HIGH CAPACITY I PRECISION I RELIABILITY

Plasser & Theurer

Utilizing Automation in Track Maintenance

Fabian Hansmann | Railway Talk | 25 June 2025

Plasser & Theurer

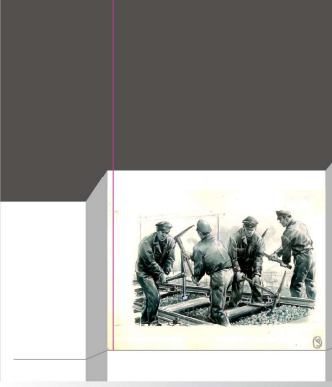
MANUAL

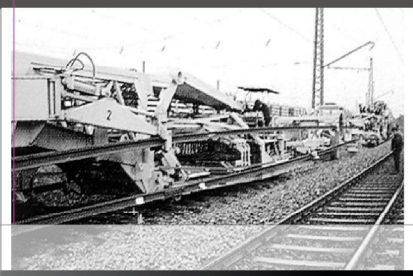
MECHANICAL

ASSEMBLY-LINE METHOD

ECOLOGICAL

DIGITAL





Lack of Skilled People

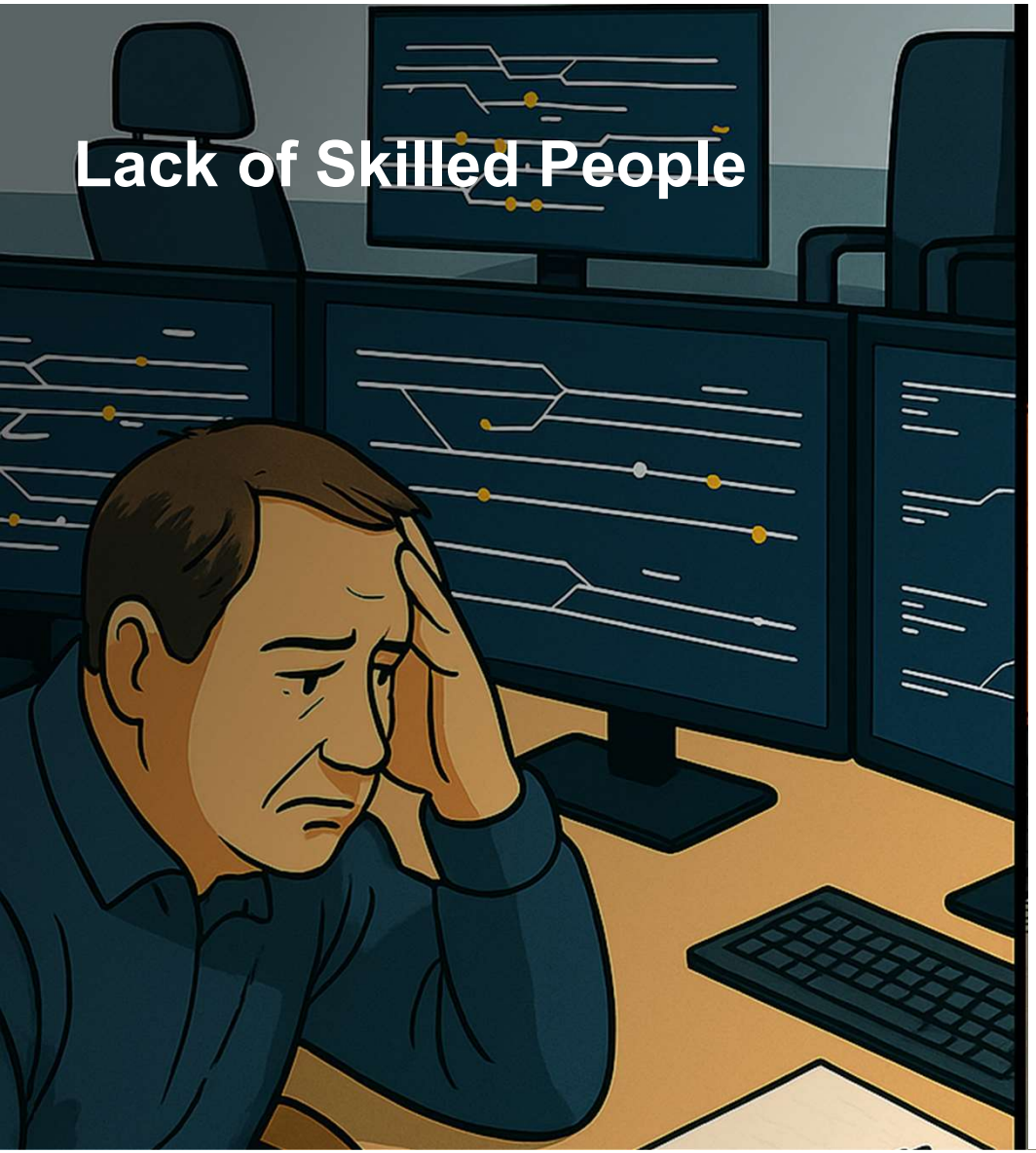


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Image generated by AI using OpenAI's DALL·E (ChatGPT), June 2025.

Lack of Skilled People?

Plasser & Theurer

A growing problem

The railroad industry in England expects that by 2030, more than 50,000 employees will retire. Those under **25 account for only 5%** of the workforce in the sector there. (1)

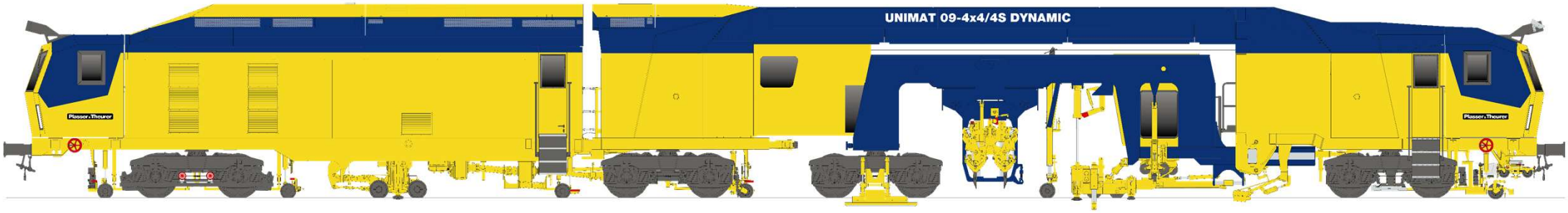
The German railroad describes the shortage of skilled workers combined with demographic change as a **"core risk"** for its current business. (2)

In April, this year APTA released guidelines to address the **shortage of skilled people** (3) because of that 96% of operators and agencies had reported a shortage with a **significant effect on their services**

Image generated by AI using OpenAI's DALL·E (ChatGPT), June 2025.

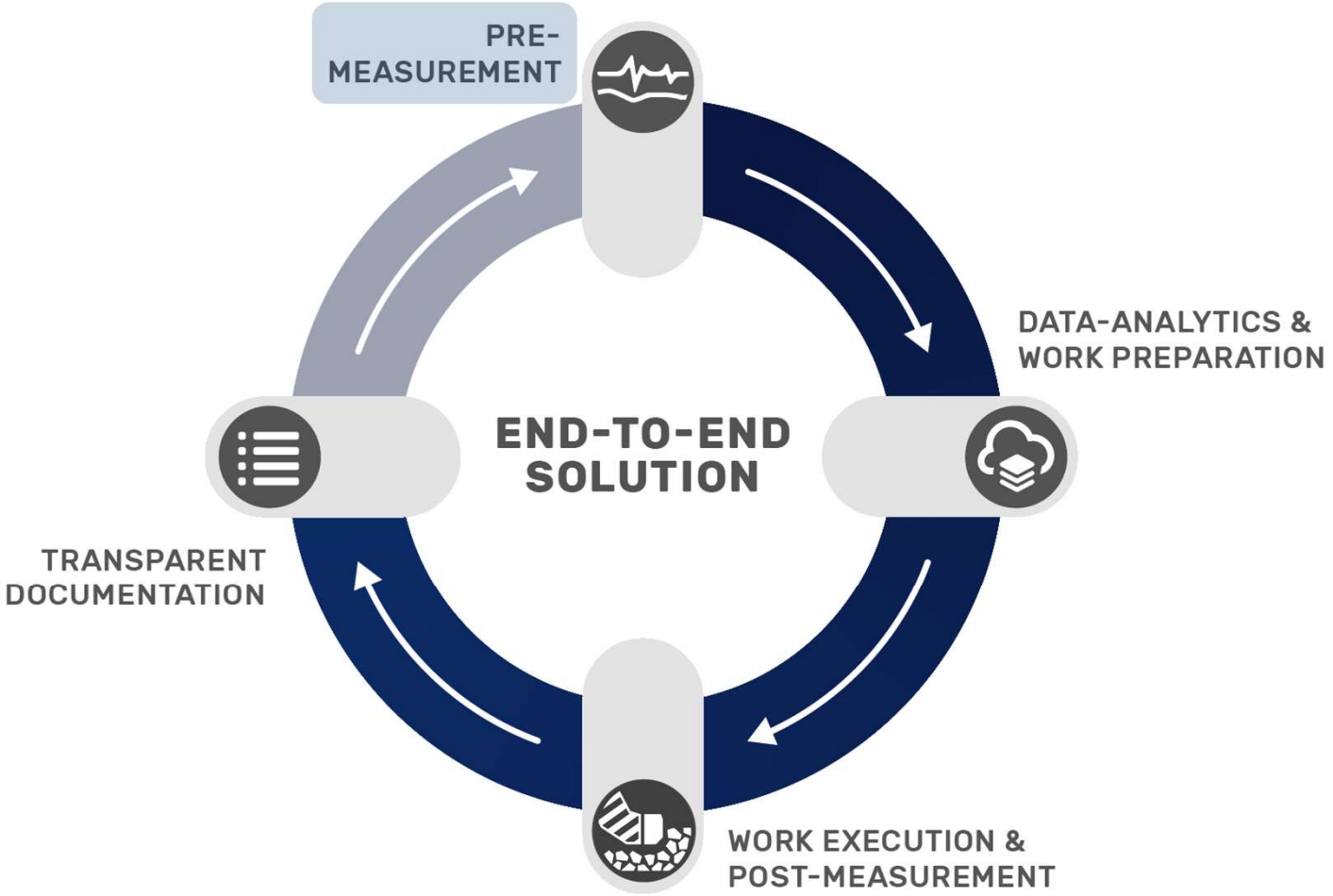
Utilizing automation in track maintenance

Is all about…



The E2E Process – Big Picture

Four-stage model



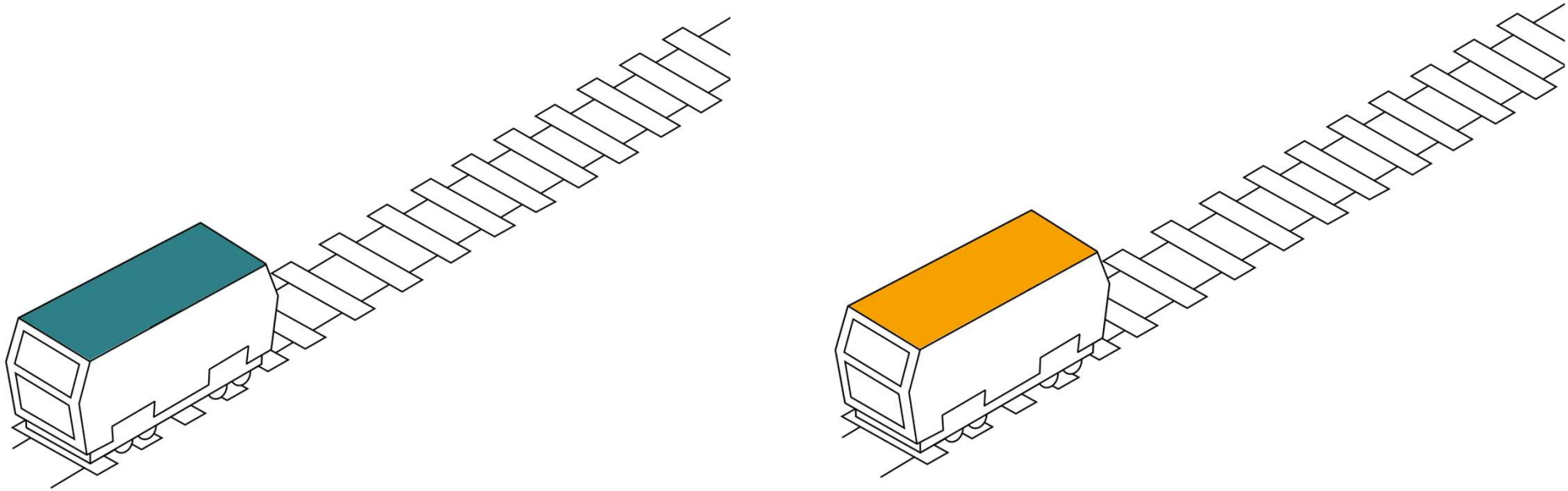
Pre-Measurement – Condition Monitoring

The right action at the right time

The Digital Future of Track Maintenance

Plasser & Theurer

How can we make existing information smarter?



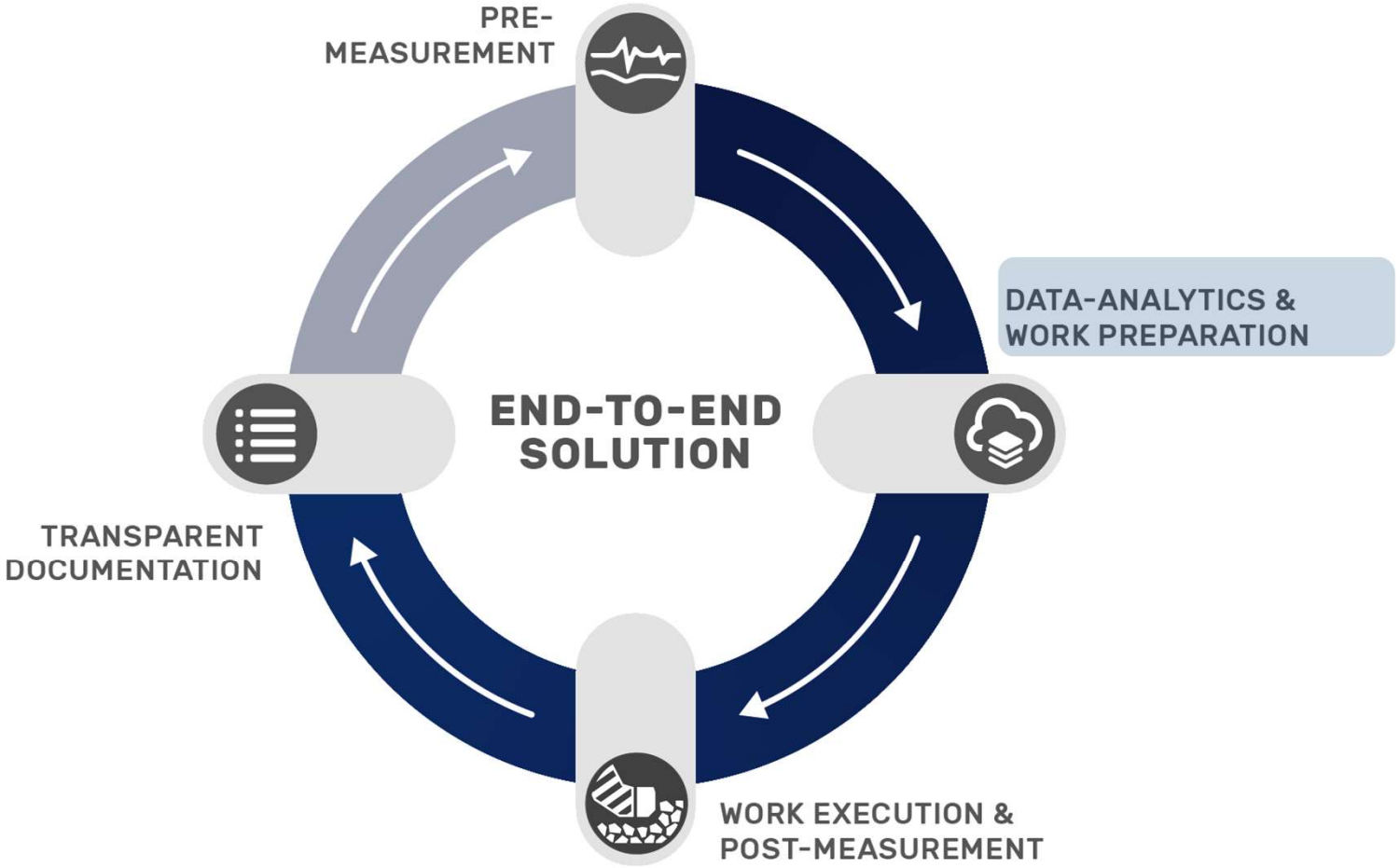
Data – Information – Knowledge

The Digital Future of Track Maintenance

Connecting – Analysing - Automating

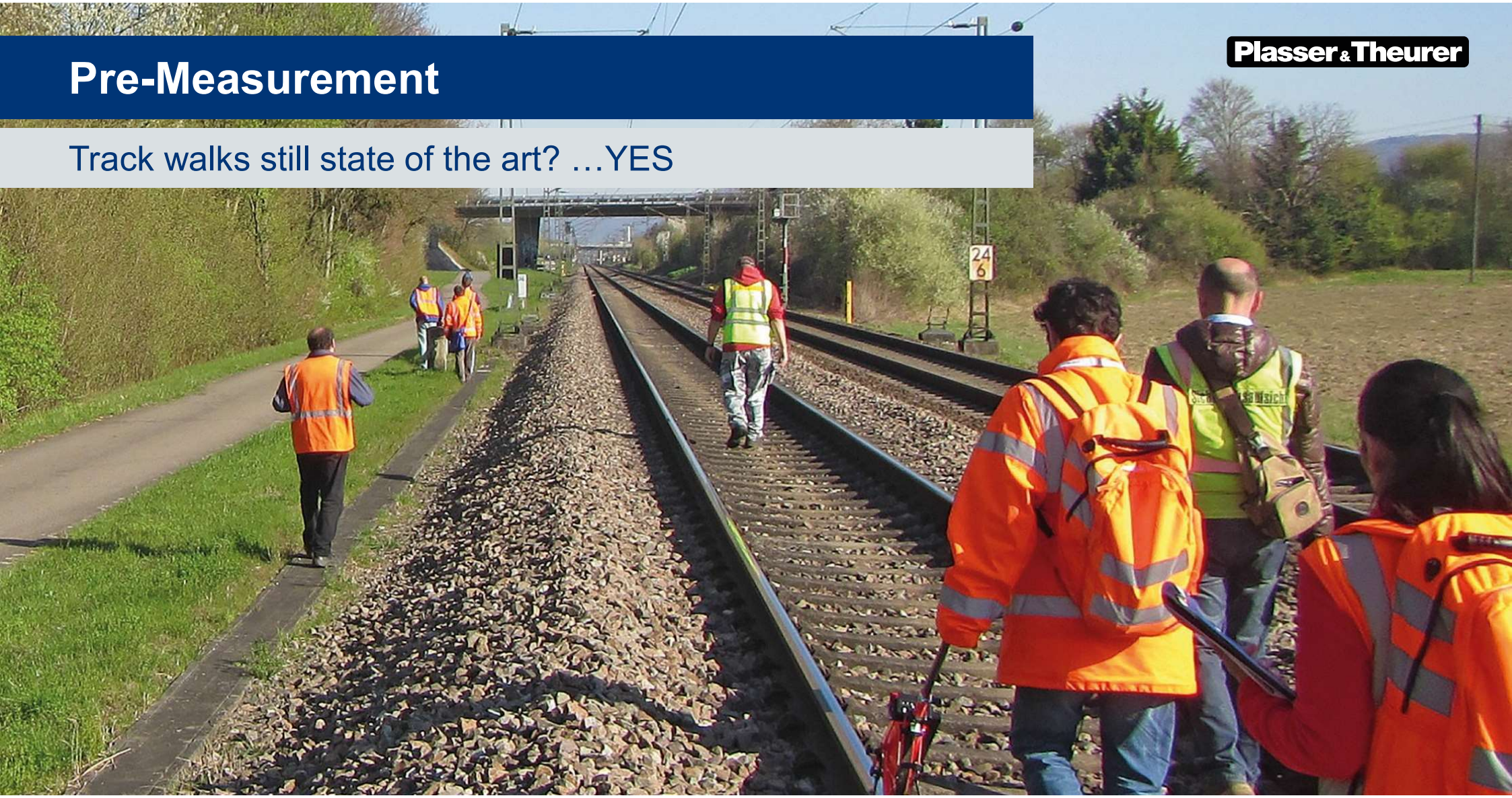
The E2E Process – Big Picture

Four-stage model



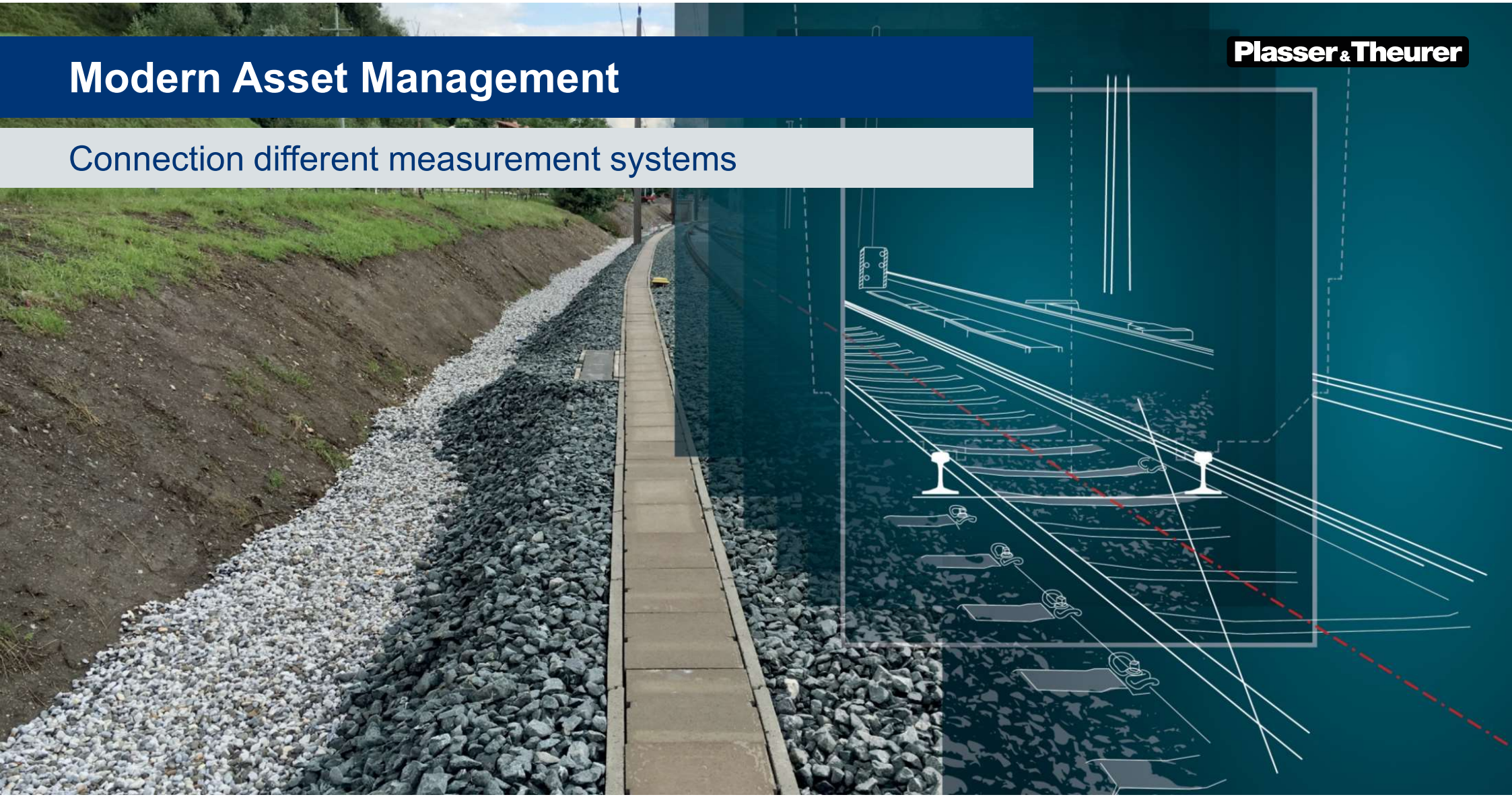
Pre-Measurement

Track walks still state of the art? …YES



Modern Asset Management

Connection different measurement systems



Digital twin

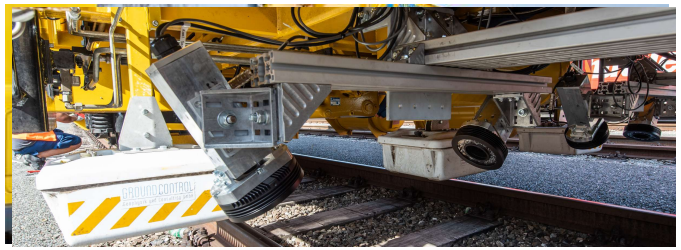
The new world of track inspection

The Challenge

- Hannover and Wurzburg (Germany)
- 523 track kilometres 224 turnouts, 80,000 sleepers 325,000 tons of ballast
- 60 days of track inspection according to the current standard

The Solution

Digital Twin /EM100VT

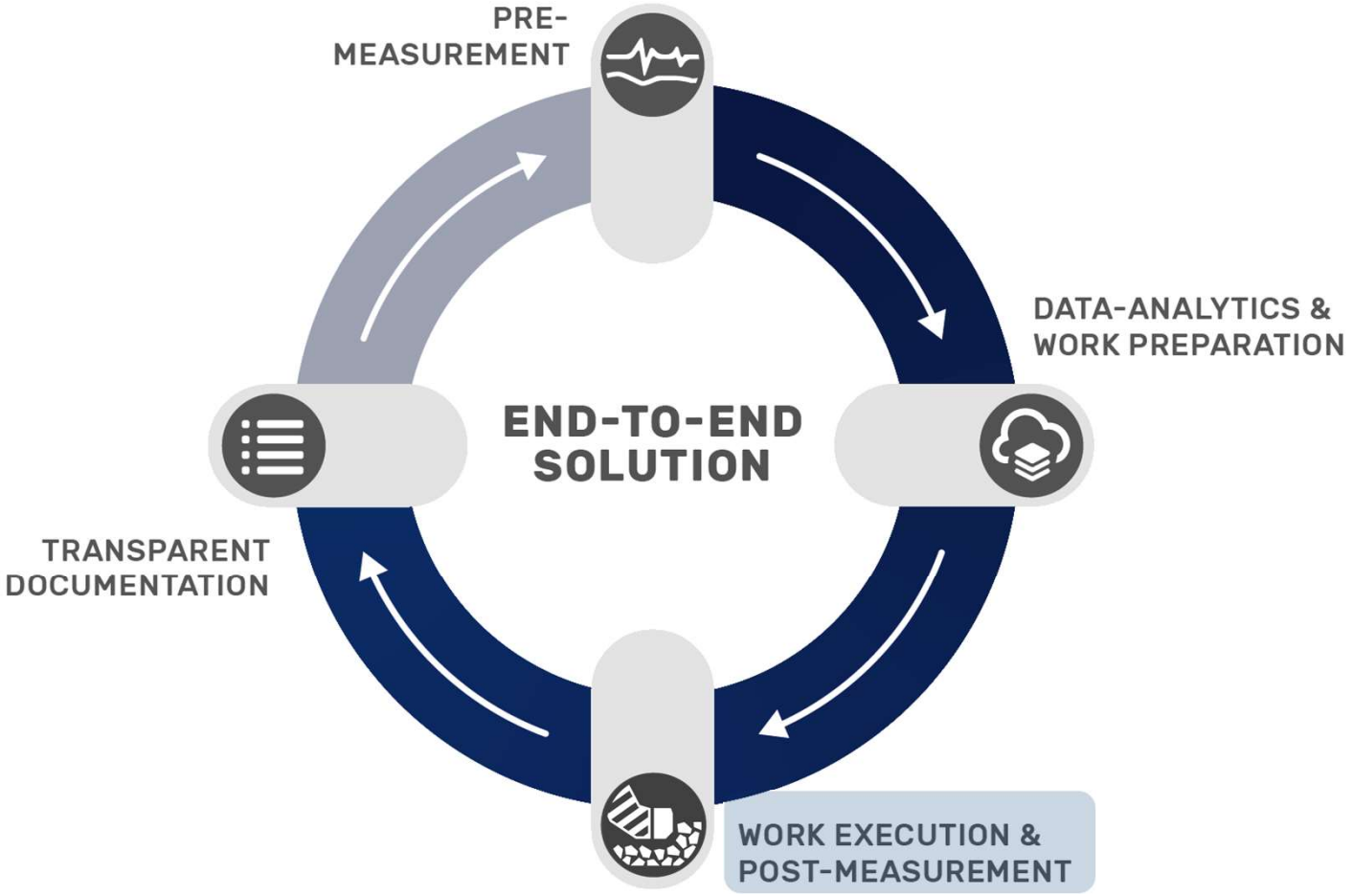


10% track possession

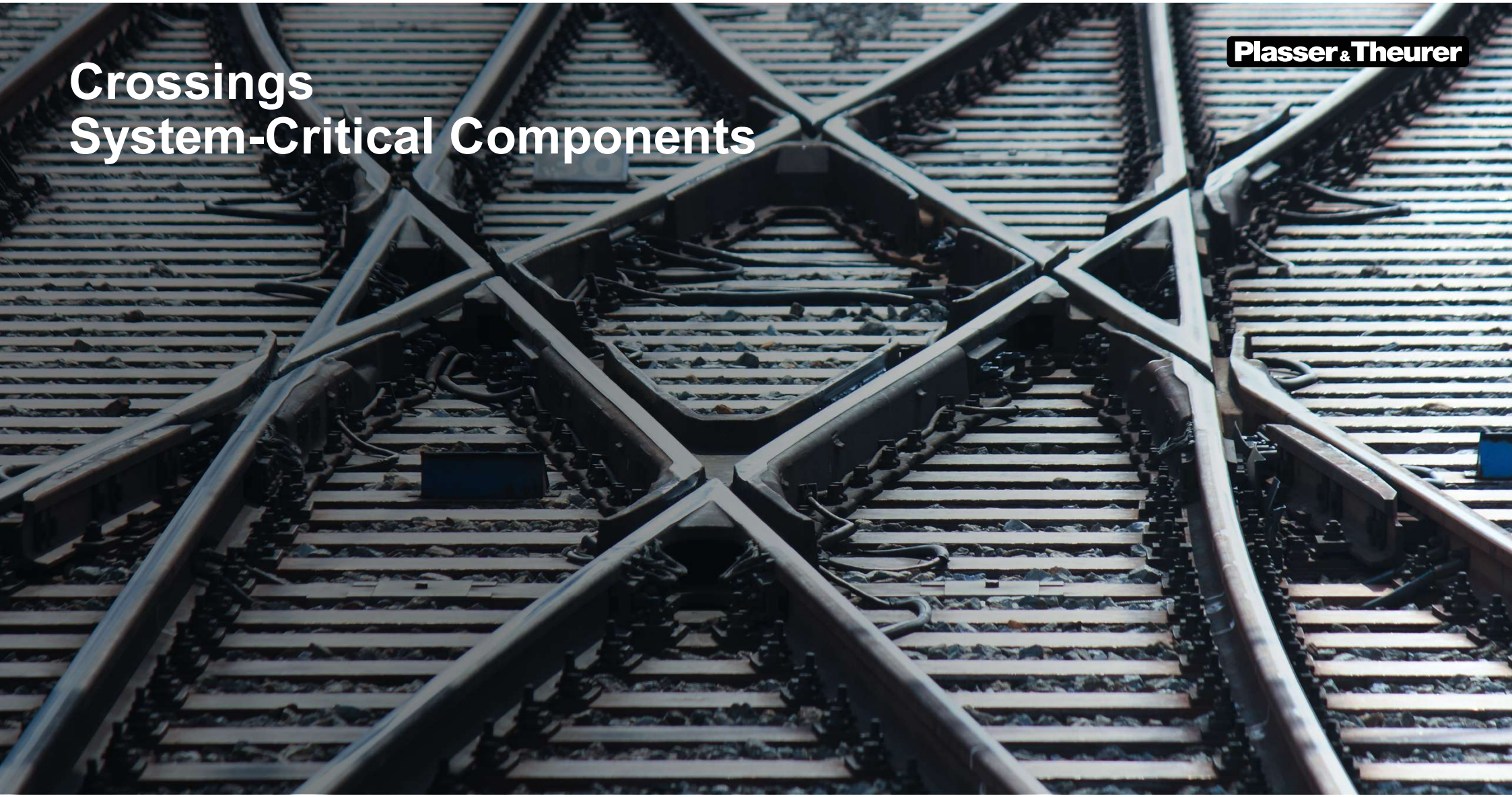
Safe working environment

The E2E Process – Big Picture

Four-stage model



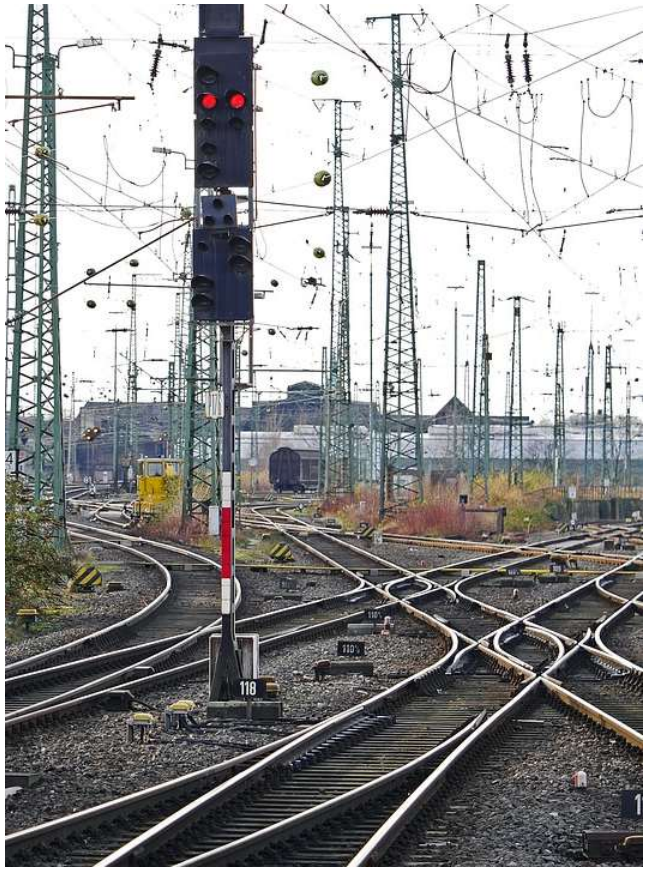
Crossings
System-Critical Components



How to Train a Track Maintenance Machine?

Plasser SmartTamping

A journey towards a fully-automated tamping machine

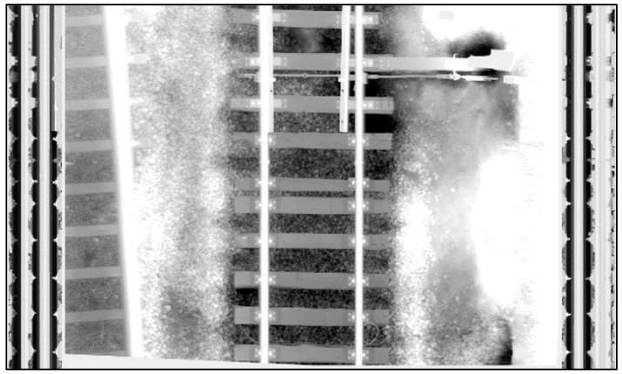


- Plasser TampingAssistant
- Plasser TampingReport
- Plasser TampingControl

Plasser TampingAssistant

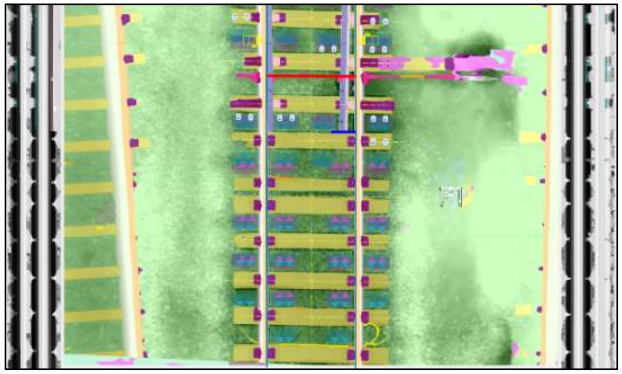
Data processing

Detects and classifies objects (sleepers, obstacles, and turnout parts) with the help of algorithms and artificial intelligence



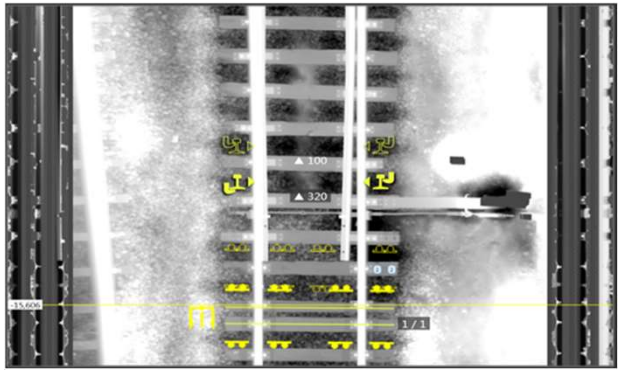
Recorded sensor data

Depth map



Processed data

Classification of images based on semantic segmentation using artificial intelligence

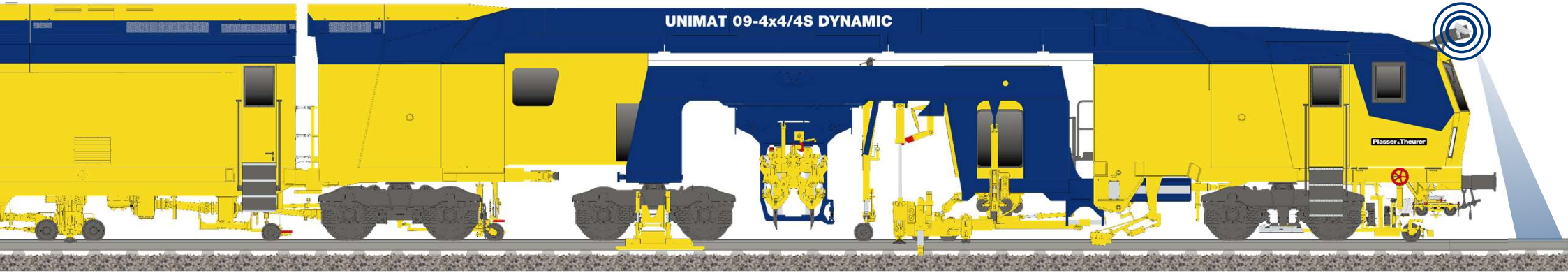


Recommended actions

Work units are positioned based on the processed data

Plasser TampingAssistant

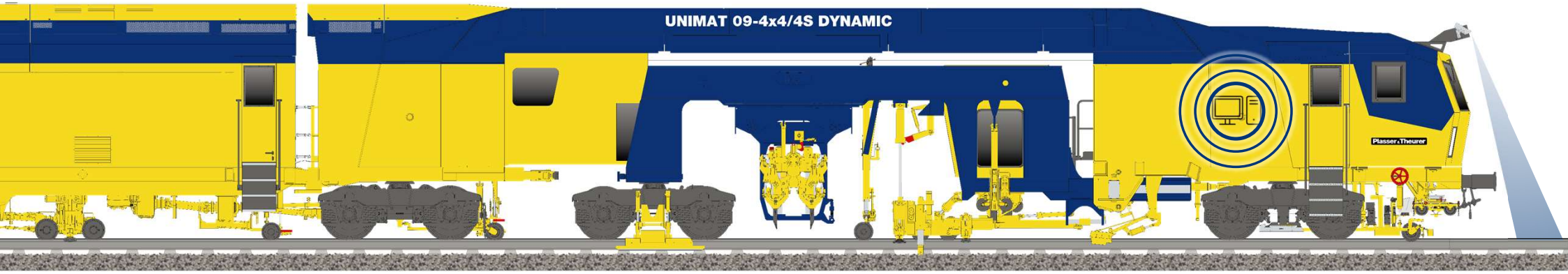
How it works



1 **Scans** and records the track sections to be tamped during working travel

Plasser TampingAssistant

How it works

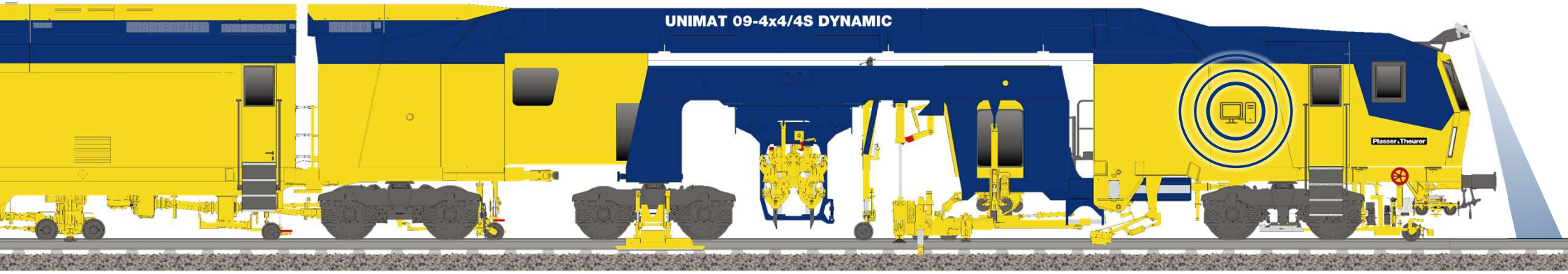


2

Detects and **classifies obstacles** and turnout parts in real time

Plasser TampingAssistant

How it works

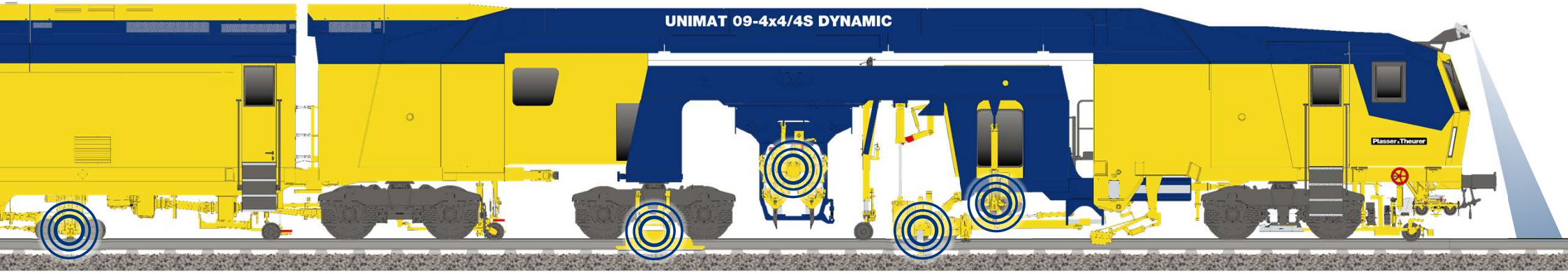


3

Automatically **calculates configurations** for each position, taking into account the tamping plan as well as identified objects

Plasser TampingAssistant

How it works



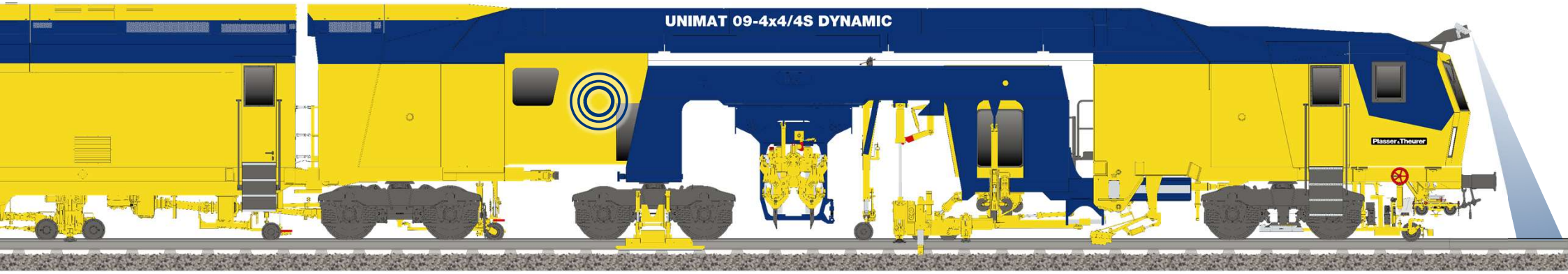
4

Automatically positions
the work units

tamping unit, roller lifting clamps, lifting hook and 3rd-rail lifting unit, DGS, sleeper-end consolidator, etc.

Plasser TampingAssistant

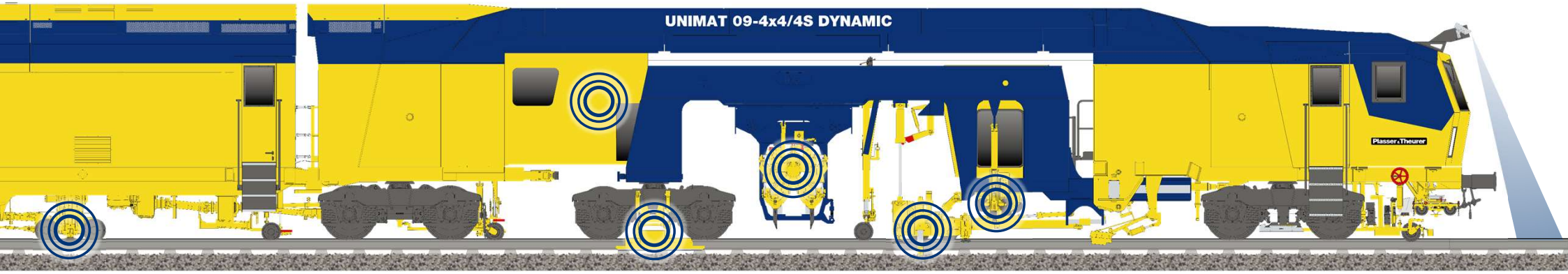
How it works



5 The operator **confirms or adjusts** the actions recommended to them

Plasser TampingAssistant

How it works

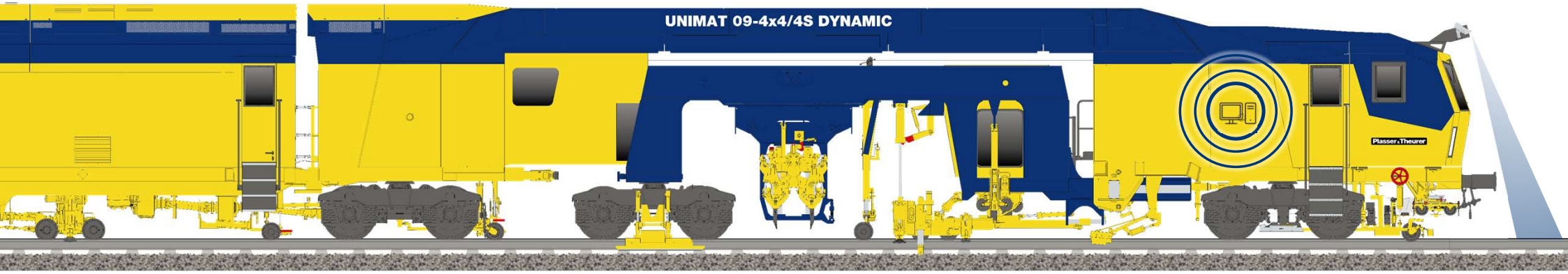


6

Automatically executes actions after confirmation by the operator

Plasser TampingAssistant

How it works

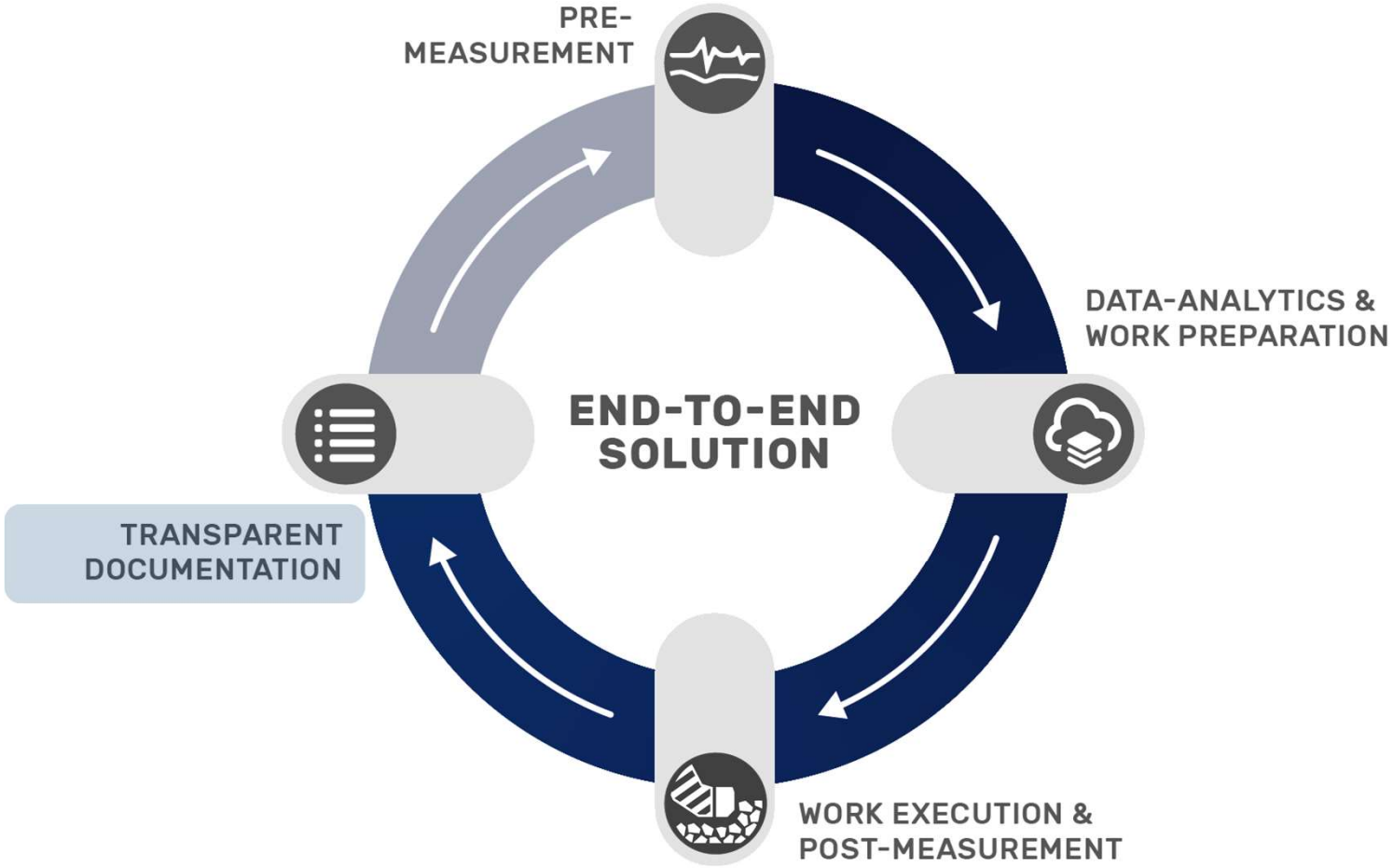


7

Automatically records
recommendations and actions,
compiles the **work documentation**

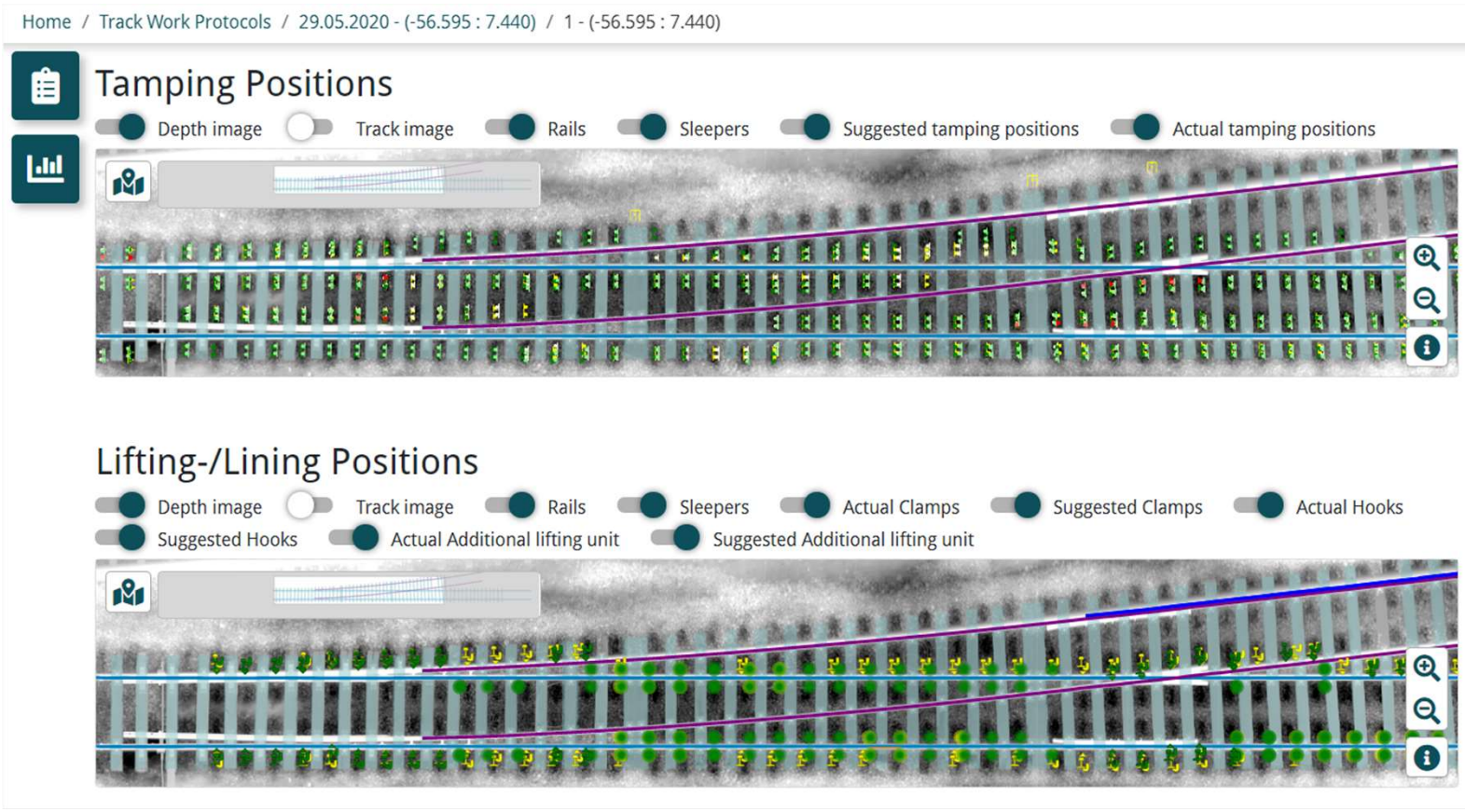
The E2E Process – Big Picture

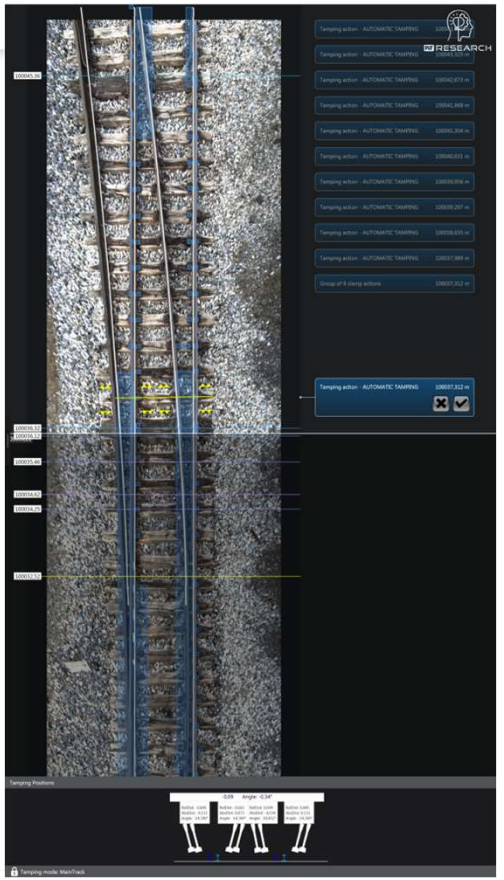
Four-stage model



Smart Tamping

The vision of an autonomous tamping machine





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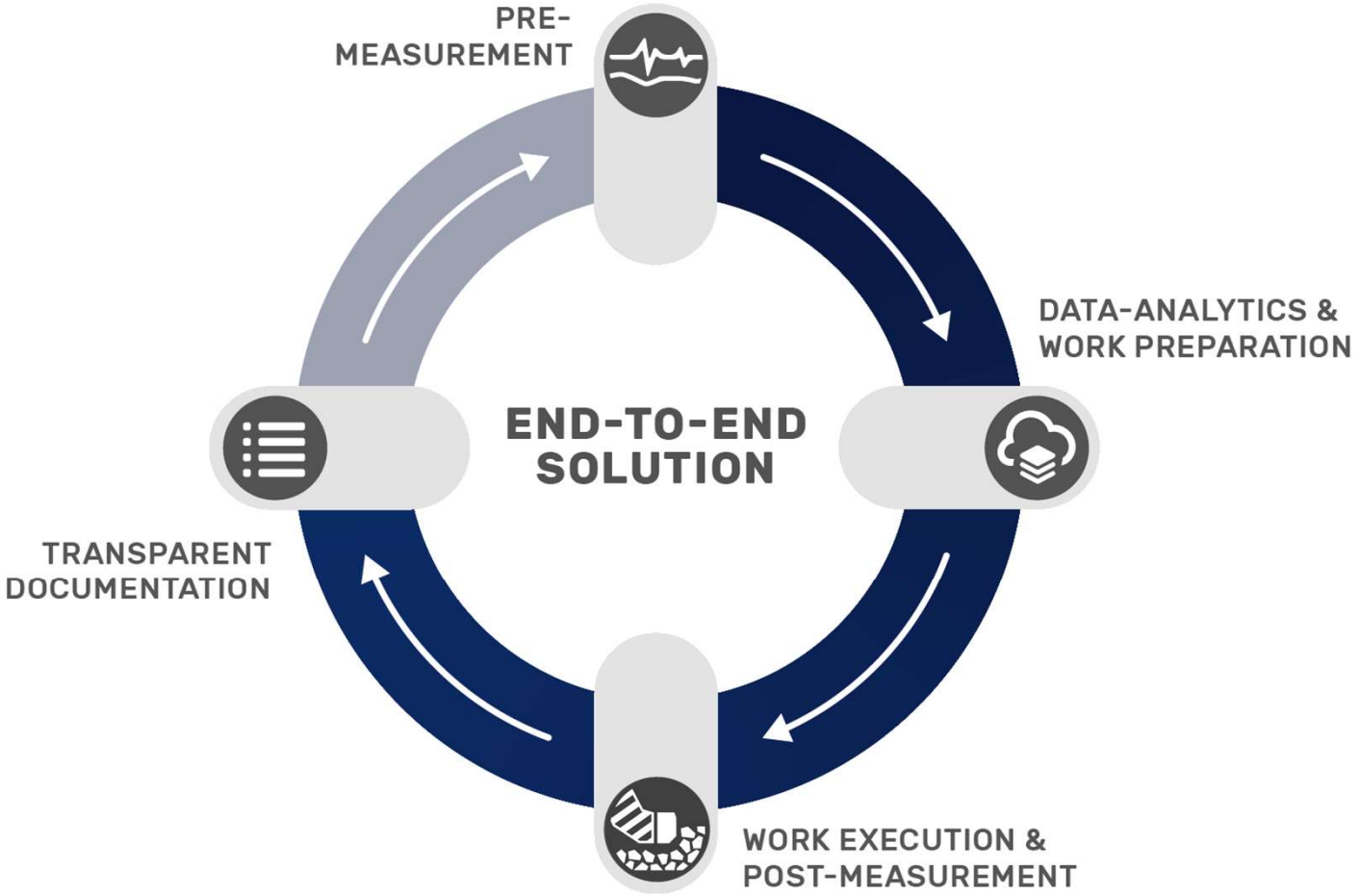
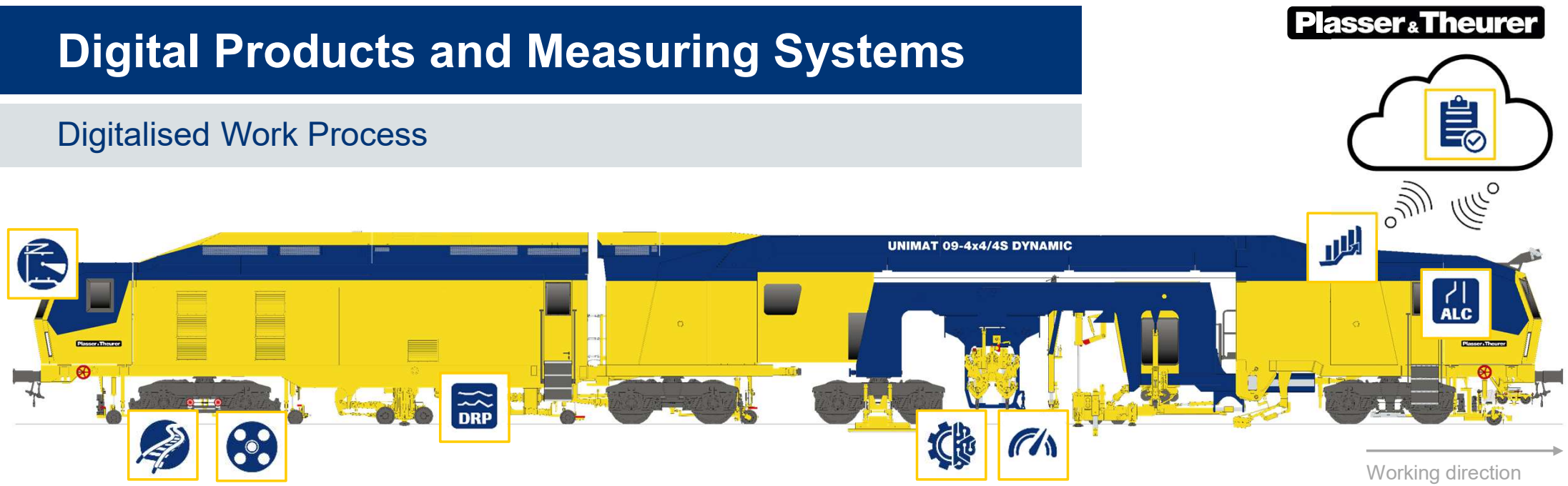


Digital Products and Measuring Systems

Digitalised Work Process



Track geometry pre-measuring	Tamping process	Post-measuring	Documentation
Plasser InertialTrackGeometry	SmartALC	DRP	Plasser Datamatic
Plasser ReferencedTrackGeometry	Plasser TampingAssistant	Plasser InfraScan	Plasser TampingReport
SmartALC	Plasser TampingControl	Plasser InertialTrackGeometry	
		Plasser ReferencedTrackGeometry	

Plasser & Theurer

"To optimize track maintenance, we don’t automate the end — we enhance every movement along the way."

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"To optimize track maintenance, we don’t automate the end — we enhance every movement along the way."