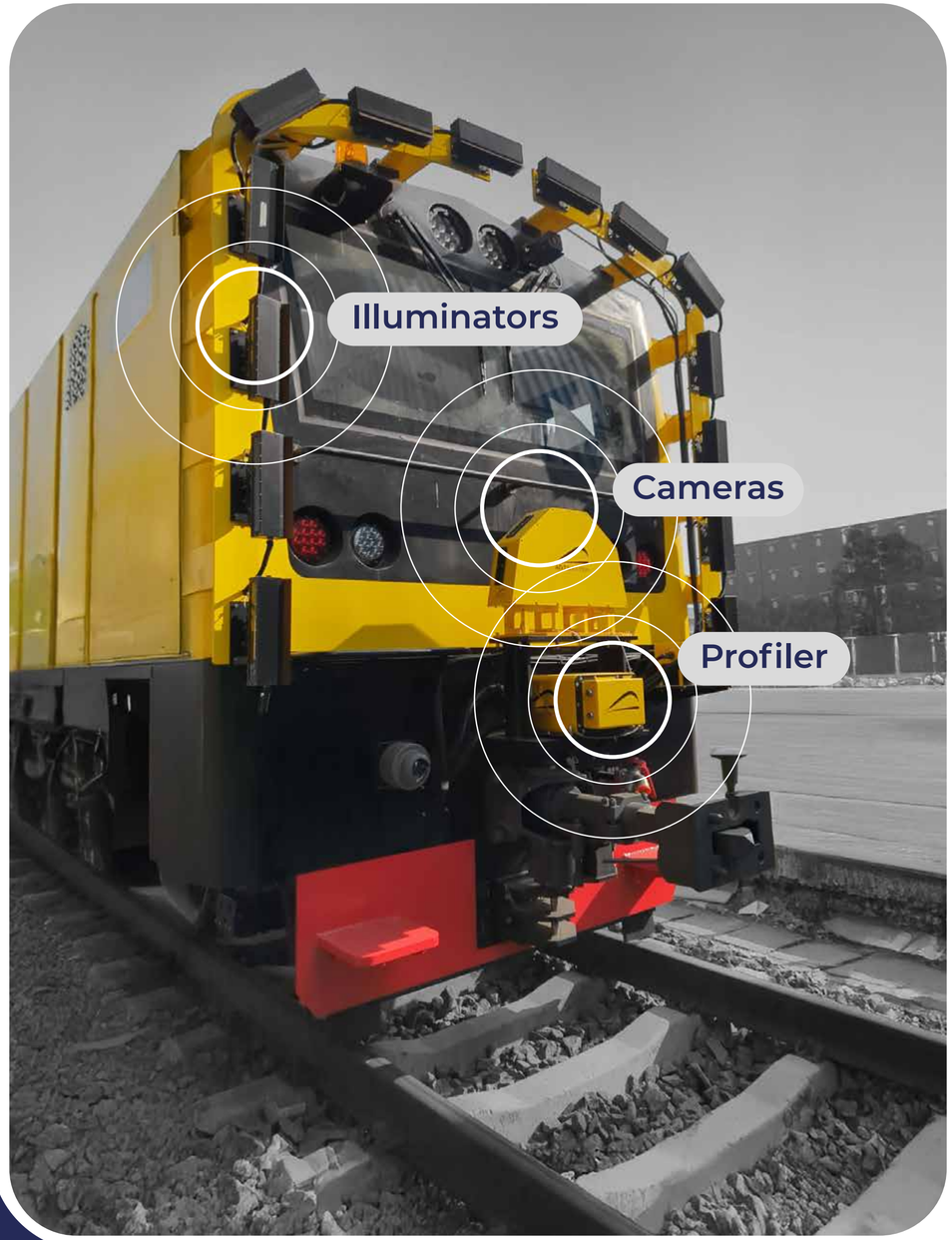
TUNNEL SCAN

Comprehensive Diagnostics for Tunnel Infrastructure

ADTSOLUTION

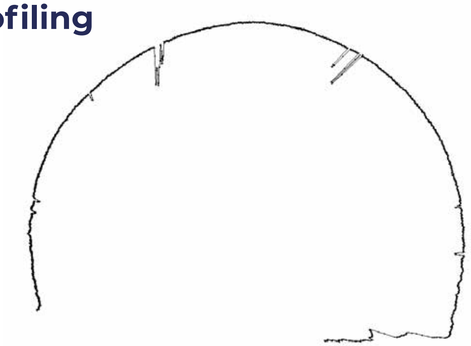


The Tunnel Scan (TS) System sets a new standard in railway tunnel inspection, providing **high-resolution imaging and 3D profiling in a single acquisition pass**.

TS scans tunnel walls at **1 mm resolution, both longitudinally and transversally**, at speeds up to 60 km/h. The entire structure is captured in a single pass, ensuring fast, accurate and complete data acquisition.

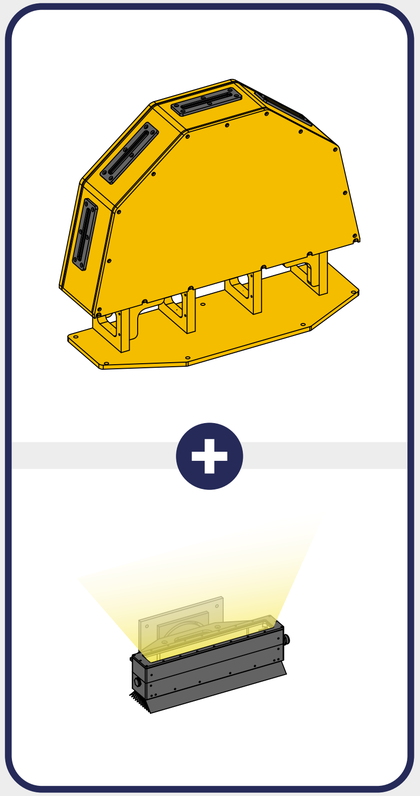
Performance	
Max Speed	Up to 60 km/h
Sampling step	1 mm
Led Light	1600 W
Max Target Distance	9 m

Profiling



How it works

LEDs illuminate the tunnel, cameras capture surface detail and the laser scanner maps 3D geometry, all in one seamless scan.



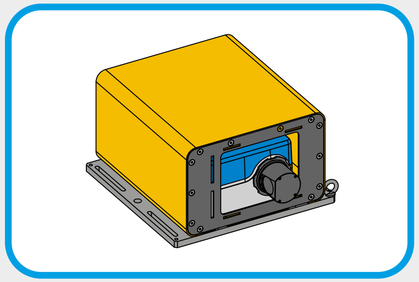
Camera Box

High-resolution imaging unit with radially mounted line-scan cameras.

Camera Accuracy	**~1mm@5m**
FOV	**210°**
Longitudinal resolution	**0.5 mm**

Illuminator

High-power LED lighting system arranged in a radial layout; the combination of multiple units ensures uniform illumination.



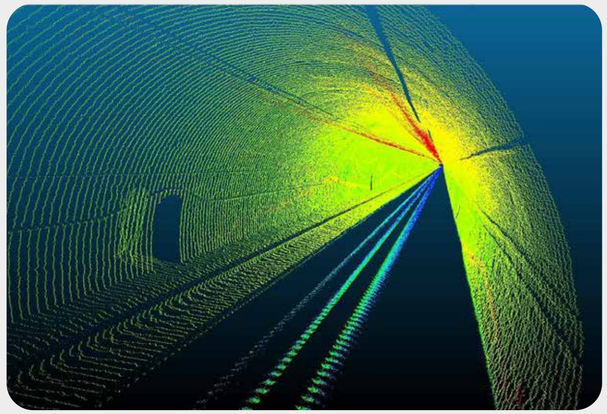
Profiler

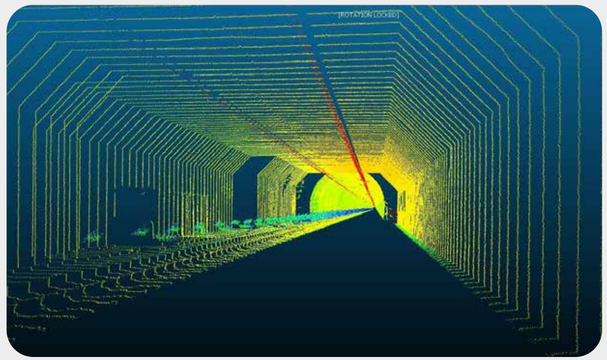
Phase-based laser scanner with 360° field of view and helicoidal scan pattern; Provides high-speed, high-precision 3D profiling.

Advanced functions

3D Reconstruction

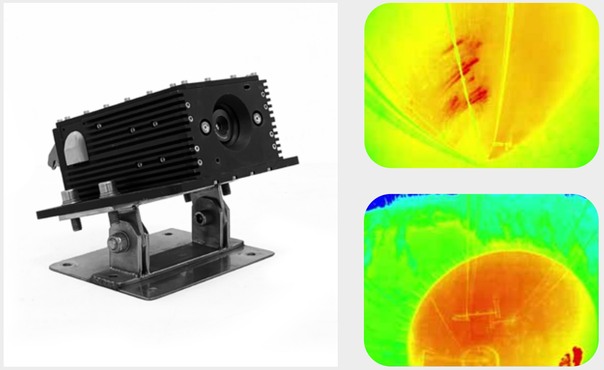
Point cloud generation via laser profiling for full-environment modeling around the train.





Thermal Inspection System

Captures temperature variations along tunnel walls to detect anomalies such as leaks or insulation issues.

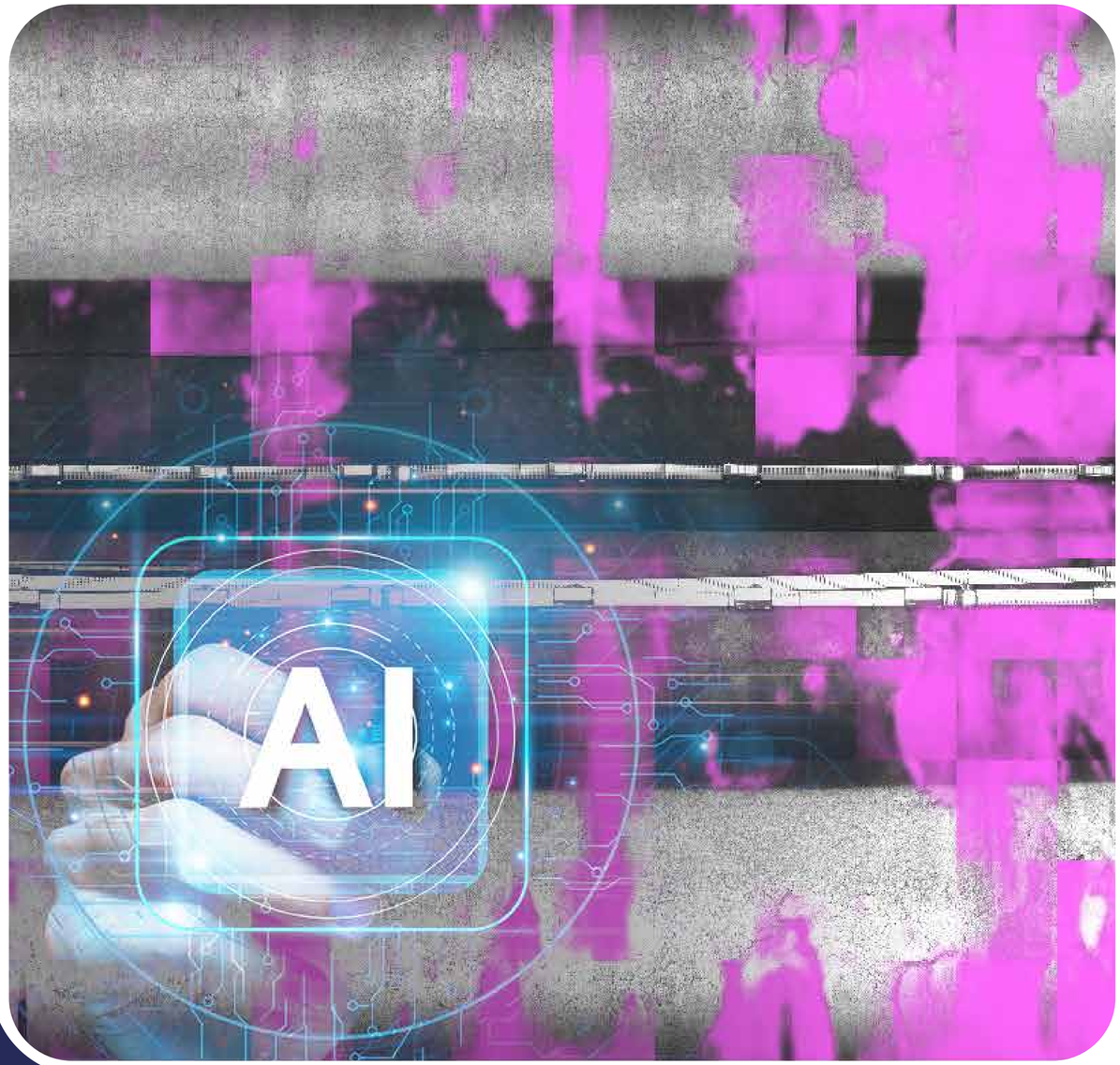


Measurement speed	**~1mm@5m**
Operating temp.	**-5°C to +50°C**
Vision System	**Thermal camera CCD 640 x 480**
Defects detected	**Water infiltration and leakage**

Video Camera

Enables **visual documentation of the inspected route**, aligned with profile and image data.

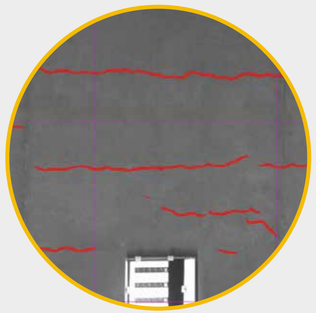
AI-powered defect detection



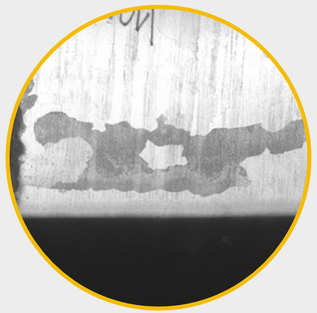
By combining high-speed linear cameras, laser scanners and AI diagnostics, **the system automatically detects** and classifies:

- Cracks
- Aggregate exposure
- Pop-outs
- Water leakage and wet surfaces
- Joint percolations
- Thermal anomalies via the Thermal Inspection System (TIS)

Defects Catalogue

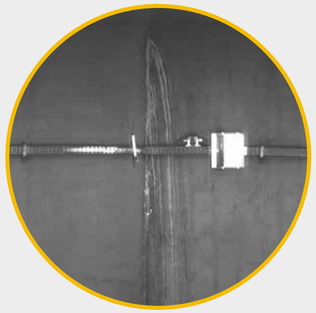


Cracks

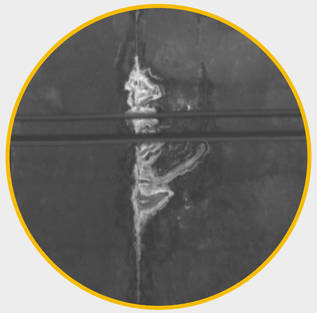


Aggregate Exposure

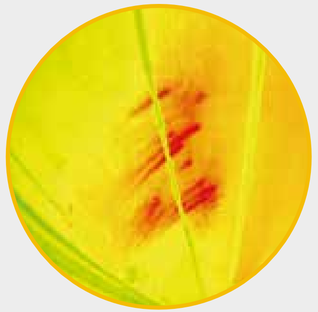
Rebar Exposure and Corrosion



Percolations



Water Leakages



Thermal Anomalies

Applications

- **Railway tunnels**
- **Metro systems**
- **Bridge underpasses**
- **Undeground passages and galleries**

Compatible with both rail-bound and road-rail vehicles, offering flexible deployment across different inspection platforms.