

# LTM Compact

Track geometry measurements  
from working machines



# Background / Motive

- Many track-machines performs track maintenance
- National standards require loaded track geometry measurements in many cases
- Ordinary track recording cars are on a schedule and cannot cover many small maintenance works.

Large need of tools to:

- Improve efficiency
- Reduce speed-restrictions
- Fill the gap between standards and common practice.



# Different perspectives



## Infrastructure manager

- Ensure safety
- Keep speed restrictions to a minimum
- Ease follow up of contracts

## Entrepreneur

- Ensure safety
- Prove successful work
- Internal feedback, good/bad jobs – how to improve



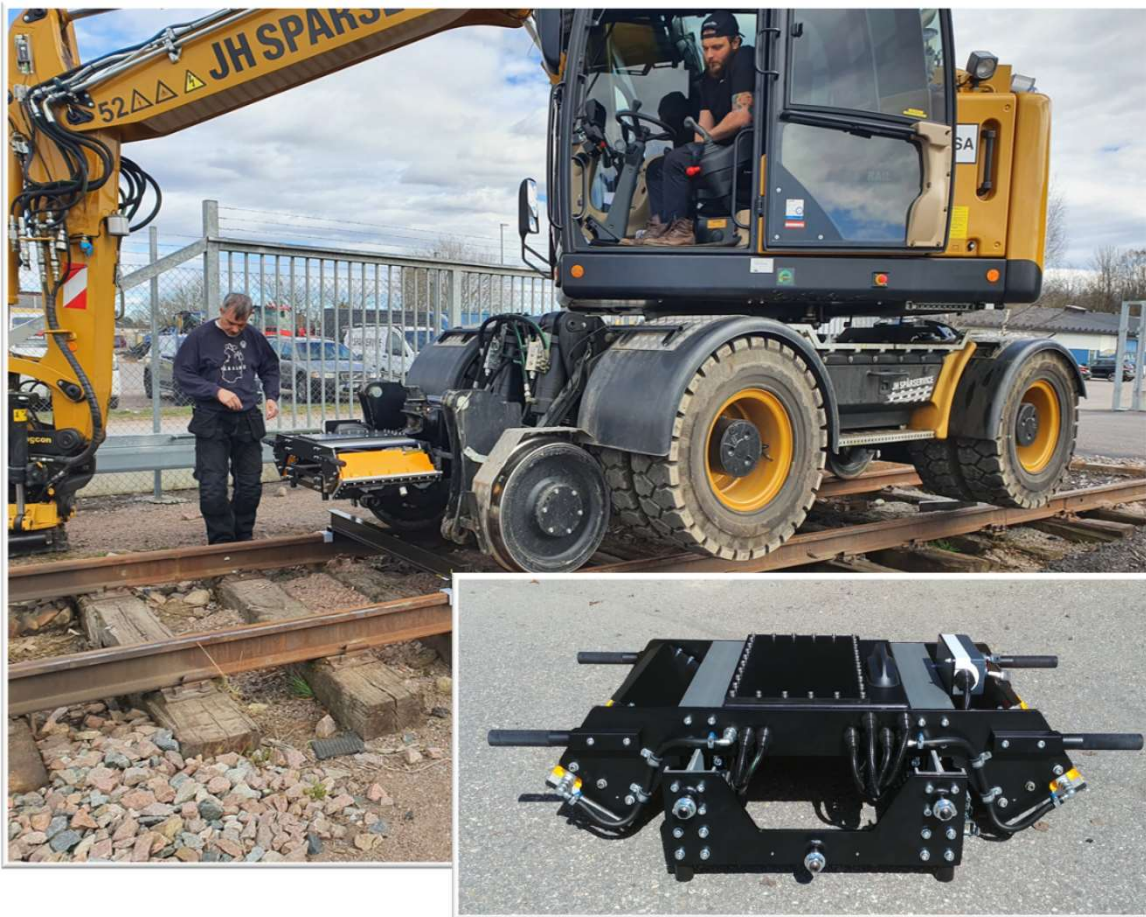
# Requirements

- Robust
  - No moving parts
  - 6-12 months between calibration
- Easy mount/dismantle close to axle
- Fulfil EN13848-2 and -3



# LTM – Latronix Track Measurement

LTM performs track geometry measurement using lasers, optical sensors and inertial measuring components (accelerometers and gyros).



- Measurement is performed in accordance with the current standard EN 13848
- Measurement can be performed at speeds from 5 km/h up to 300 km/h
- The measuring system does not contain any moving parts or parts that are subject to wear. Ongoing maintenance is limited to keeping glass panes clean.
- LTM-Compact can be mounted on a number of different types of rail vehicles; measuring cars, excavators, tampers, grinding trains and of course locomotives or train carriages.



# Track geometry - working machine

- Processing is done in real-time, or directly after measurements. Track geometry is visualized and alerts are generated.
- Data is directly shared in cloud.
- Data is the property of the customer and can be imported into various systems.

Main parameters:

- Longitudinal level
- Alignment
- Track gauge
- Cant
- Twist

Other parameters on demand

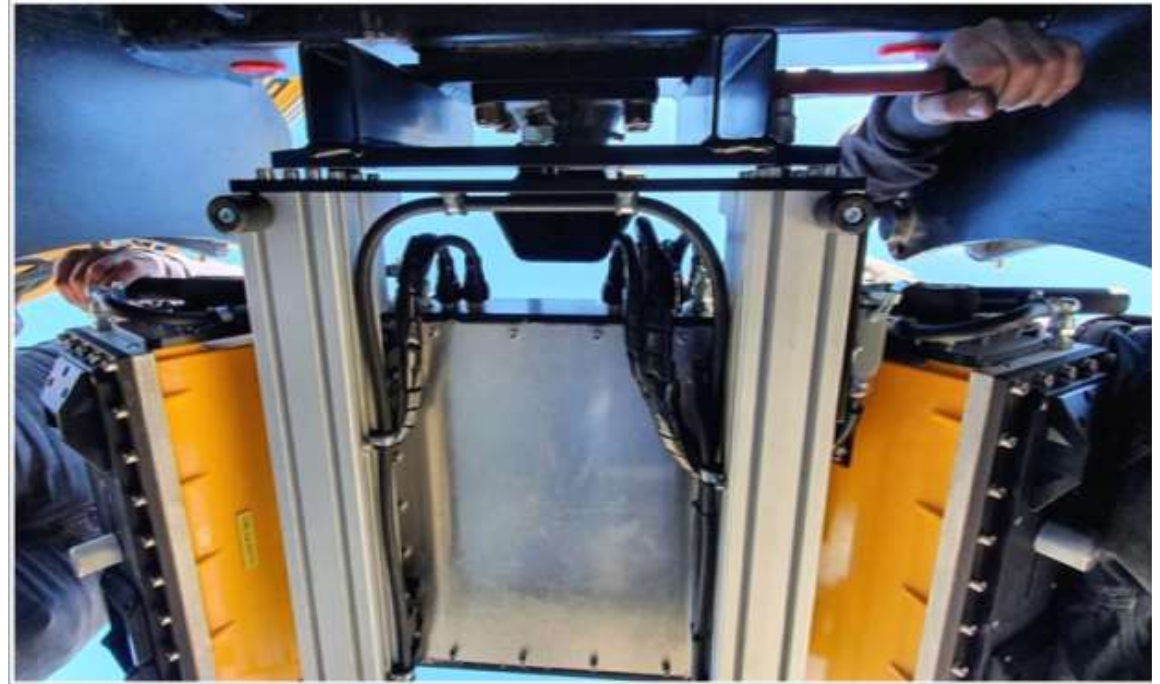


# Mounting

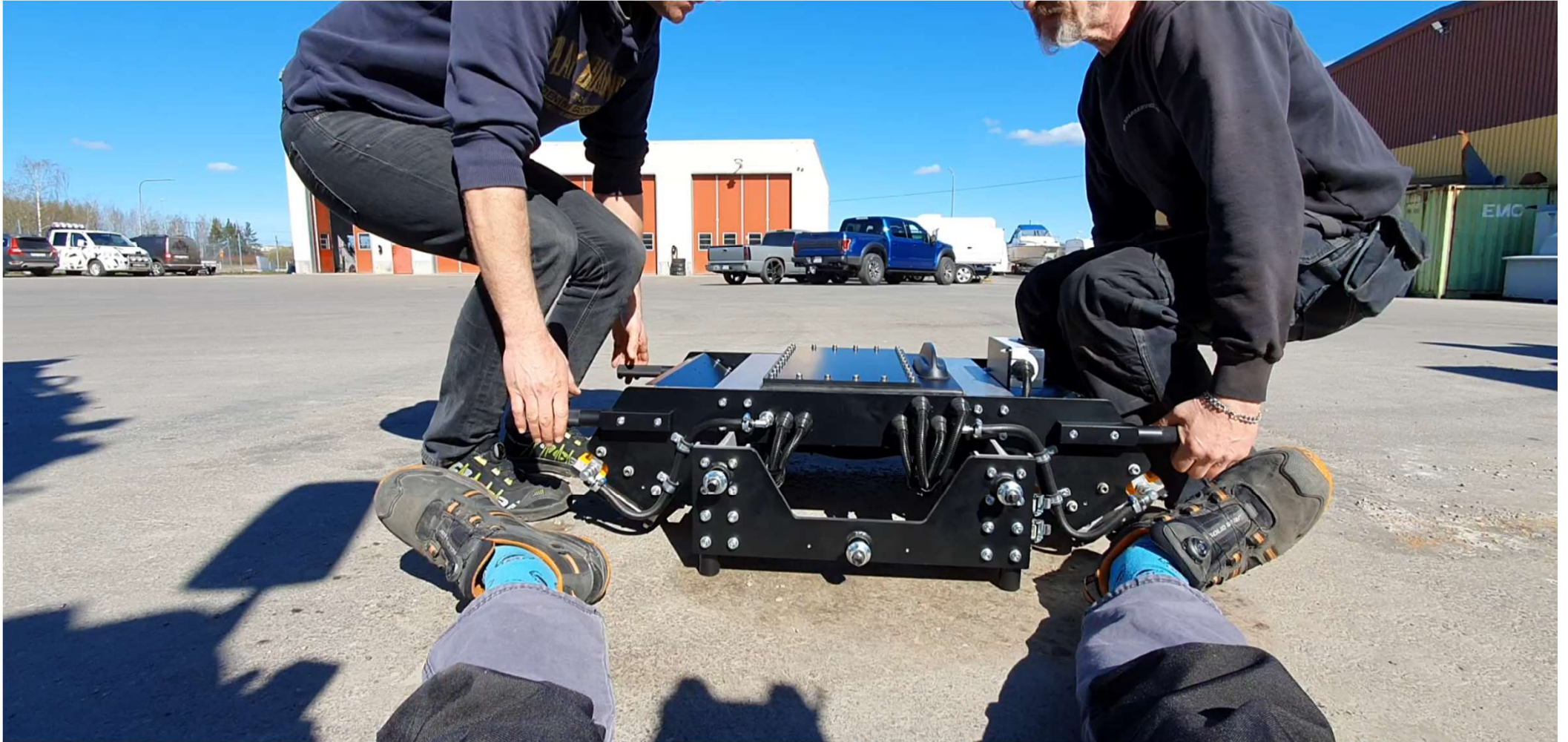
(1-2 min)



Step 1, Lift LTM to pre-assembled bracket



Step 2, Tighten three bolts



**LATRONIX**  
*Laser Systems*



**EBER DYNAMICS**





# Preparation for measurements



Step 3, Connect two connectors (24VDC and pre-mounted encoder or Doppler radar)



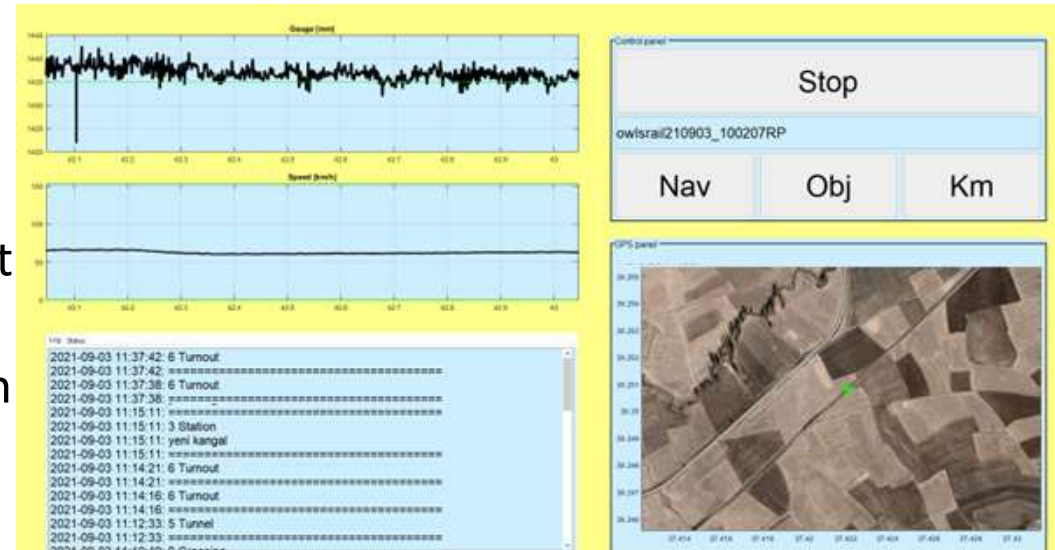
Step 4, Press start to start the measuring system, turn the key switch to connect the two laser meters

# Start measurement



Step 5, Start measurement

The measurement is controlled wirelessly from an iPad or Android device



- Real-time information with status
- Real-time measurement data (track gauge, vehicle speed, GPS position)
- Possibility for operator to store notes

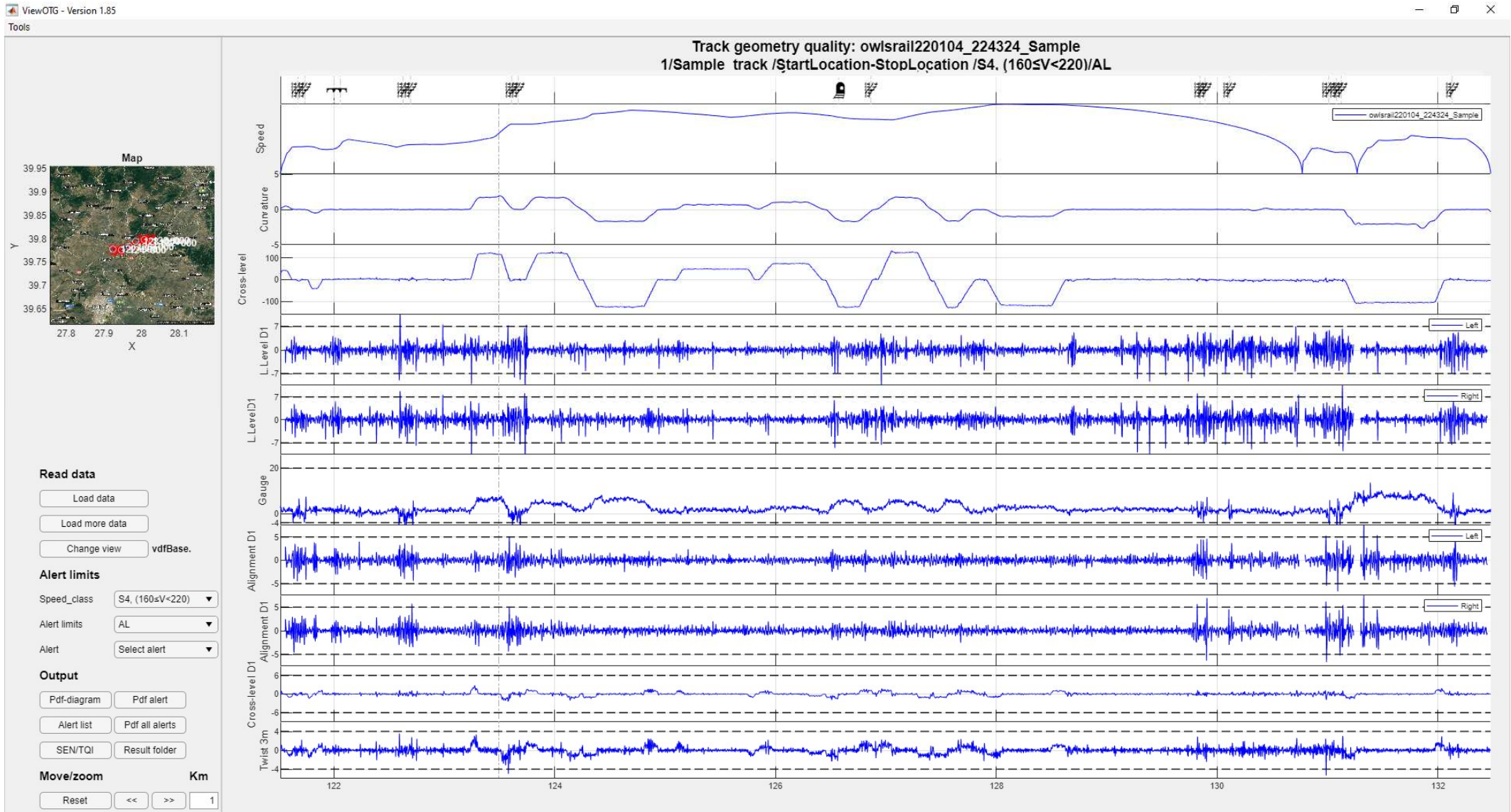
# Measurement example



# Metis Live - Demonstration

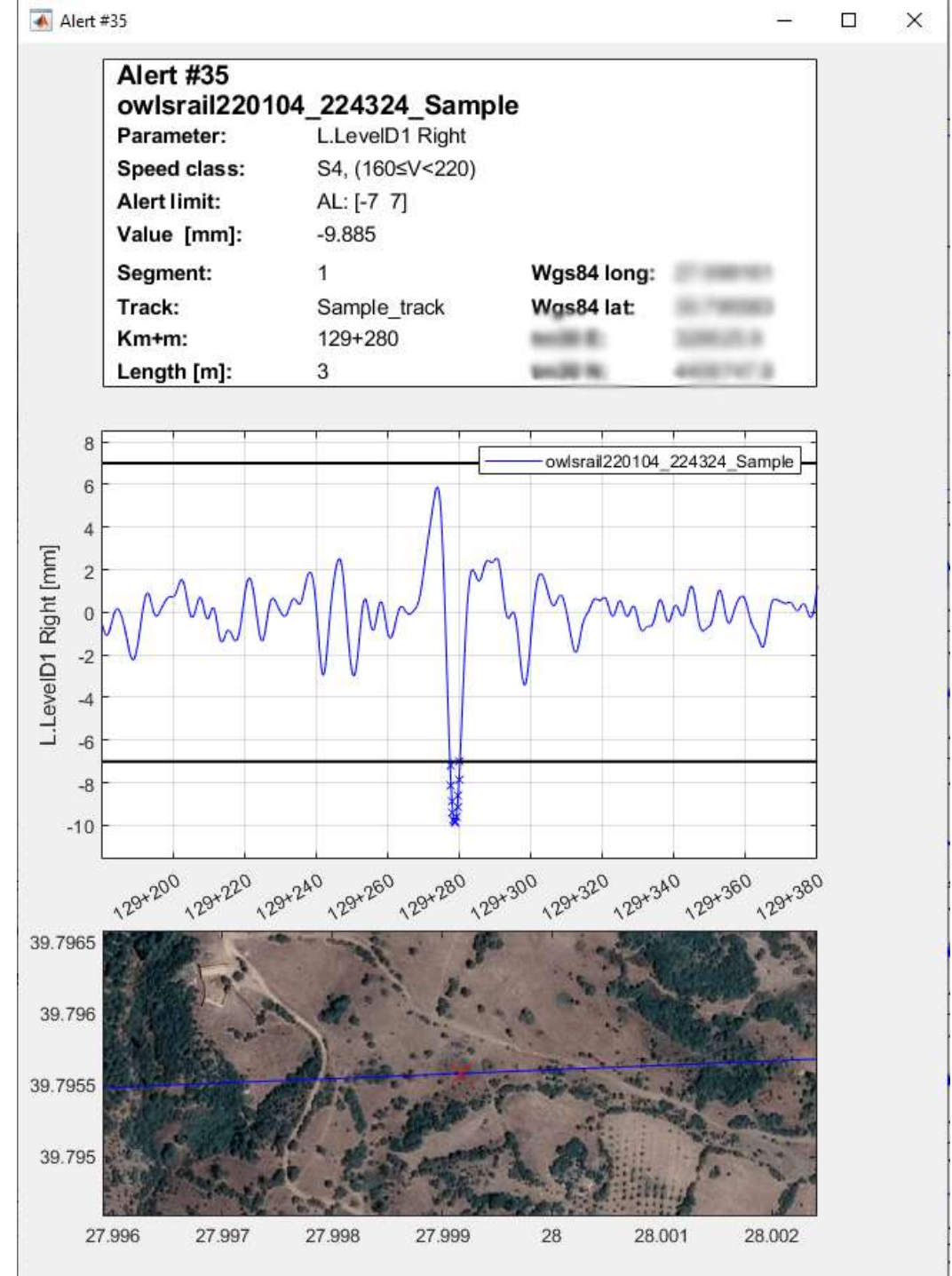


# Metis viewer – Data viewer

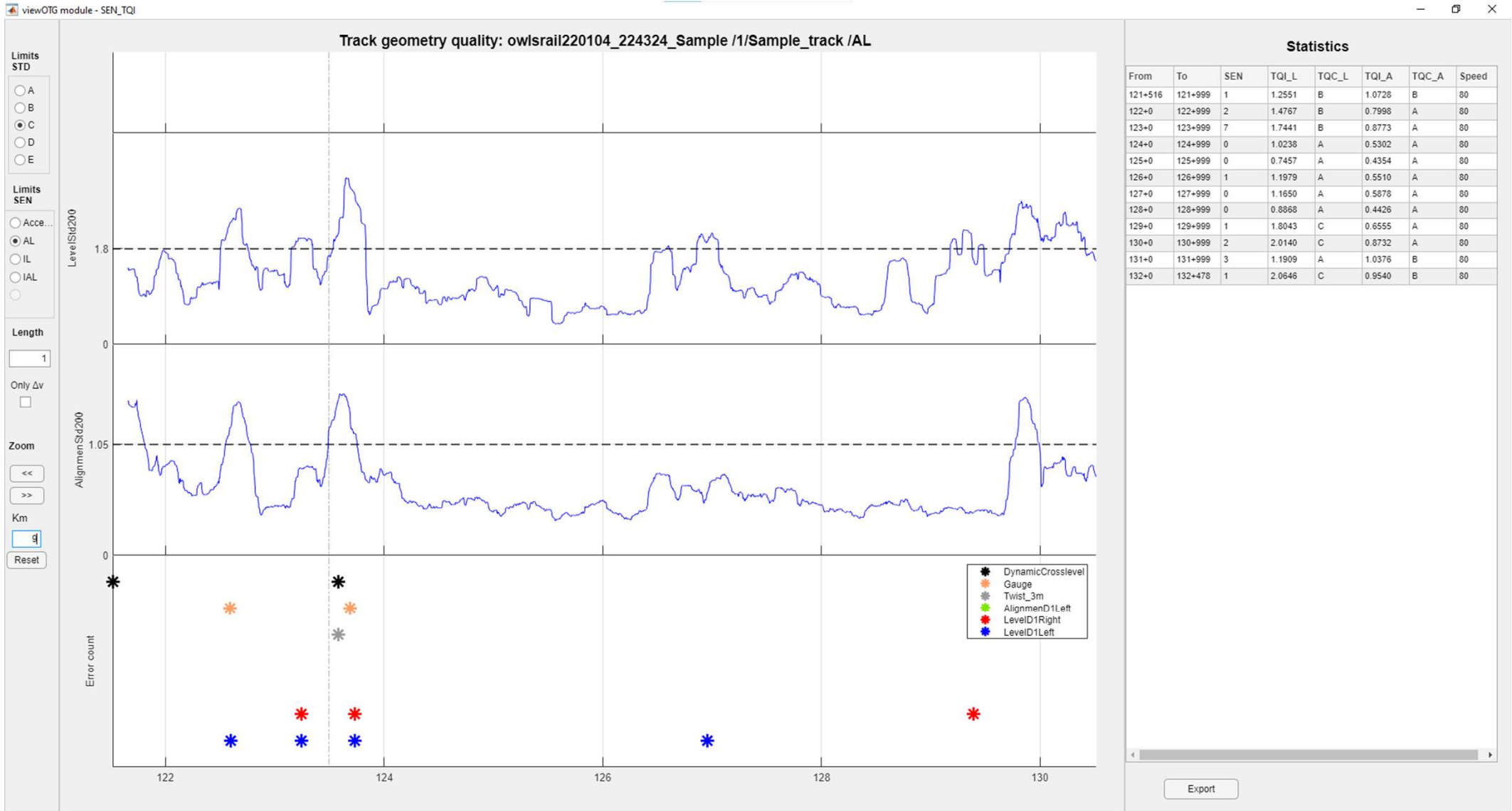


# Alert report

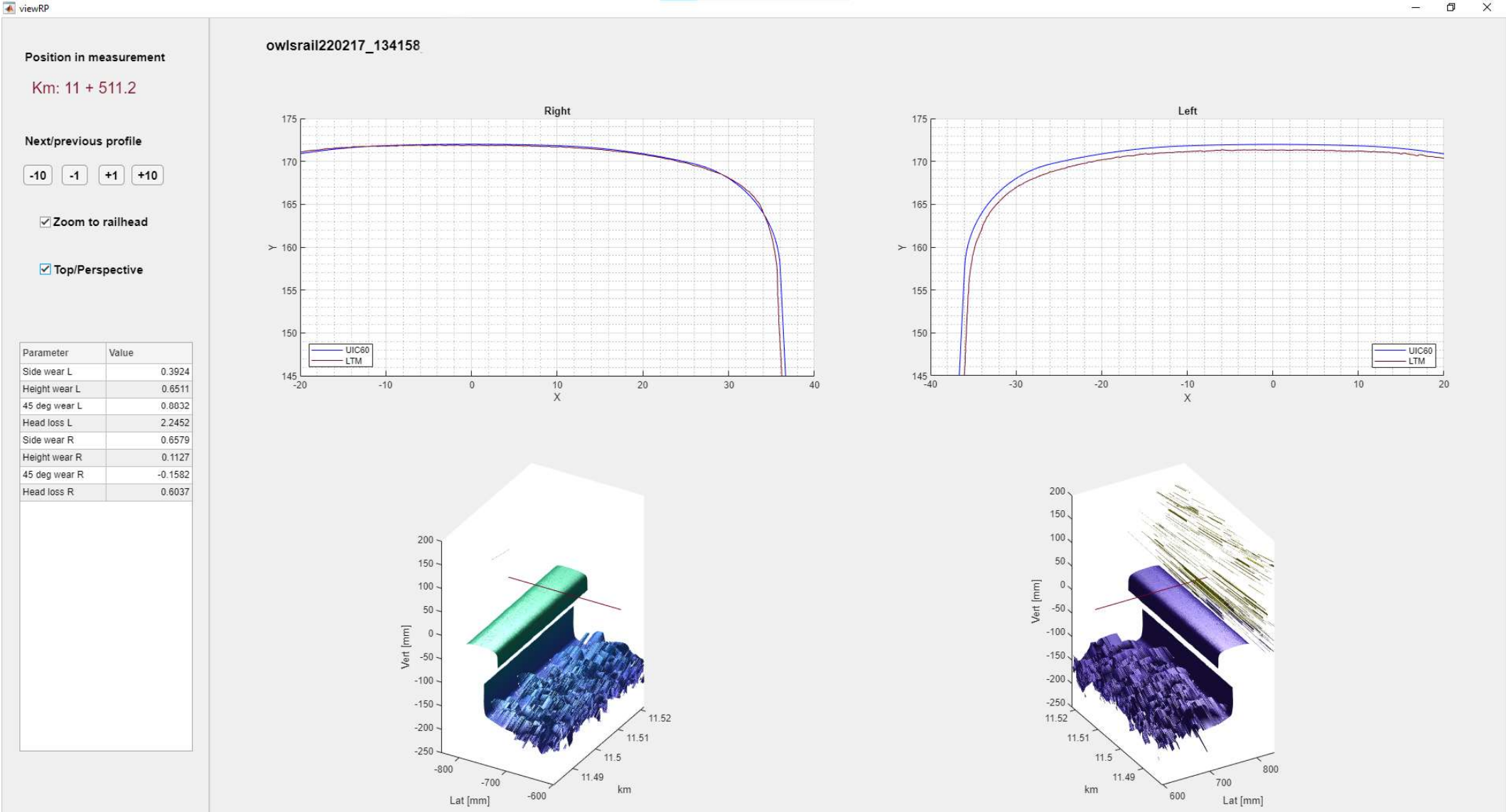
- Alert report can be seen
  - On screen
  - Pdf-export
  - Excel lists
- A second measurement can easily be added to prove that maintenance was successful



# Module for SEN-Single Error Number, and TQI-Track Quality Index



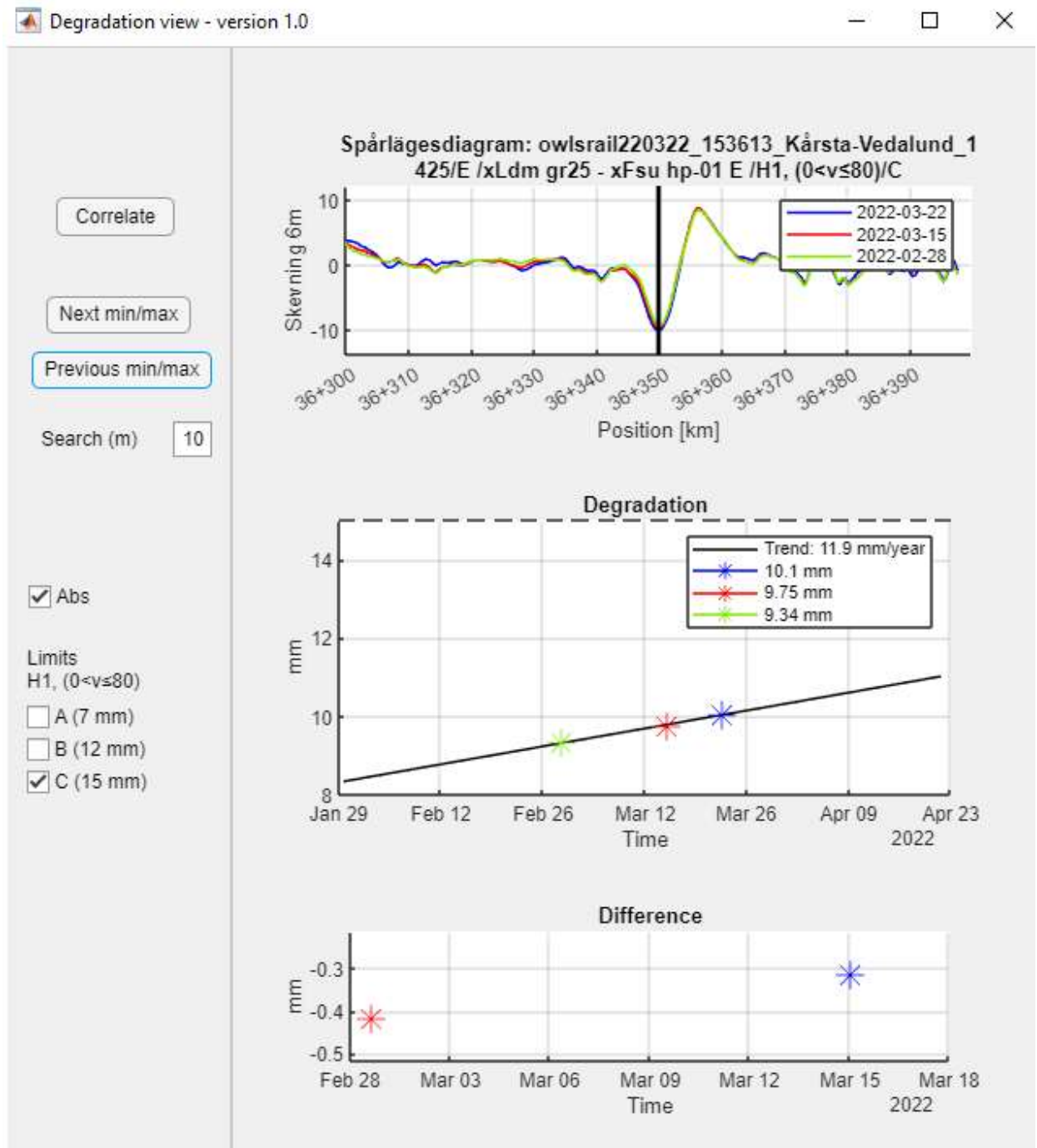
# Module for rail-profile





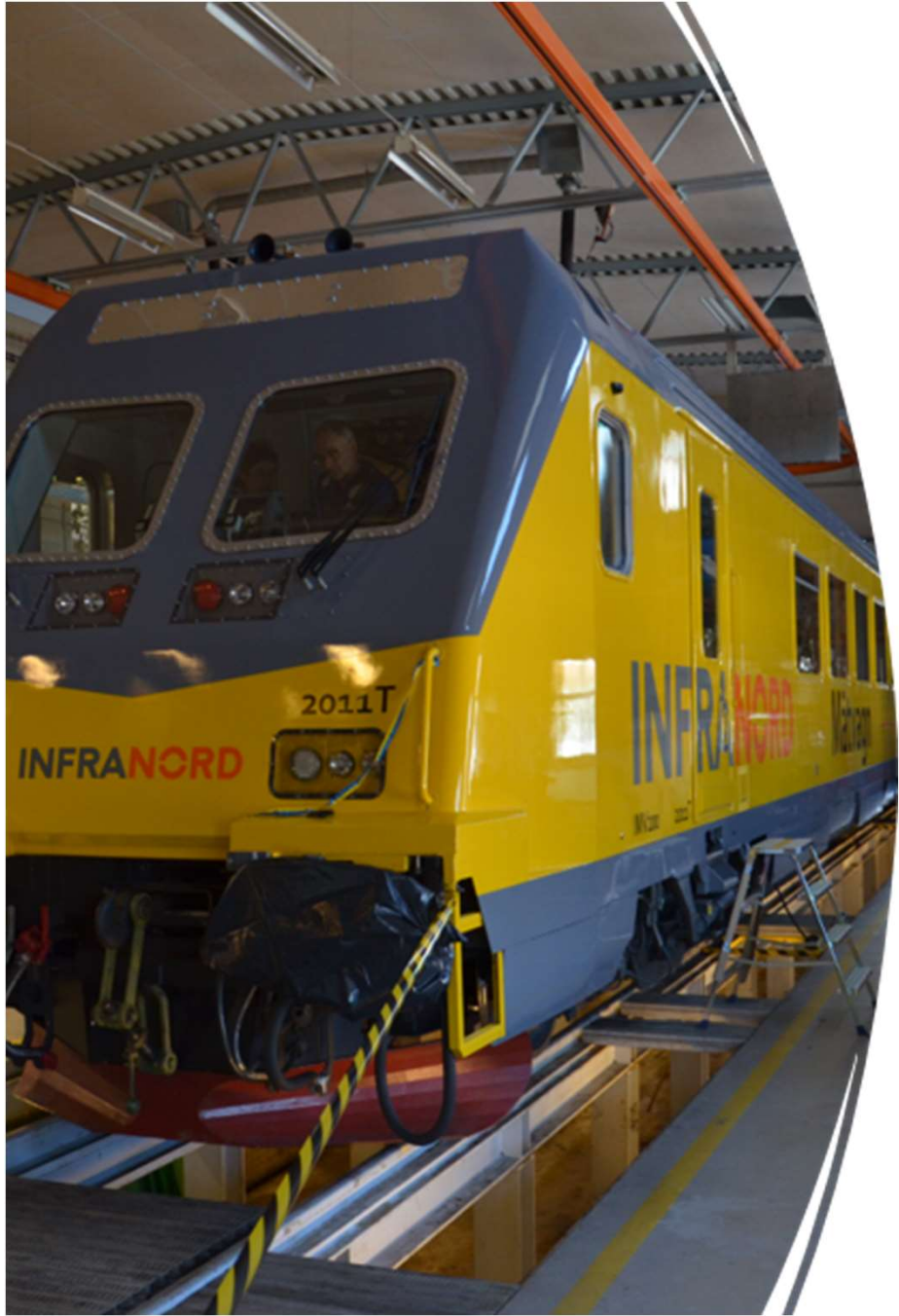
# Module for degradation

- By clicking the track diagram, degradation view is started
- Measurements are correlated, and degradation can be monitored at min/max positions



# Reproducibility EN13848

<u>Parameter</u>	Reproducibility (Passenger car)	Reproducibility (Excavator)	EN13848-2	EN13848-3
Longitudinal level	0.26 mm	0.64 mm	0.8 mm	2 mm
Alignment	0.28 mm	0.59 mm	1.1 mm	2 mm
Track gauge	0.26 mm	0.50 mm	1 mm	1 mm
Twist	0.08 / 0.04 mm	0.10 / 0.12 mm	0.5 mm	0.42 mm
Cross-level	0.51 mm	0.52 mm	2.5 mm	2.5 mm



Customers include:

- TÜV SÜD, Germany (used Internationally)
- Infranord, Sweden
- Network Rail
- Bane Nor, Norway
- TCDD Teknik, Turkey
- AB Stockholms Lokaltrafik, Sweden
- Göteborgs Spårvägar AB, Sweden
- Trafikverket, Sweden
- Banverket Industridivisionen, Sweden

# Conclusions

- Large need for loaded track measurements at maintenance works
  - Verify correct maintenance
  - Limit speed restrictions
  - Align with national standards
  - Assure safety
- LTM-Compact is a new solution for loaded track geometry quality measurements
  - Robust, easy to use
  - Well within EN13848 requirements
  - Analysis and reports can be done directly

