

LTM Compact

Track geometry measurements from working machines



Authors

- Eric Berggren, EBER Dynamics
 - BV/TRV 1996 – 2010
 - EBER Dynamics 2011 –
- Mikael Pettersson, MethoTech
 - BV/TRV 1988-2010
 - Private companies maintenance/consultant 2010--
 - MethoTech 2021 -
- Mattias Mattson, Latronix
 - CEO at Latronix
- Björn Skatt, Latronix
 - CTO at Latronix



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

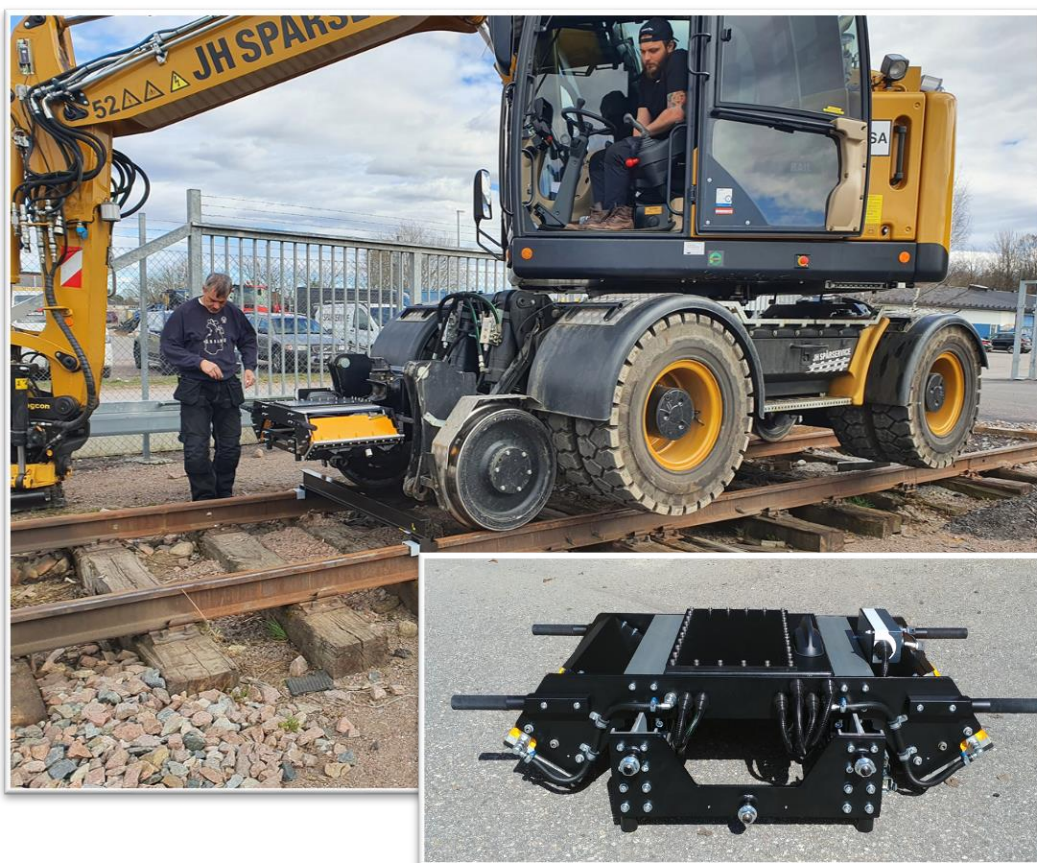
Requirements

- 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

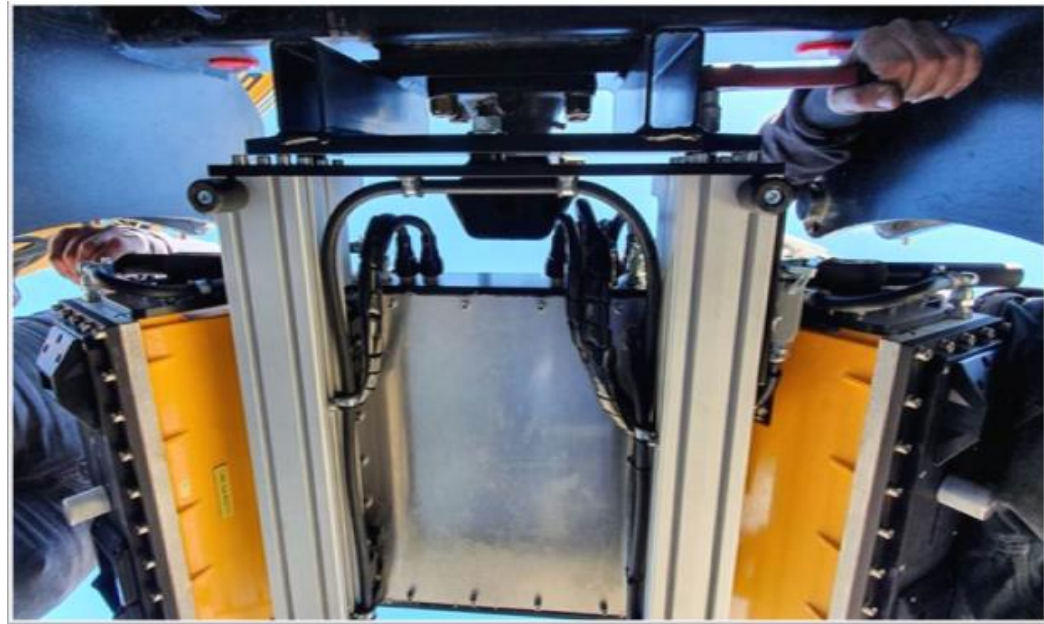


Mounting

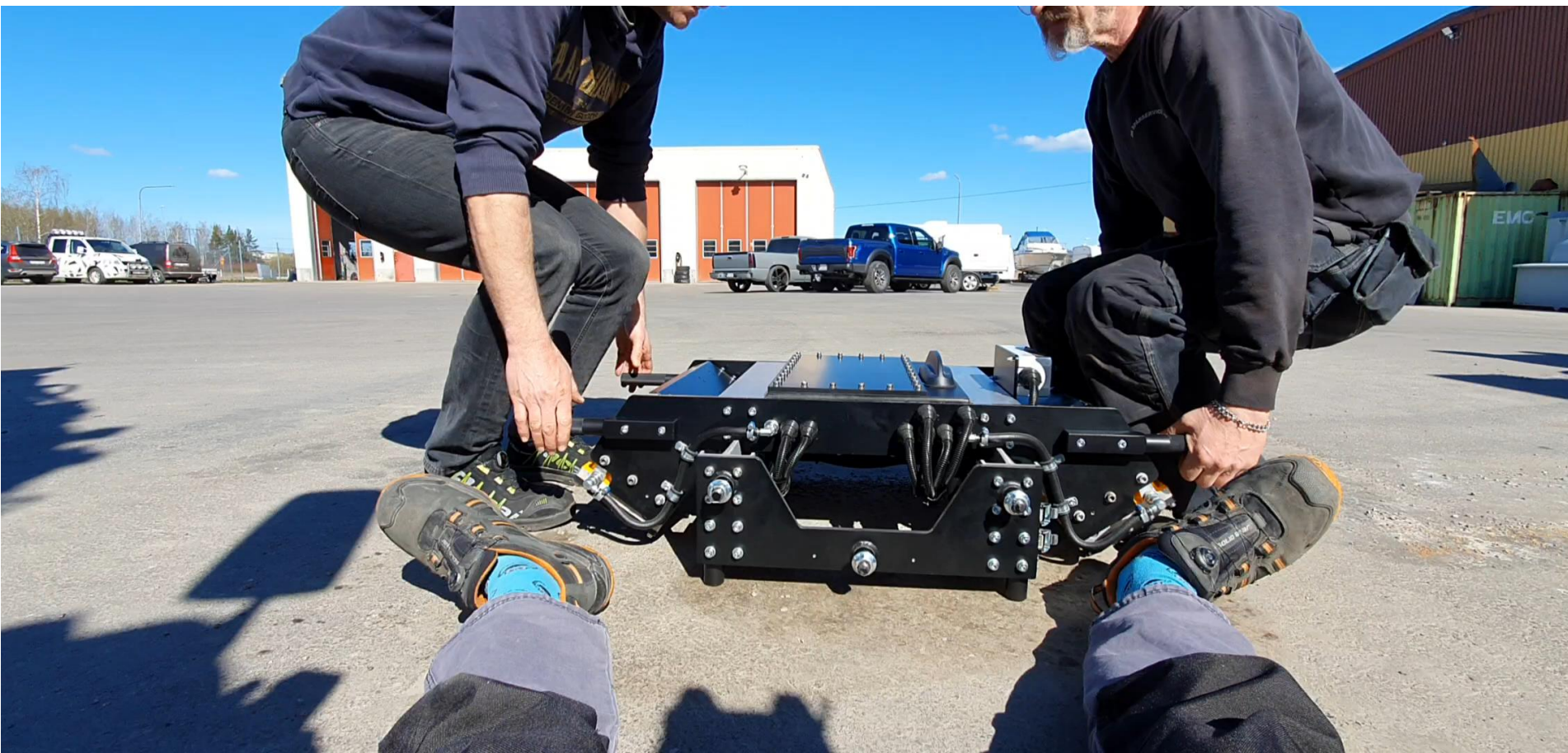
(1-2 min)



Step 1, Lift LTM to pre-assembled bracket



Step 2, Tighten three bolts



Preparation for measurements



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



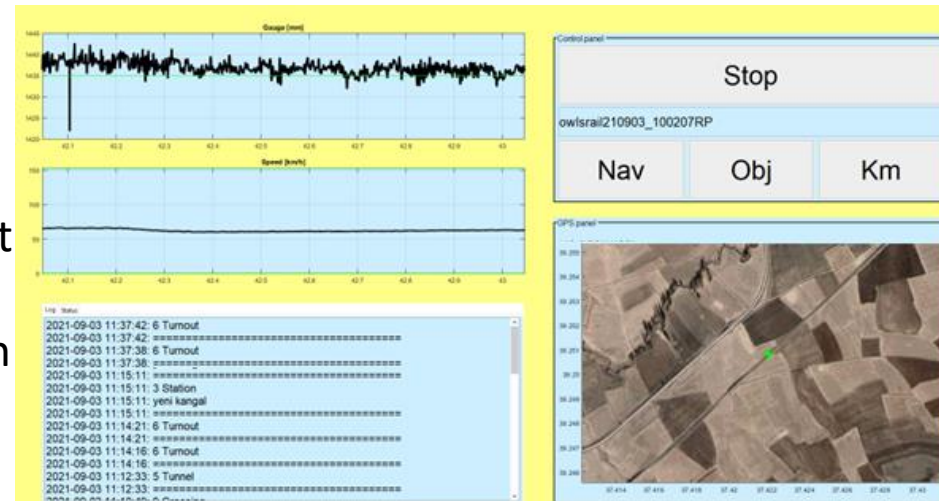
Step 4, Press start to start the measuring system, turn the key switch to connect the two laser meters

Start measurement



Step 5, Start measurement

The measurement is controlled wirelessly from an iPad or Android device

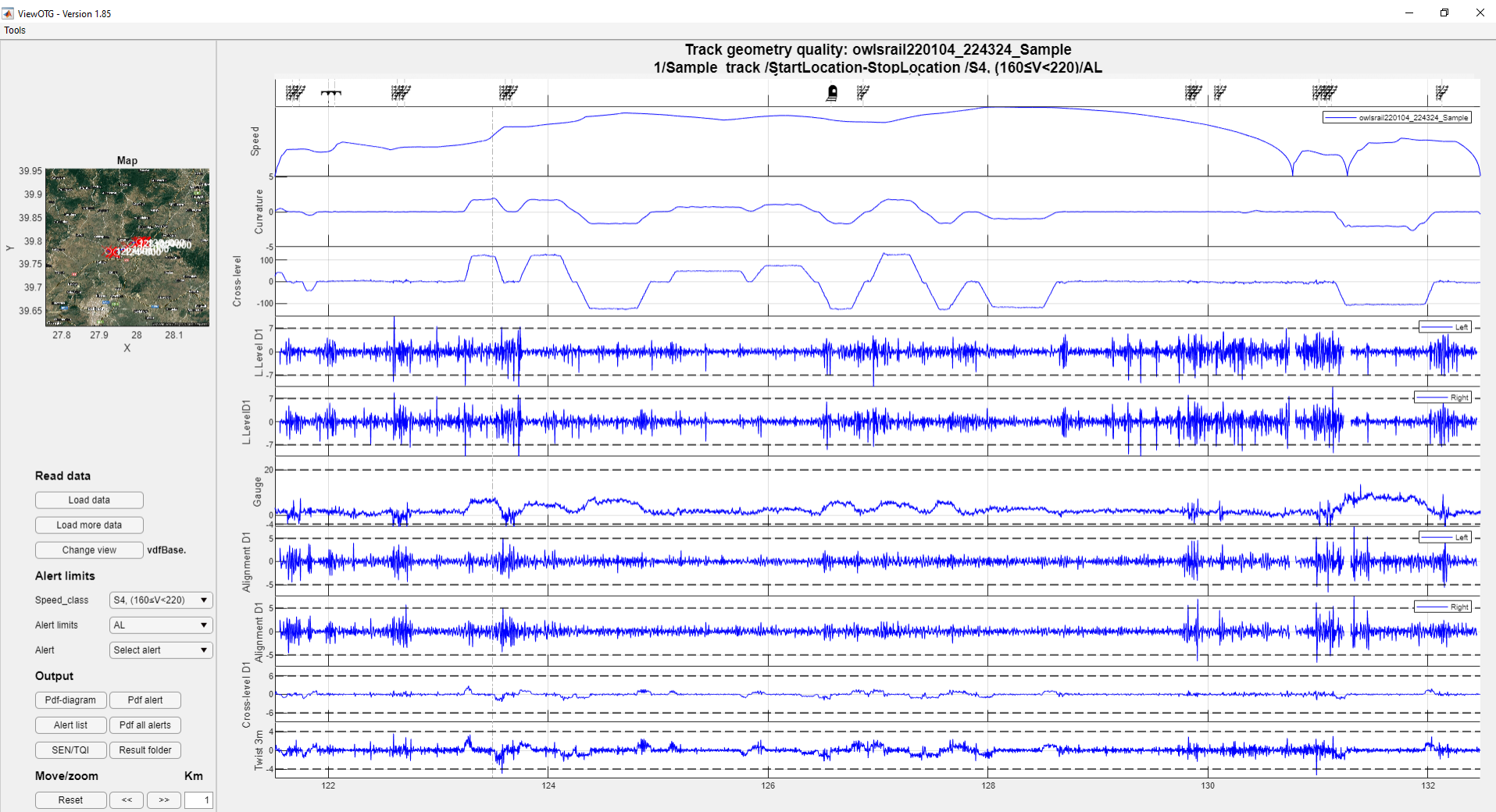


- Real-time information with status
- Real-time measurement data (track gauge, vehicle speed, GPS position)
- Possibility for operator to store notes

Measurement example

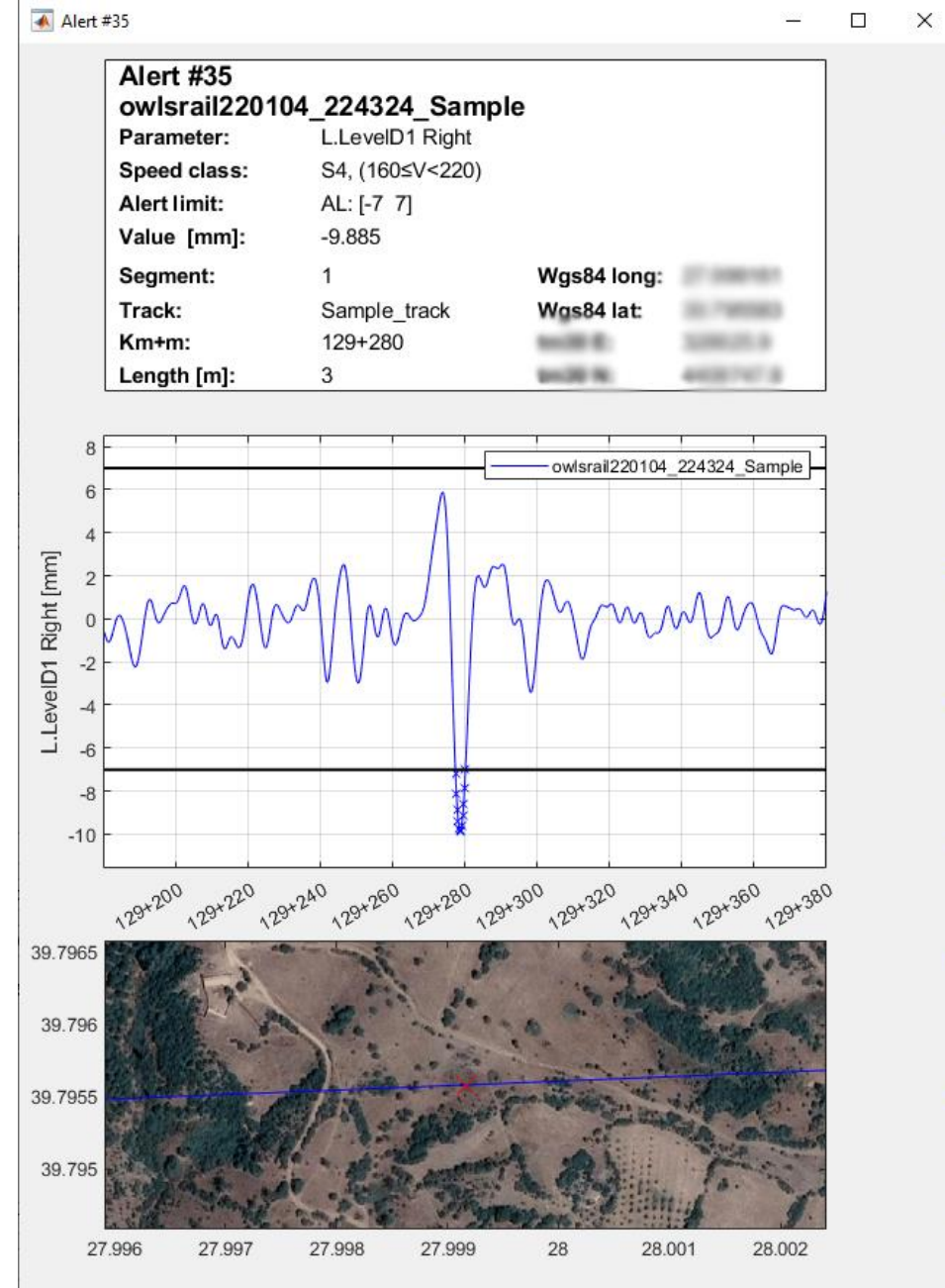


Metis viewer – Data viewer

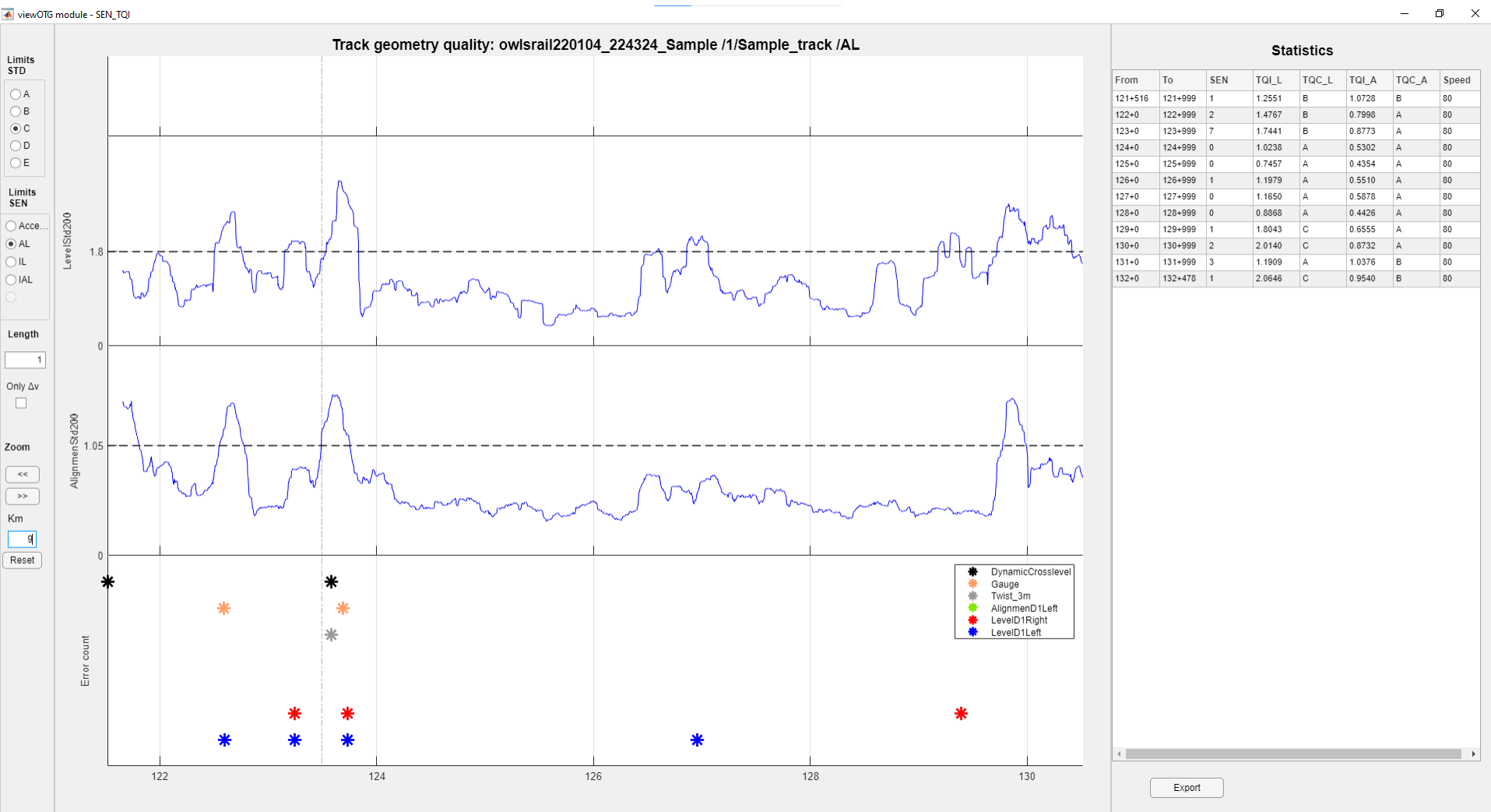


Alert report

- 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

viewRP

— □ ×

Position in measurement

Km: 11 + 511.2

Next/previous profile

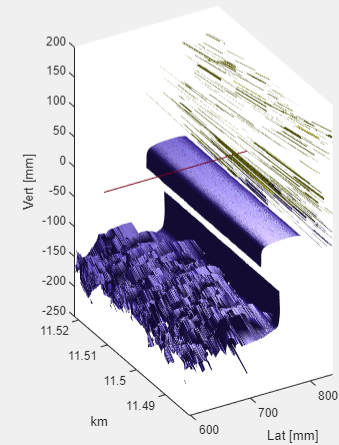
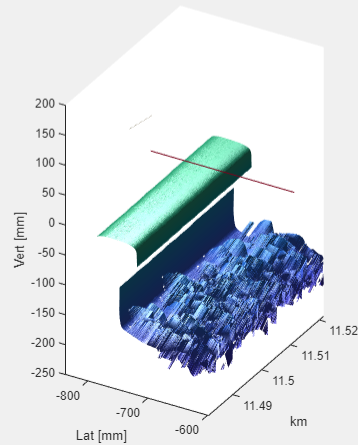
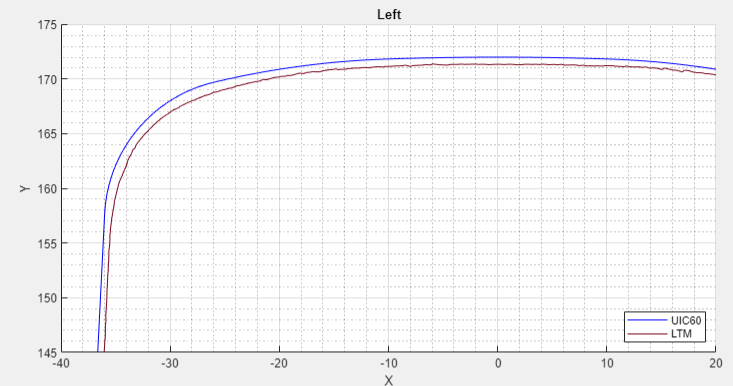
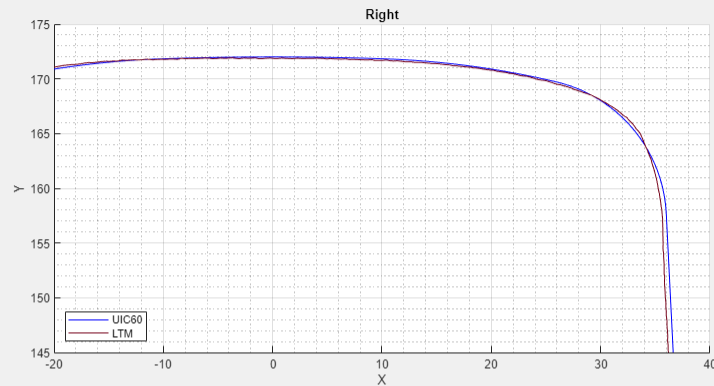
-10 -1 +1 +10

☒ Zoom to railhead

☒ Top/Perspective

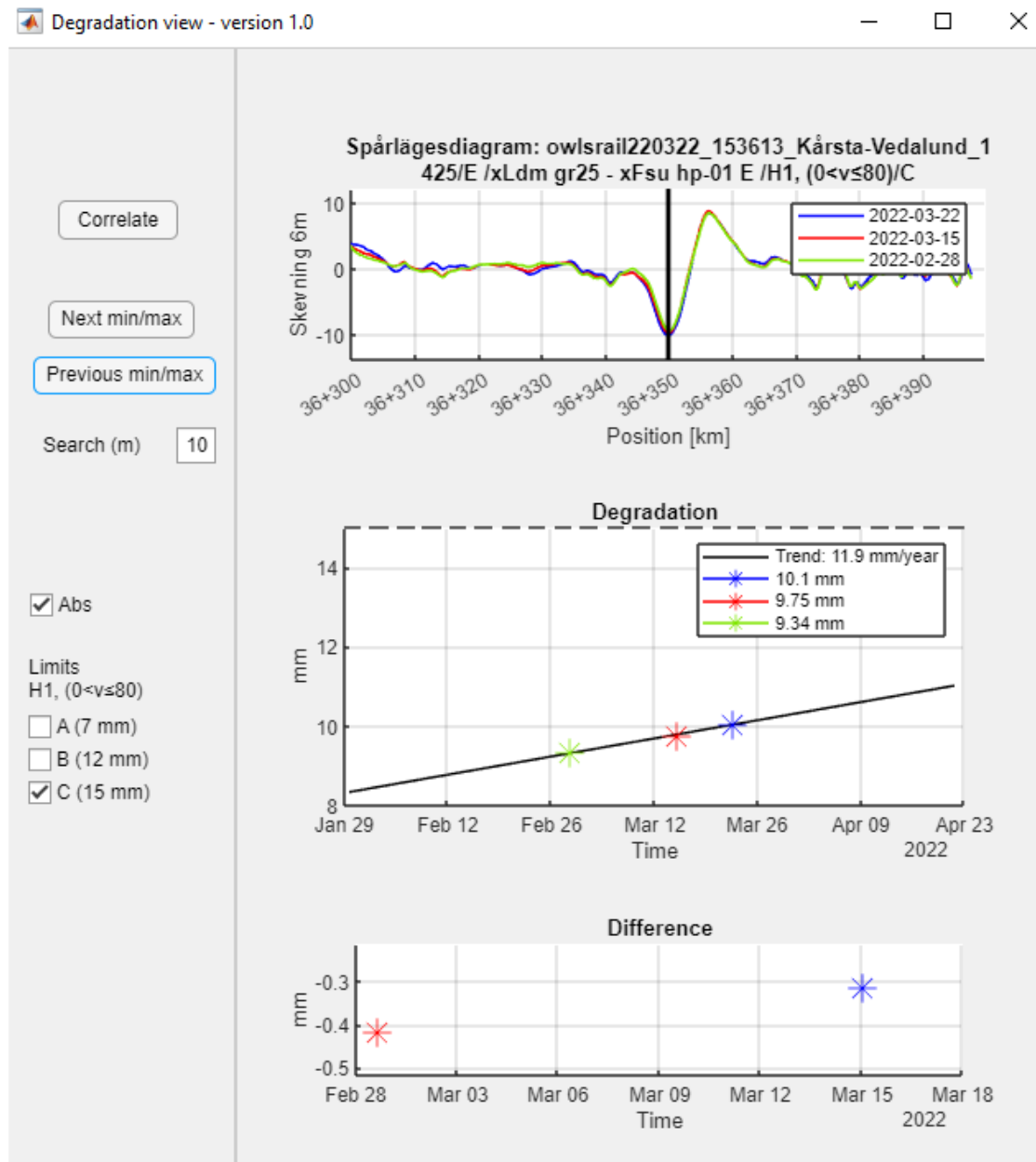
Parameter	Value
Side wear L	0.3924
Height wear L	0.6511
45 deg wear L	0.8832
Head loss L	2.2452
Side wear R	0.6579
Height wear R	0.1127
45 deg wear R	-0.1582
Head loss R	0.6037

owlrail220217_134158



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

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

