HIGH CAPACITY I PRECISION I RELIABILITY

Plasser & Theurer

Digital Transformation of Railway Infrastructure

Stefan Damm, CEO DMA (Italy)
Jochen Nowotny, CEO tmc (Austria)

Track Machines Connected

We ♥ Railways

FOUNDED IN	3 SITES	EMPLOYEES
2019	Austria & India	96

The IT branch of world market leader Plasser & Theurer: **High-tech in the Niche**

Coming from Austria, the **#4 export country in rail technology**

You are no Beta-Tester: **Quality Assurance on our machines and tracks**

Software Suite tmOS understands **Lifecycle Management, Obsolescence and Cybersecurity**

DMA s.r.l. – Acurate & Reliable

Part of Plasser & Theurer since 2023

OUR FOCUS
Trainborne applications

LOCATED IN TURIN
ITALY'S INDUSTRIAL CENTER.

120 EMPLOYEES

ENTIRE VALUE CHAIN

- Design & Engineering
- Manufacturing & Lifecycle
- Integration & Installation

FOUNDED 1997

01 Digital Environmental Twin

High-precision colored Point Clouds

Project Offenburger Railway Line, Germany

Project Riedbahn Railway Line, Germany

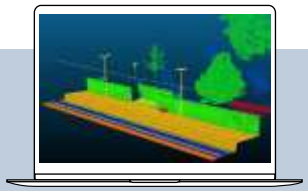
Digital full-service process

Making a Point cloud useful

Track Survey

MEASUREMENT CARS,
TROLLEYS, FLAT WAGONS

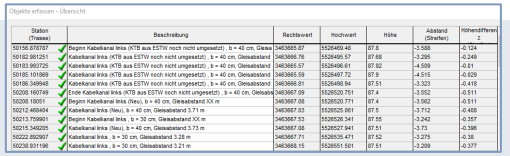
1. Central start & stop
2. Capture & process
3. Upload to backoffice



Generation of highly precise Point Cloud & AI-based Data Analytics

BACKOFFICE

1. Visualization
2. AI - application
3. Analysis & measurements



Transparent Data and Documentation

BACKOFFICE

1. Categorized Point Cloud
2. Inventory – geo-data package
3. Updated drawings
4. Reports

02 Inventory as a Service

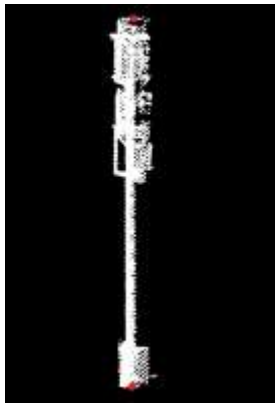
Makes more use of the Point Cloud

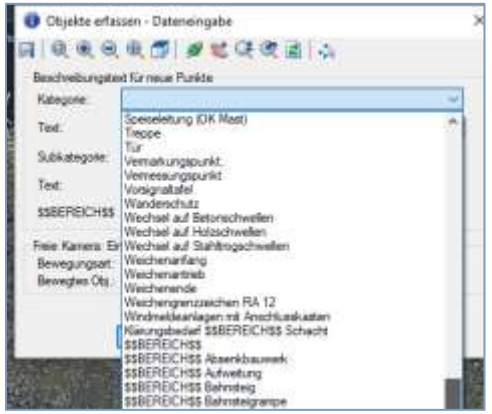
Inventory as a Service

Doing the counting …

Automatic Detection in (driving-) images

Automatic extraction of individual objects as point cloud





Objekte erfassen - Übersicht

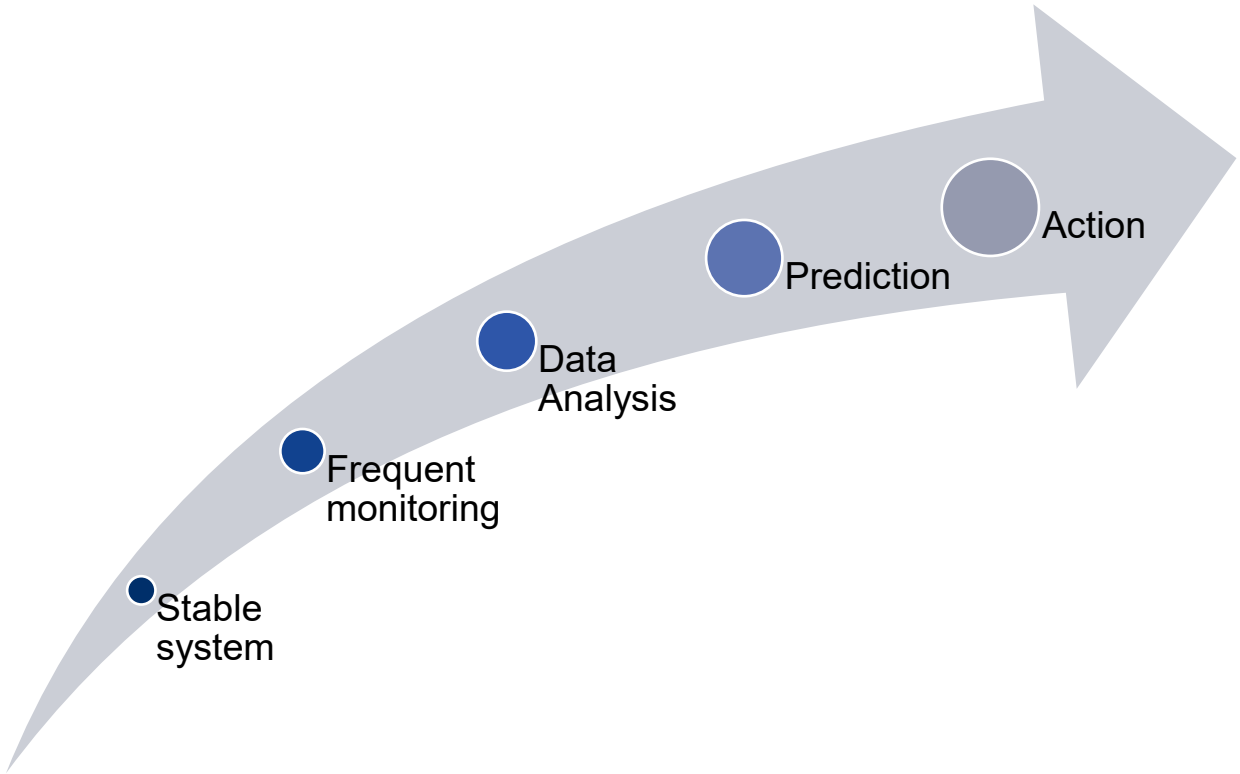
Station (Trasse)	Beschreibung	Rechtswert	Hochwert	Höhe	Abstand (Streifen)	Höhendifferenz
50156.878787	Beginn Kabelkanal links (KTB aus ESTW noch nicht umgesetzt) , b = 40 cm, Gleisa	3463665.87	5526469.48	87.8	-3.588	-0.124
50182.981251	Kabelkanal links (KTB aus ESTW noch nicht umgesetzt) , b = 40 cm, Gleisabstand	3463666.76	5526495.57	87.68	-3.295	-0.249
50183.993725	Kabelkanal links (KTB aus ESTW noch nicht umgesetzt) , b = 40 cm, Gleisabstand	3463665.57	5526496.61	87.92	-4.509	-0.01
50185.101869	Kabelkanal links (KTB aus ESTW noch nicht umgesetzt) , b = 40 cm, Gleisabstand	3463665.59	5526497.72	87.9	-4.515	-0.029
50186.349948	Kabelkanal links (KTB aus ESTW noch nicht umgesetzt) , b = 40 cm, Gleisabstand	3463666.81	5526498.94	87.51	-3.323	-0.418
50208.160749	Ende Kabelkanal links (KTB aus ESTW noch nicht umgesetzt) , b = 40 cm, Gleisabs	3463667.09	5526520.751	87.4	-3.552	-0.511
50208.18051	Beginn Kabelkanal links (Neu), b = 40 cm, Gleisabstand XX m	3463667.08	5526520.771	87.4	-3.562	-0.511
50212.468404	Kabelkanal links (Neu), b = 40 cm, Gleisabstand 3.71 m	3463667.03	5526525.061	87.5	-3.712	-0.408
50213.759901	Beginn Kabelkanal links , b = 30 cm, Gleisabstand XX m	3463667.53	5526526.341	87.55	-3.242	-0.357
50215.349205	Kabelkanal links (Neu), b = 40 cm, Gleisabstand 3.73 m	3463667.08	5526527.941	87.51	-3.73	-0.396
50222.892907	Kabelkanal links , b = 30 cm, Gleisabstand 3.28 m	3463667.71	5526535.471	87.52	-3.275	-0.38
50238.931196	Kabelkanal links , b = 30 cm, Gleisabstand 3.21 m	3463668.15	5526551.501	87.51	-3.209	-0.377

03 Slab-track Measurements

Geometric stability offers prediction based on micro-changes

Slab-track Measurements

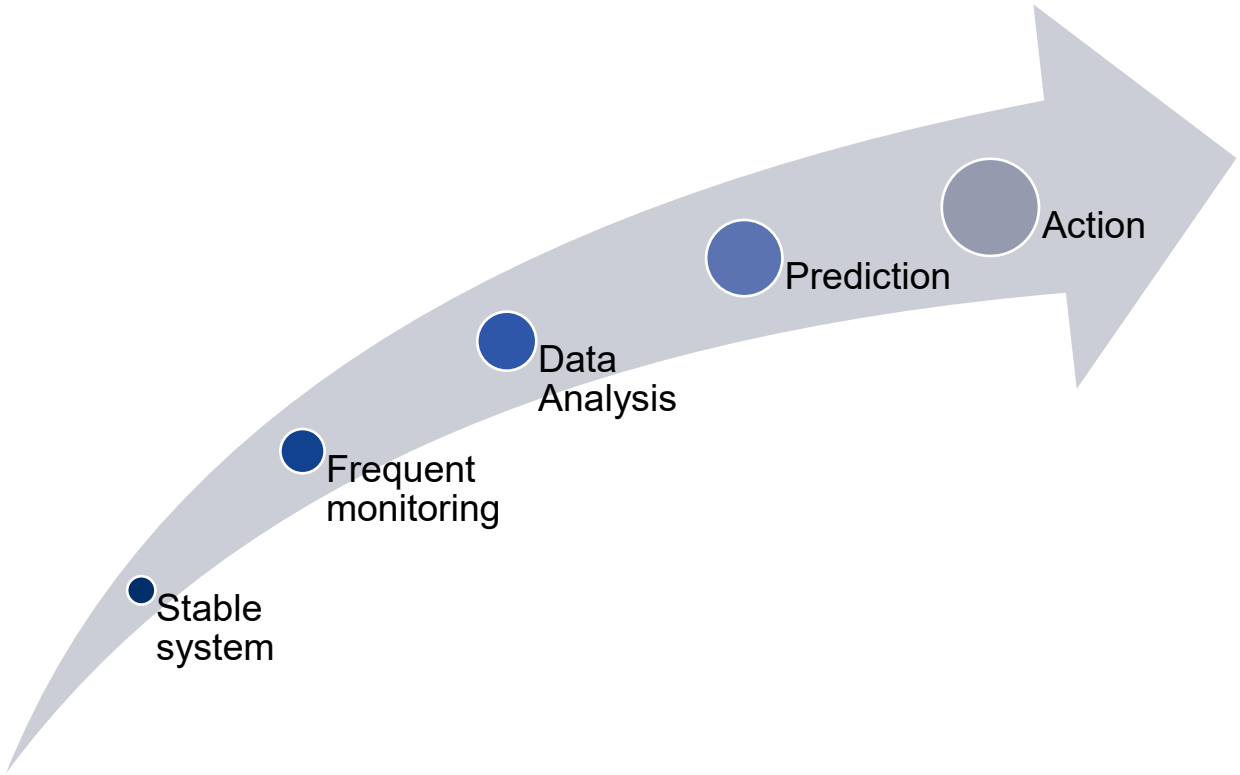
Track Geometry: minimum settlement and deformation

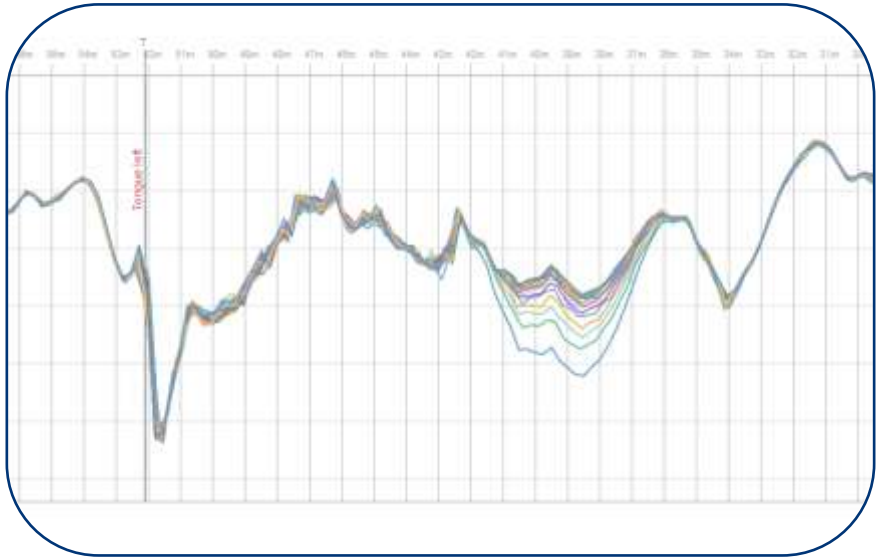


The slab track system ensures exceptional geometric stability over time, minimizing settlement and deformation compared to ballast track.

Slab-track Measurements

Track Geometry: subtle trends allow for prediction

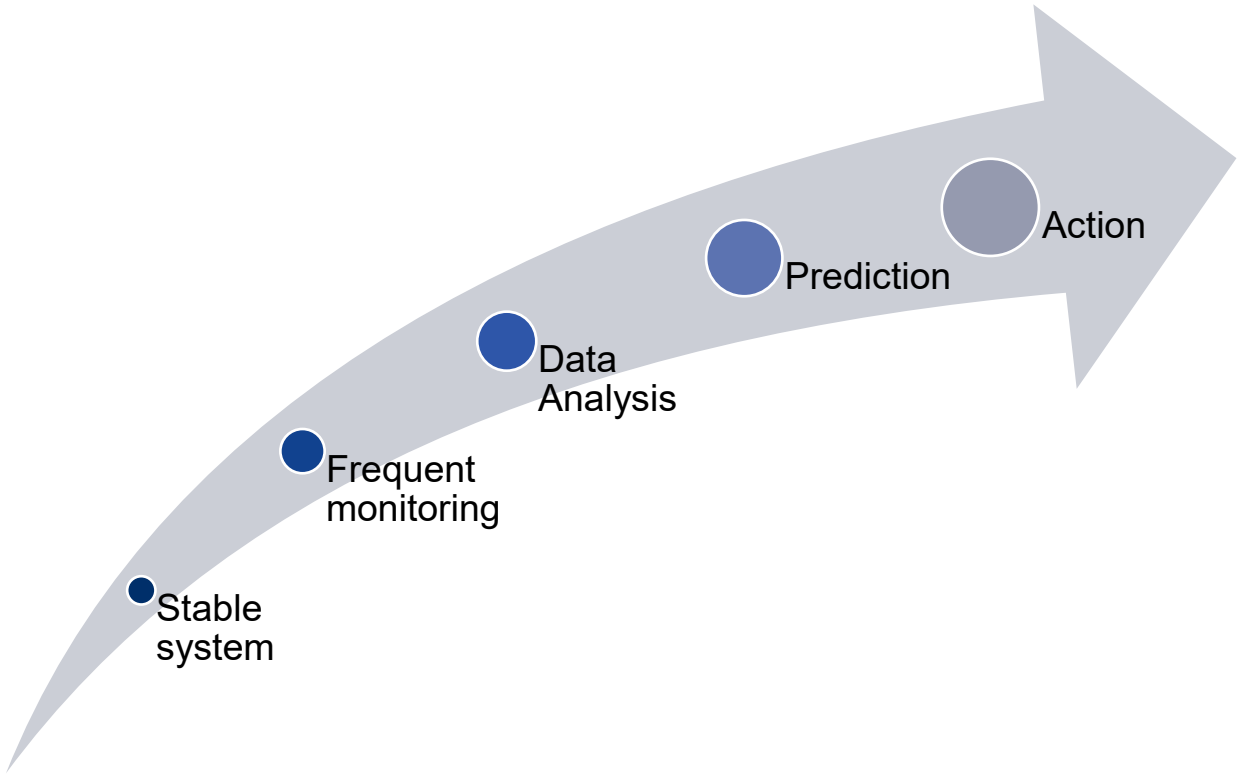




By increasing measurement frequency, even subtle trends in track geometry can be identified before they evolve into faults.

Slab-track measurements and inspections

Track Geometry: patterns for future deterioration



Through data analysis and predictive insights, each measurement becomes a signal of the track's future condition revealing patterns and deviations.

04 Slab-track Inspection

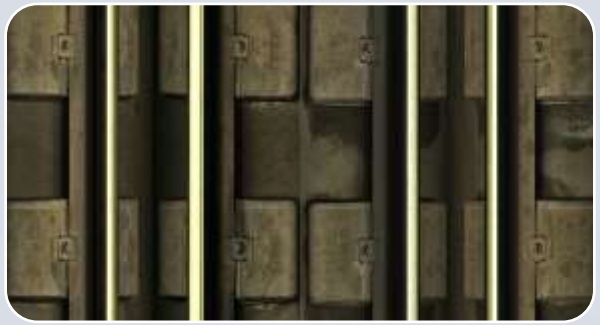
2 Case Studies: EUROTUNNEL and ELIZABETH LINE

Case Study 1: Eurotunnel

Automated Video Inspection

Case Study 1: Eurotunnel

Automated Video Inspection



Infrastructure

- 50 km of railway running through an underwater tunnel
- 80 km of railway running in open-air sections

Track System

- Ballastless slab track used in all tunnel sections
- Analysis of 660,000 fasteners

Monitoring

- 100km/h measurement speed
- 4 inspecting linear cameras

Case Study 1: Eurotunnel

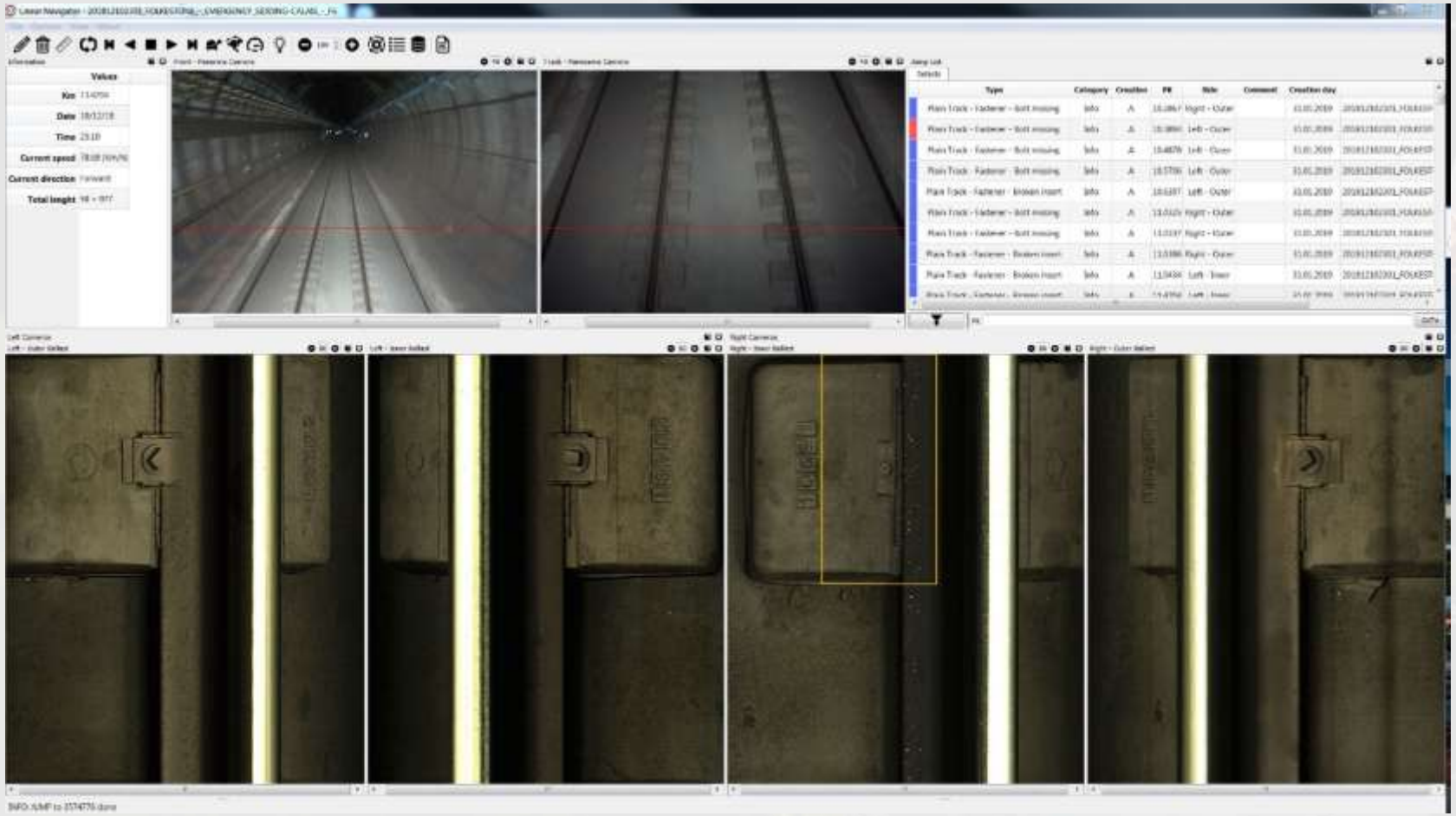
Automated Video Inspection

On a 2-week inspection basis

Identification success rate

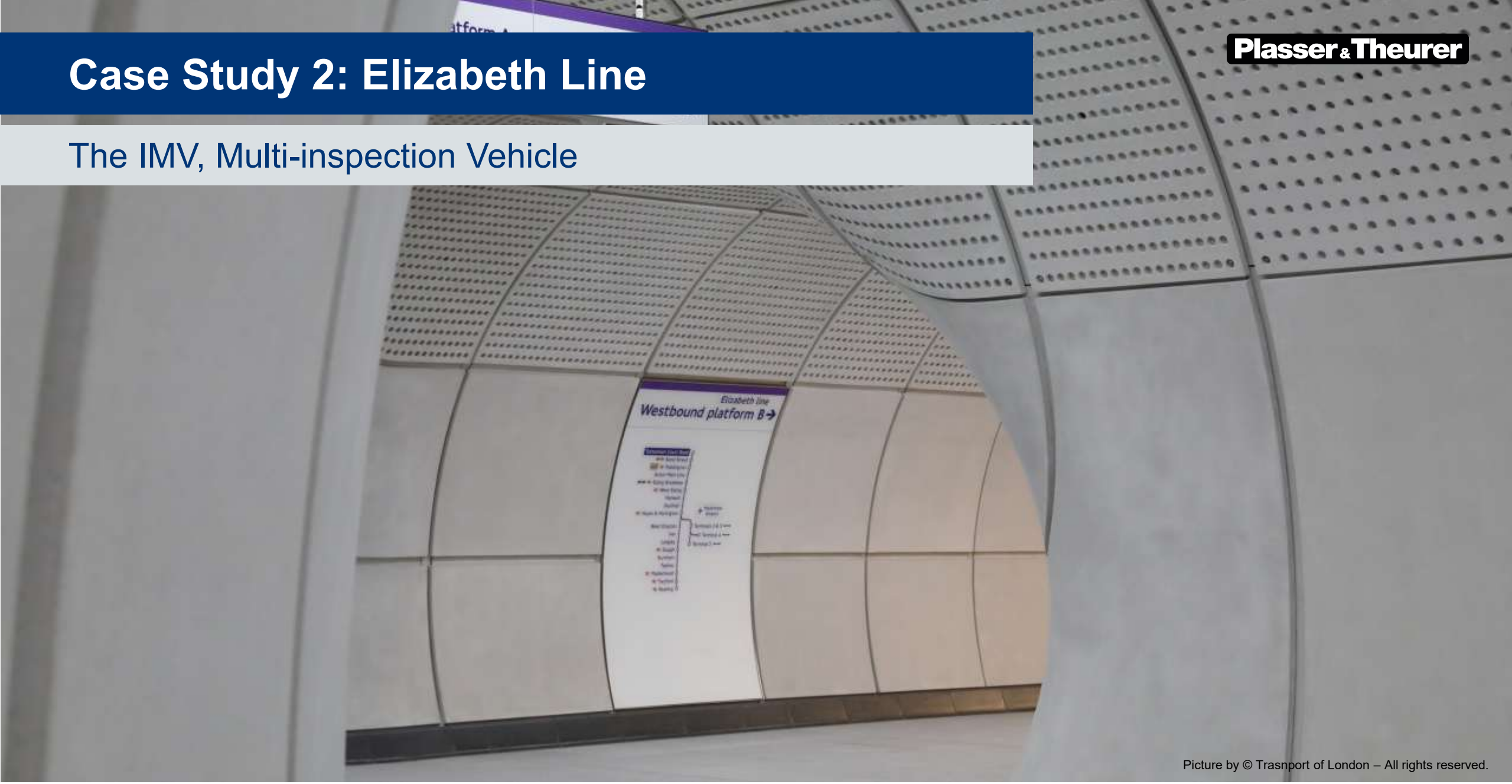
Case Study 1: Eurotunnel

Automated Video Inspection



Case Study 2: Elizabeth Line

The IMV, Multi-inspection Vehicle



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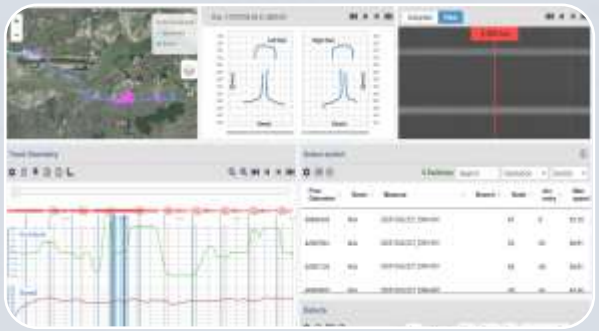


Infrastructure

- 100 km total route, including 42 km of new twin tunnels under central London
- Designed to increase central London rail capacity by 10%

Track System

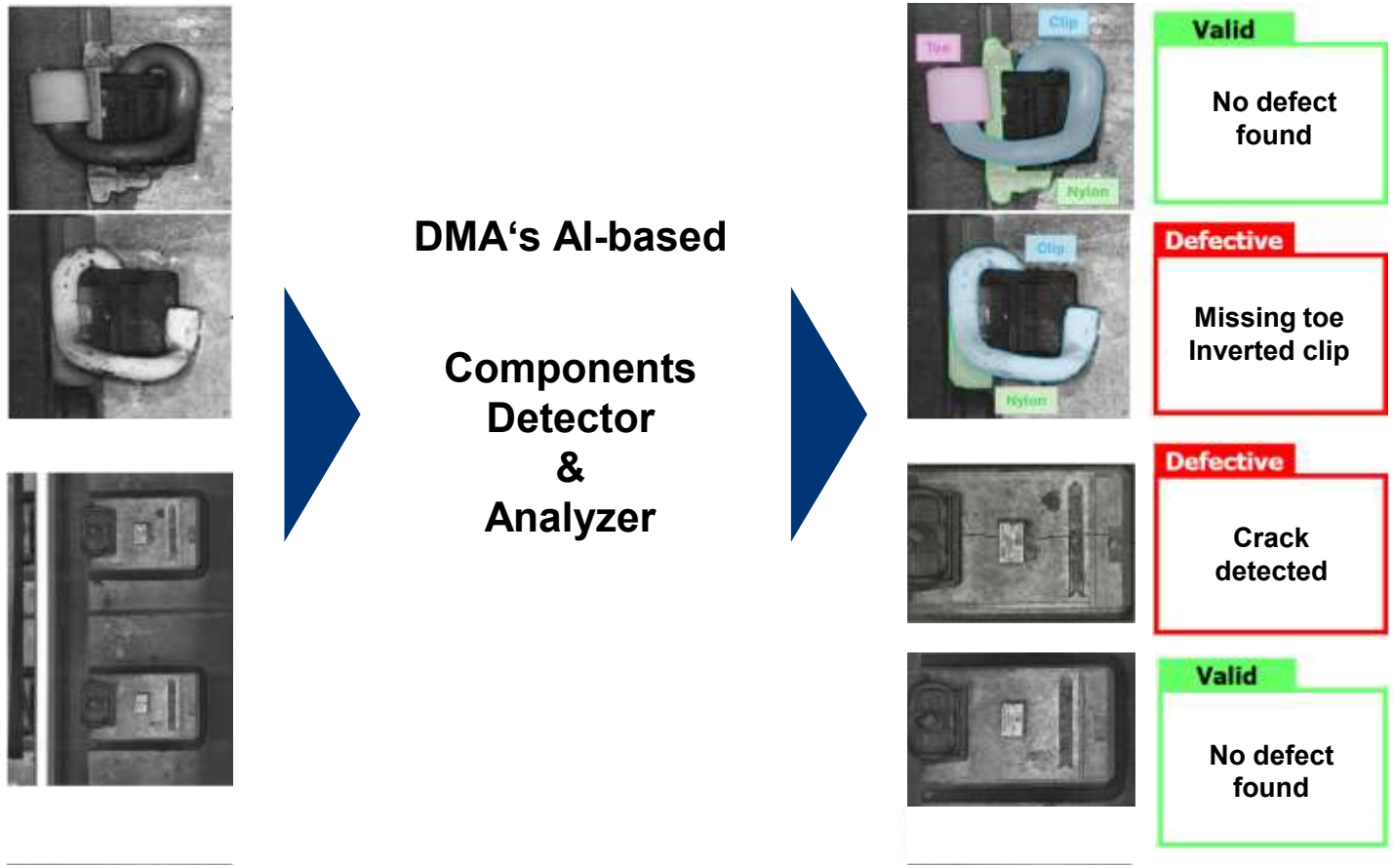
- Ballastless slab track throughout tunnel sections
- Floating slab track in sensitive areas to mitigate noise and vibration

Monitoring

- Routine track inspection with dedicated vehicle;
- TracksNet software suite for multi-source data collection and analysis.

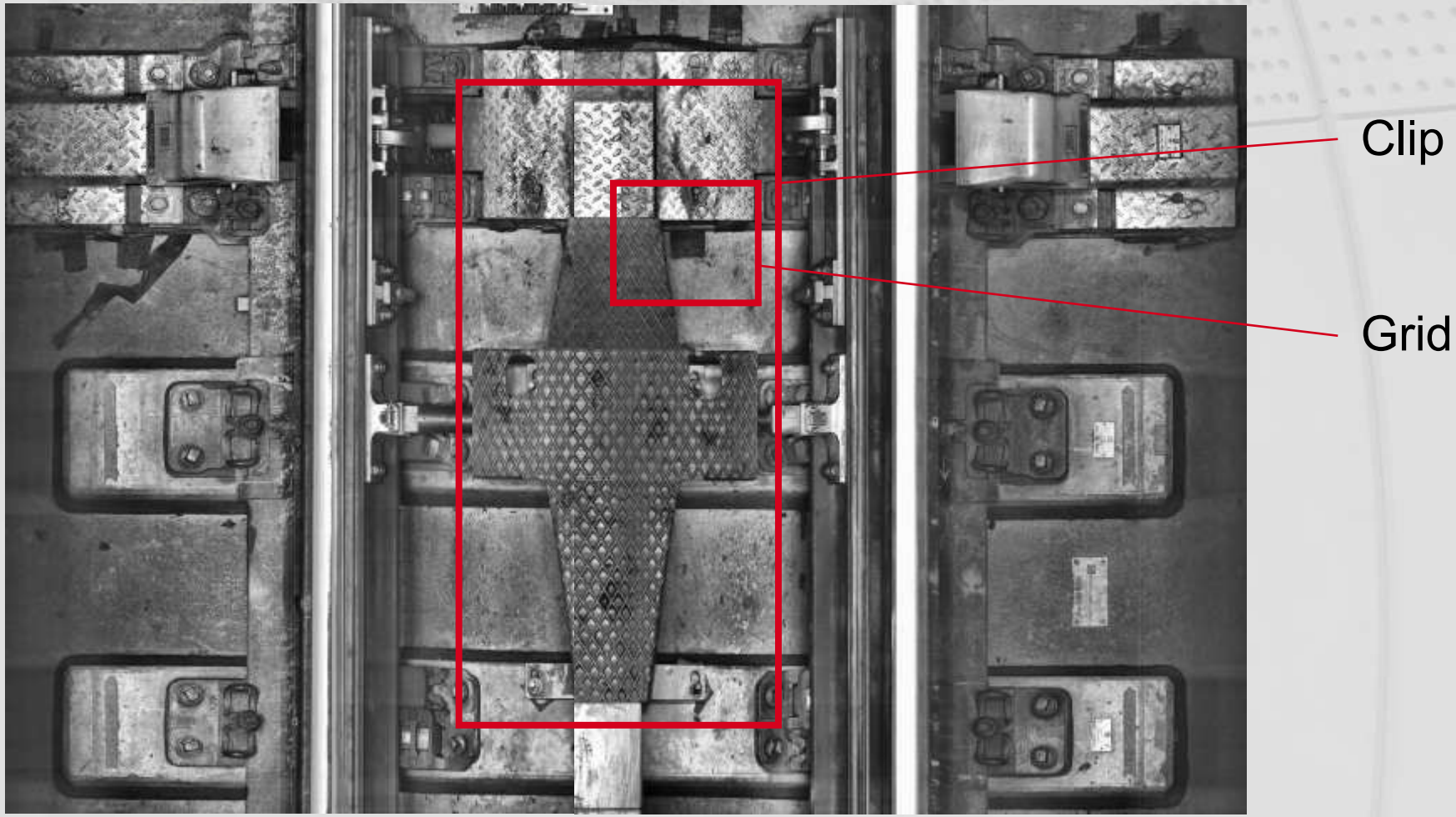
Case Study: Elizabeth Line

Asset-specific defect identification – High-precision



Case Study: Elizabeth Line

Assets Virtual Inspection



05 One Stop Shop

We offer a System or “as a Service”

Recording Services

One Stop Shop offering

Riegl VMX System

- IMU (Inertial Measurement Unit)
- GNSS (Global Navigation Satellite System)
- DMI (Distance Measuring Instrument)
- 3 Lidars (360° 3D Laser scanner)
- 2 Colour cameras (high resolution RGB)

Fleet of 14 Measurement vehicles in Europe and US

- Fully equipped and calibrated measurement car
- Provided under full track usage approval management
- All DMA Geometry and Vision Inspection Systems operational
- Ultrasonics, Eddy Current and Georadar upon request

From a single system to a fully-fletched fleet

Plasser Diagnostics Systems

Self-propelled or towed measurement vehicles up to 160 km/h and stand-alone up to 350 km/h systems*:

- Track Geometry Measurement
- Turnouts and Crossing Measurement
- Rail Profile Measurement
- Corrugation Measurement
- 3rd (power) Rail Measurement
- Catenary Wear- and Position Measurement
- Clearance and Tunnel Inspection
- Track Component Video Inspection
- Top-of-rail and rail-web Video Inspection
- Catenary Video- and Infrared Inspection
- Driver's View Video Inspection
- Ultrasonic Rail Inspection
- Ground Penetrating Radar Track Inspection

** solution-dependent limits may apply, e.g. UT systems*

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