



Smart Maintenance Conference 2018
Krzysztof Wilczek
4th September 2018

We are passionate about railways



Florian Auer (Director of Technology)

- 10 years work experience in railway infrastructure
- Head of Life Cycle Management ÖBB
- PhD on “How to reduce wear in sharp curves”



Krzysztof Wilczek (Head of Track Analytics)

- 5 year work experience in railway infrastructure
- Life Cycle Management Track SBB
- Head of data laboratory SBB

TRACK CHALLENGES

TRAFFIC LOAD



TOTAL COST OF OWNERSHIP



RELIABILITY



AVAILABILITY OF SKILLED WORKERS



SERVICE LIFE



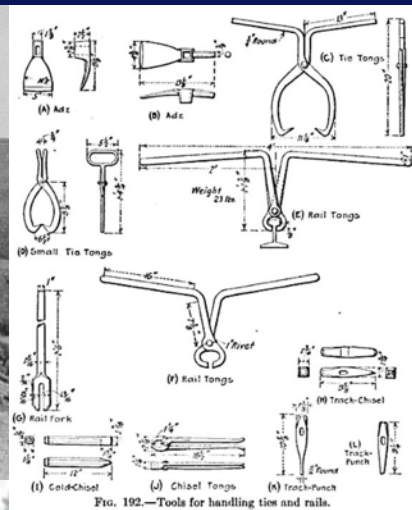
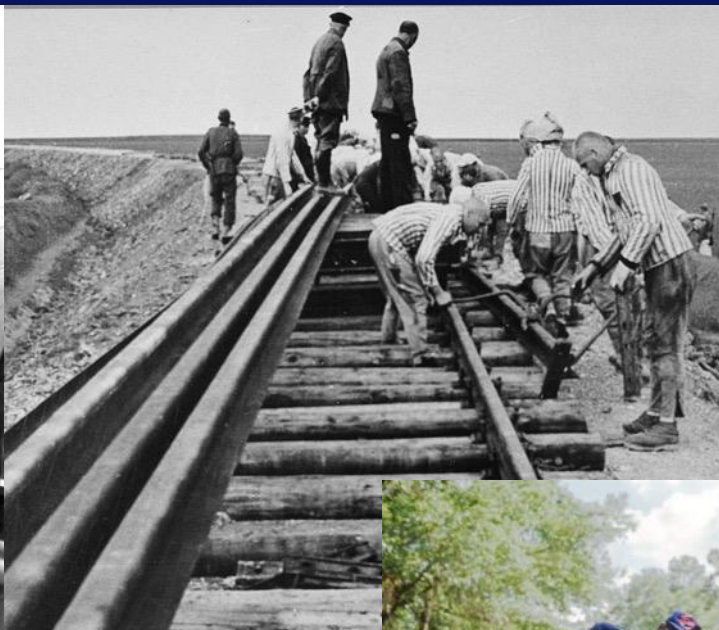
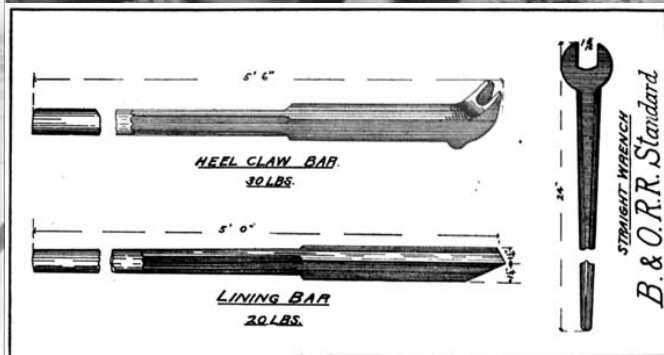




FIG. 192.—Tools for handling ties and rails.



What is smart track maintenance?

Innovation: Business innovation is the creation of substantial **new value** for customers and the firm by creatively changing one or more dimensions of the business system.¹⁾  increase efficiency

Disruption: In business, a disruptive innovation is an innovation that **creates a new market and value network** and eventually disrupts an existing market and value network, displacing established market-leading firms, products, and alliances.²⁾  increase efficiency by at least 10x

¹⁾Sawhney, Wolcott, and Arroniz (2006) ²⁾ Ab Rahman, Airini; et al. (2017).

Mechanizing maintenance processes

TAMPING

BALLAST
MANAGEMENT

STABILISATION
AND CONSOLI-
DATION

BALLAST BED
CLEANING

FORMATION
REHABILITA-
TION

MATERIAL
LOGISTICS

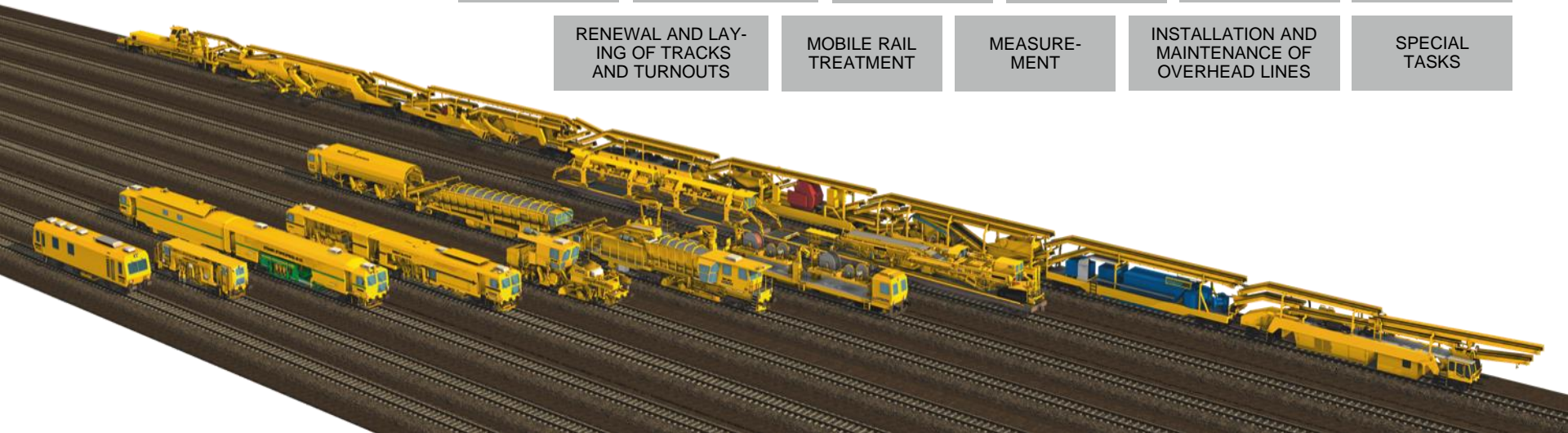
RENEWAL AND LAY-
ING OF TRACKS
AND TURNOUTS

MOBILE RAIL
TREATMENT

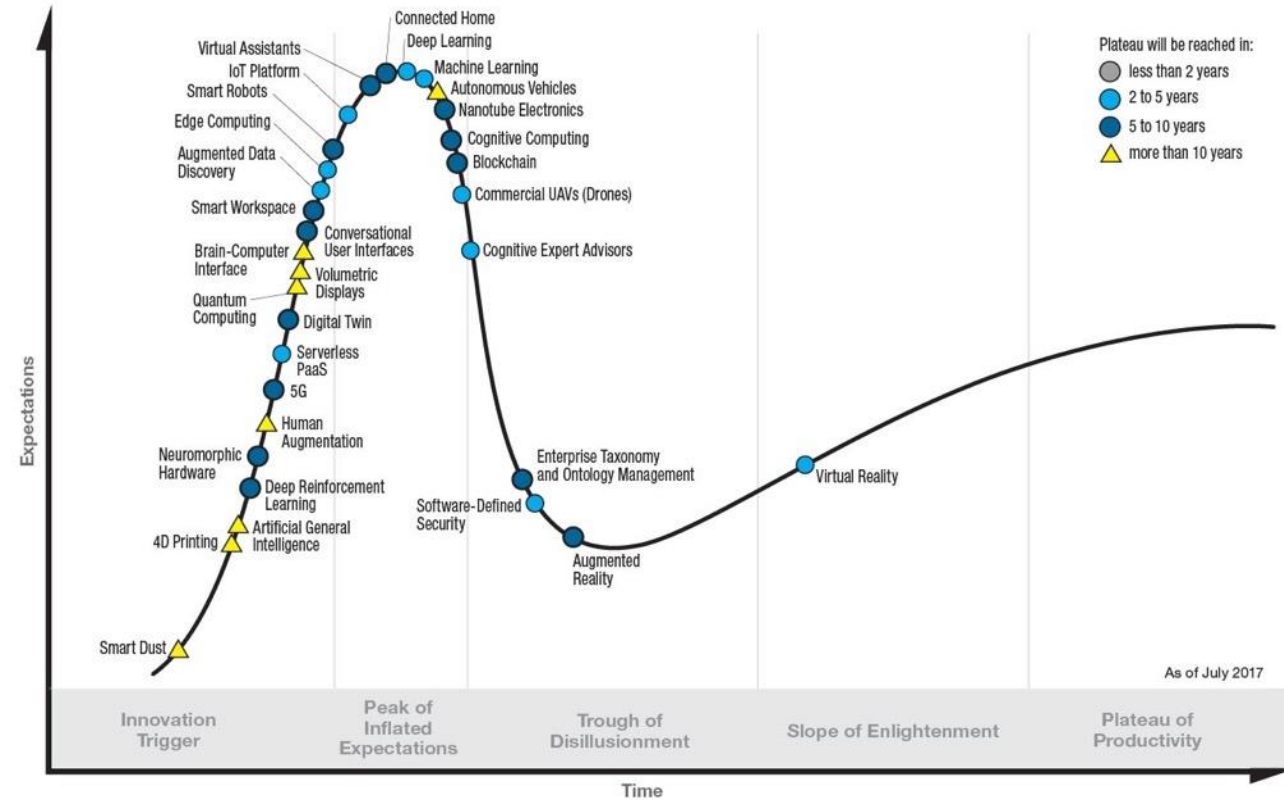
MEASURE-
MENT

INSTALLATION AND
MAINTENANCE OF
OVERHEAD LINES

SPECIAL
TASKS



Gartner Hype Cycle for Emerging Technologies, 2017




Technology trends driving track maintenance

A close-up, low-angle shot of a white wind turbine tower against a cloudy sky. The tower has the word 'sustainability' written vertically on it.

Energy

A background image consisting of a dense, colorful, and blurred pattern of text, resembling computer code or data, in various colors like blue, green, yellow, and red.

Data

A black quadcopter drone with a camera attached, flying against a clear blue sky. The drone is shown from a side-on perspective, with its propellers in motion.

Autonomous Systems

#1 gas station to charging station



Plasser & Theurer

3

by **Plasser & Theurer**

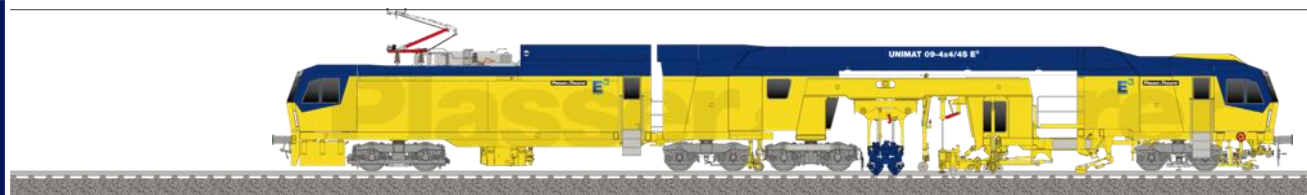
Track maintenance goes electric



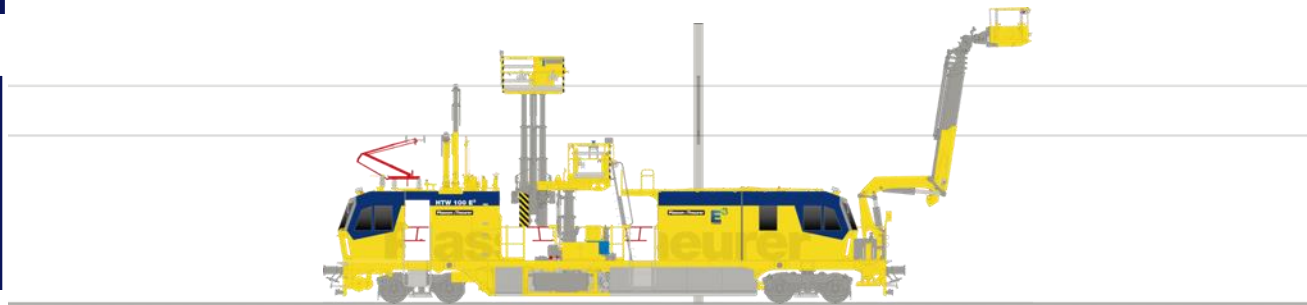
**Electric &
hydraulic power
transmission**



**Electric power
transmission**



**Battery powered
operation**



Being clean pays off

Unimat 09-32/4S Dynamic E³ (Krebs Bau, CH)



CO₂-reduction

-286,39 kg/h

Cost reduction

-130,73 CHF/h

(Diesel costs - electricity costs + logistics costs + maintenance costs + CO₂ reduction)

#2 measure what matters

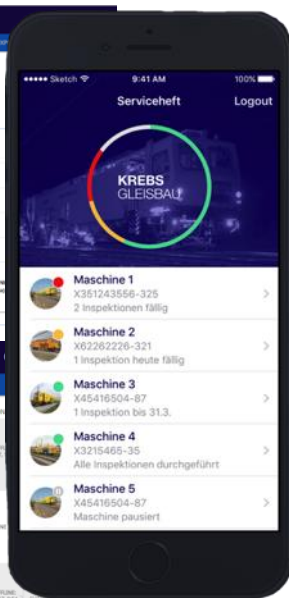


Measure machine performance

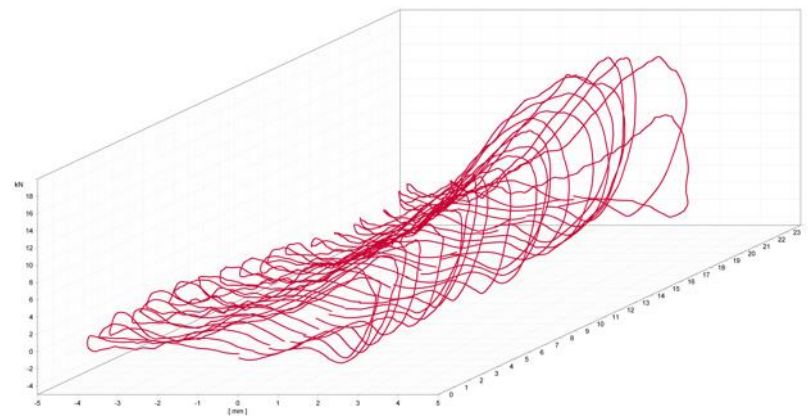
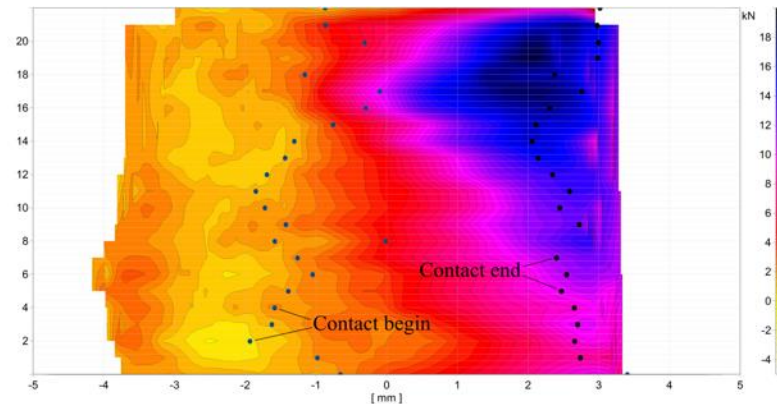
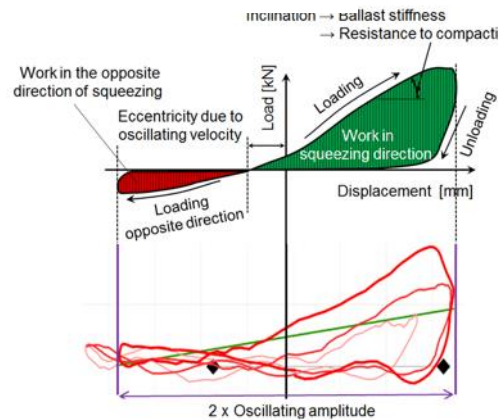
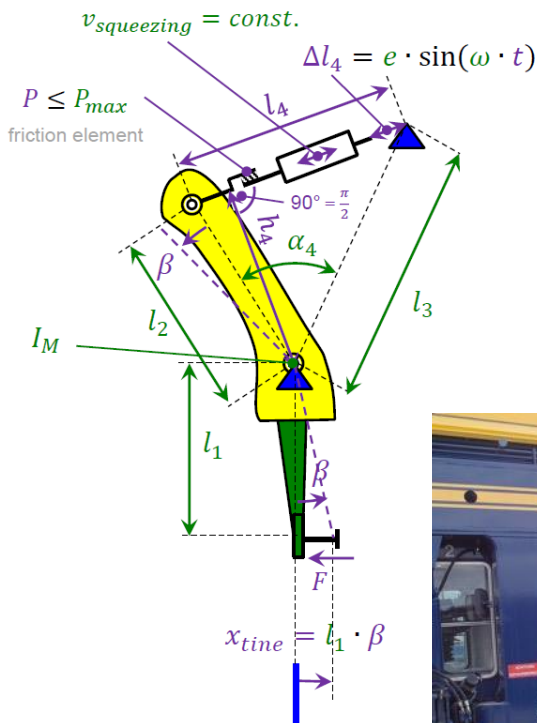


FLEET OVERVIEW

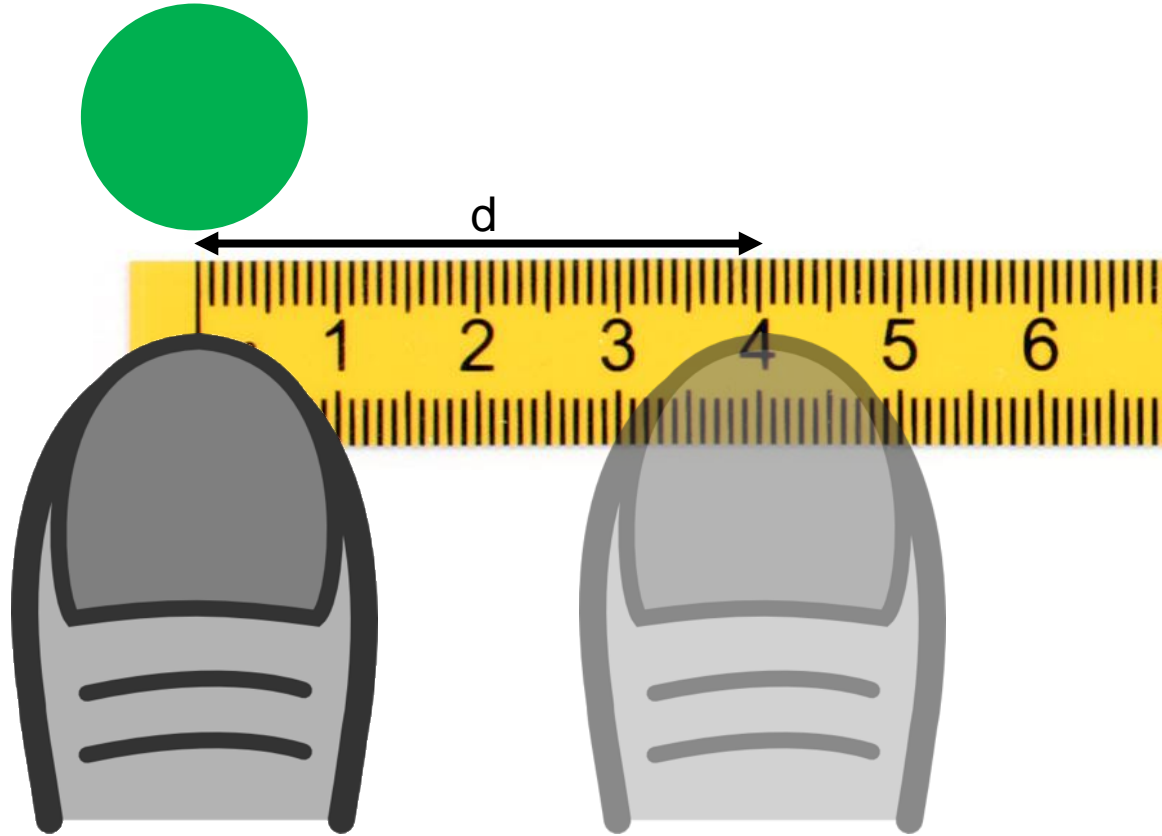
MACHINE INFORMATION	ACTIVE APPS	SPS	LAST CONNECTION
3531 - GRM3000 COUSINRY SHIPPED COMMISSIONED PLASSER AMERICAN CORP 08/2013	SwitchProduction Tamping Machine AGGS +	Taps per hour Tamping cycle counter Trailer 0	OFFLINE TAMPING 1.5.4 10/03/2017
3532 - GRM3000 COUSINRY SHIPPED COMMISSIONED PLASSER AMERICAN CORP 11/2013	SwitchProduction Tamping Machine AGGS +	Taps per minute Taps per hour Total distance 0 727 2 mile	ONLINE TAMPING 1.5.4 10/03/2017
3533 - GRM3000 COUSINRY SHIPPED COMMISSIONED PLASSER AMERICAN CORP 11/2013	SwitchProduction Tamping Machine AGGS +	Work Distance Operating hours Taps per minute 376 ft 6,311 h 0	OFFLINE TAMPING 1.5.4 10/03/2017
3540 - GRM3000 COUSINRY SHIPPED COMMISSIONED PLASSER AMERICAN CORP 08/2014	SwitchProduction Tamping Machine AGGS +	Work Distance Operating hours 12,376 ft 4,864 h	ONLINE TAMPING 1.5.4 10/03/2017



Measure ballast



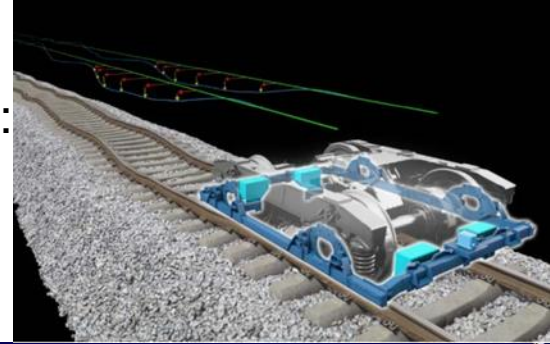
Measure distance



Measure track location



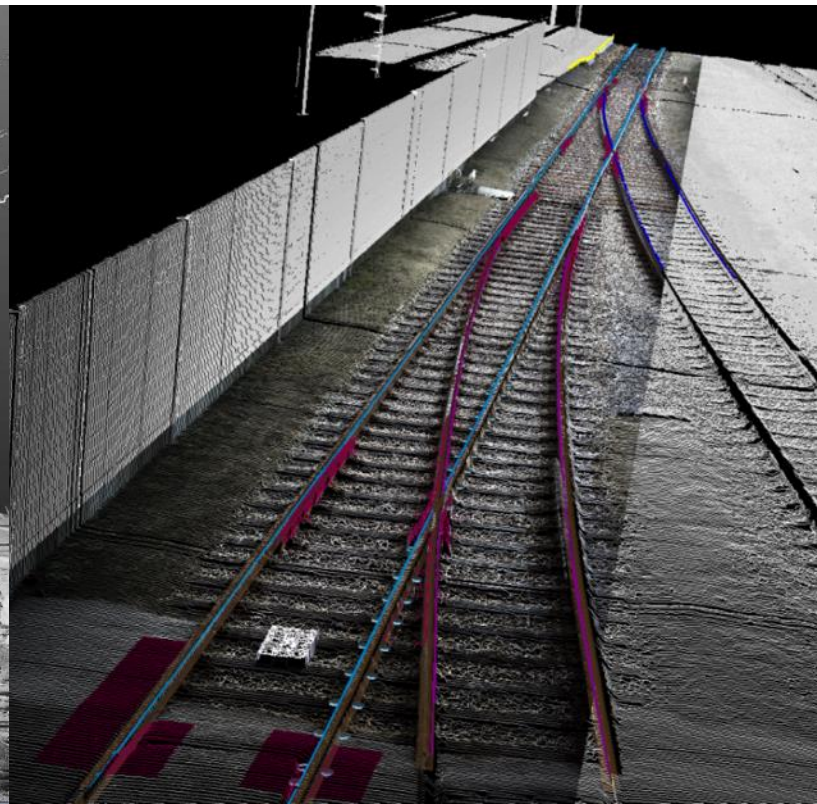
Fixpoint measuring system:
from 5km/h to 100 km/h



#3 autonomous systems

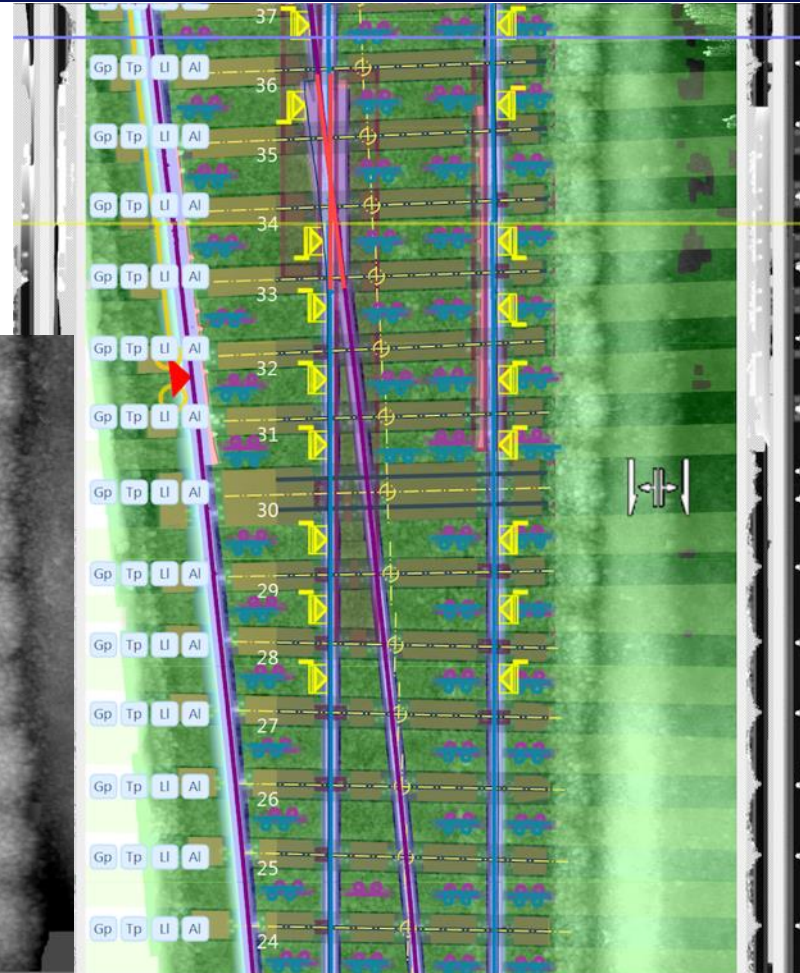
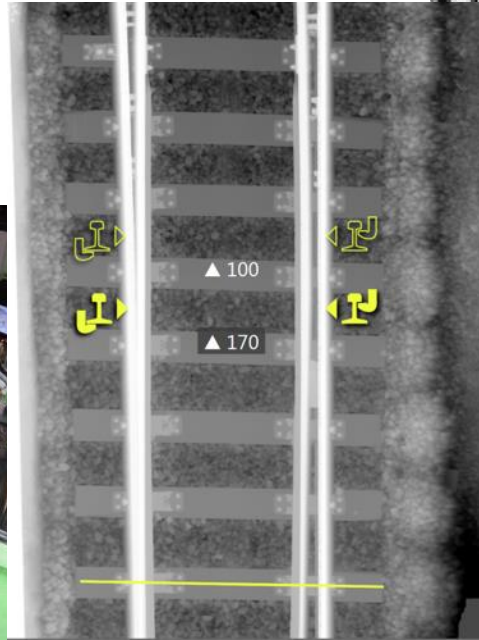


Detecting objects



The Assistant

- Mapping turn-out on the fly
- Precise tamping recommendation
- Obstacle detection
- Autonomous tamping

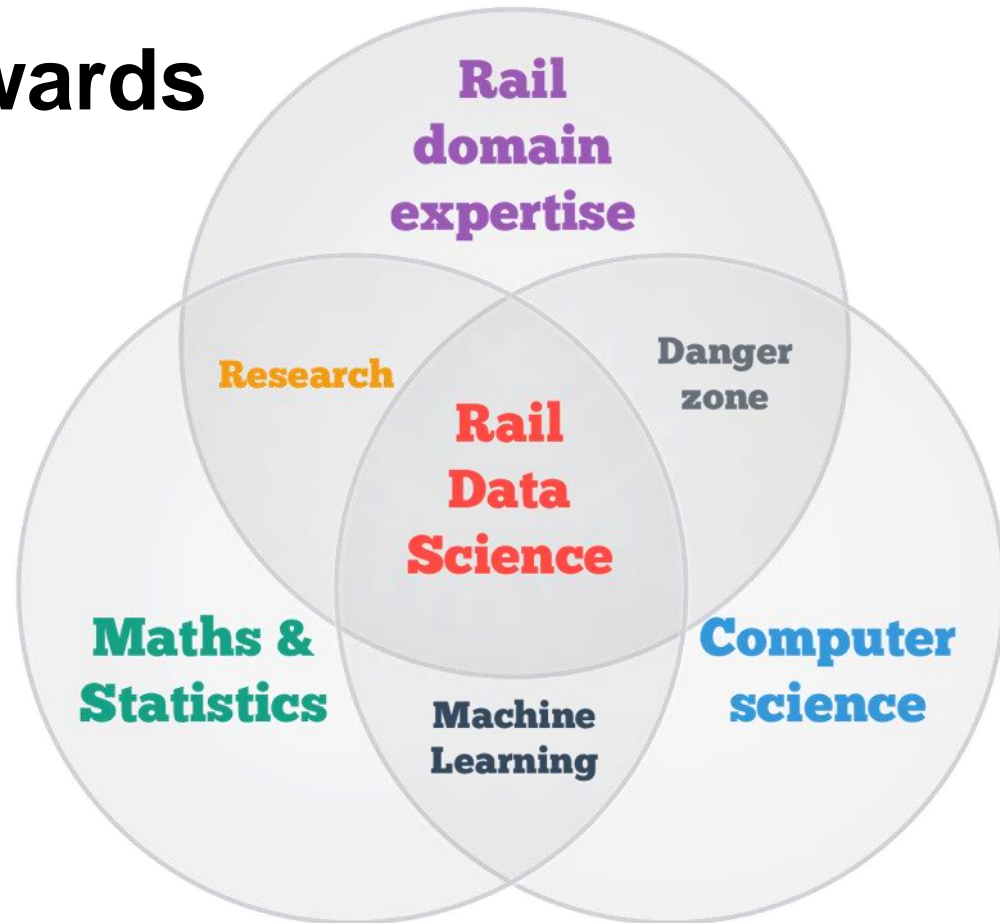




Transformation towards digital railways

The era of digitalization is a fantastic opportunity for railway to increase our competitive advantages over other means of transport.

However, to exploit this potential we need to look beyond our own domain expertise.





PlasserSmartMaintenance

MACHINE • FLEET • INFRASTRUCTURE

One more thing ...

There's an app for that



game.plassertheurer.com