Presented By:
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Updates in Trimble Railway products –
new features adding higher productivity and quality

28 May, 2024

Trimble

Agenda

News in railway surveying and scanning Q2 2024

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Trimble Access goes on Rails

From track stakeout and survey to construction and as-built control

02

GEDO Scan Office – news

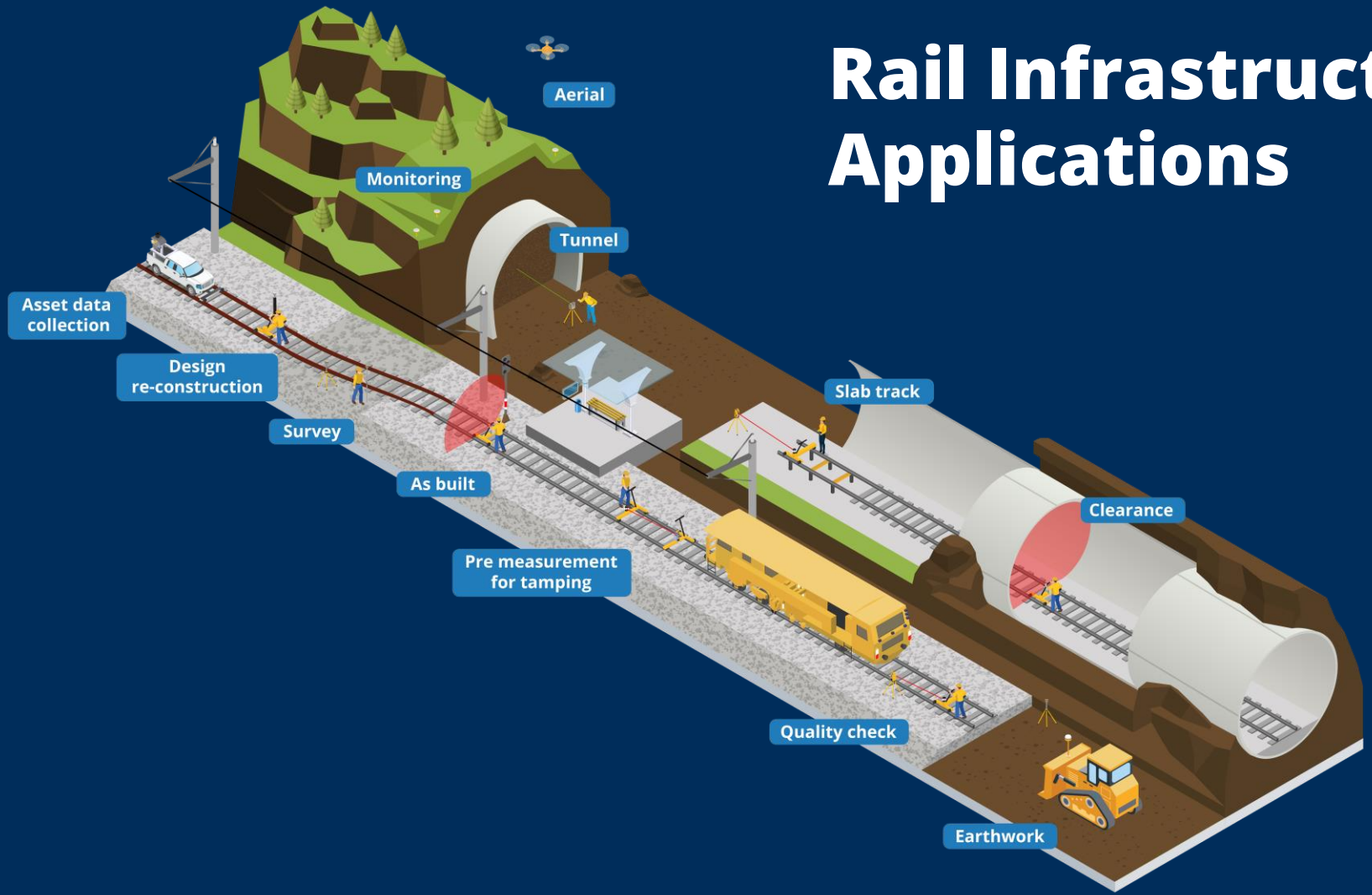
Review of key features and latest updates

03

Questions & Answers

Ask your Questions

Rail Infrastructure Applications



Key track survey applications

- **Track Quality** - Operation

  TA Rail – GEDO Doc
  GEDO IMS

  - Gauge/Cant/Twist
  - Full relative

- **Track Survey** - Design/As-built

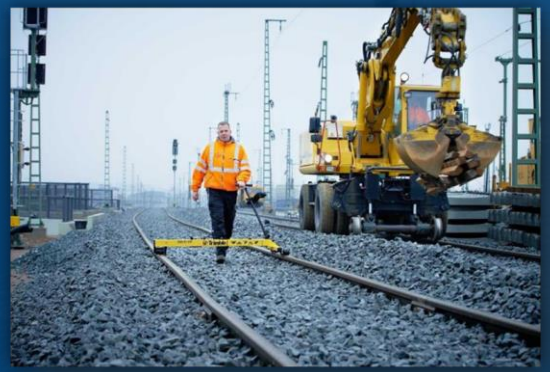
  TA – Track Gauge Survey
  TA Rail – GEDO Track trolley
  TA Rail – GEDO Rec trolley
  GEDO IMS TS/GNSS

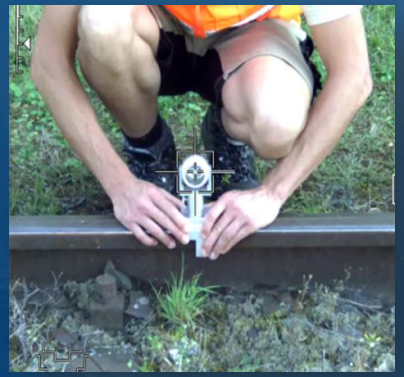
  - Design
  - As-built check
  - Quality check (relative)
  - Monitoring

- **Stakeout** - Construction

  TA Rail – Stakeout
  TA Rail – GEDO Track trolley

  - Stakeout
  - Track positioning
  - As-built check



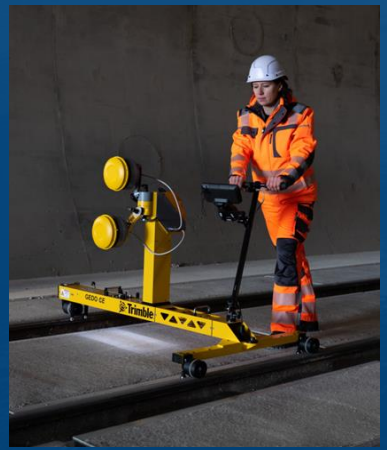


Key track scanning applications

- **Hi-Res track survey** - Design / As Built

GEDO Rec-Scan
GEDO IMS-Scan

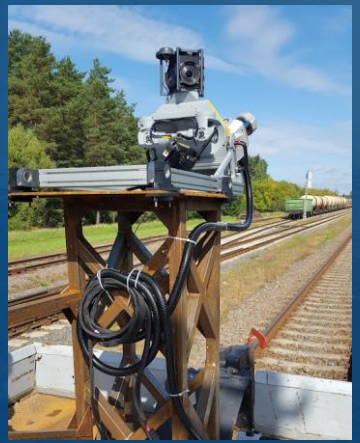
- Design
- 3D Modeling
- As-built check



- **Clearance** - Design / Construction / Operation

GEDO Scan
GEDO Rec-Scan
GEDO IMS-Scan

- Operations
- Re-Design
- New rolling stock

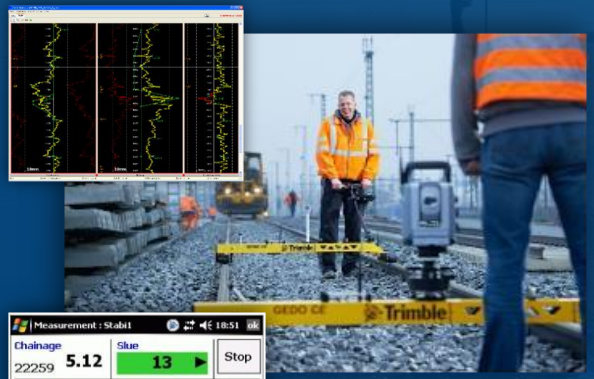


Key track pre-measurement applications

- **Pre-Measurement** - Construction

  TA Rail – GEDO Track trolley
  GEDO Vorsys
  GEDO IMS

  - New construction
  - Re-construction
  - Tamping data



- **Slab Track** - Construction

  TA Rail – GEDO Track trolley
  GEDO IMS

  - New construction
  - As-built documentation
  - Quality check

- **Re-Construction** - Construction

  GEDO IMS-GNSS

  - Line upgrade
  - High Output trains
  - Tamping

News in Trimble Railway products

Track survey

New track survey and control applications released for Trimble Access:

TA Rail – GEDO Rec

TA Rail – GEDO Track

TA Rail – Stakeout

TA – Track Gauge and Cant

Point cloud classification

GEDO Scan Office functionality is complimented with rail-specific classification capabilities:

Ballast

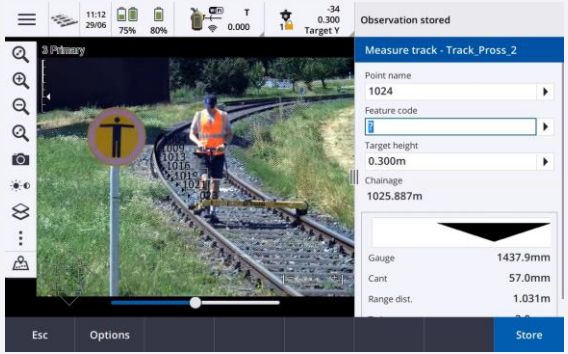
Rails

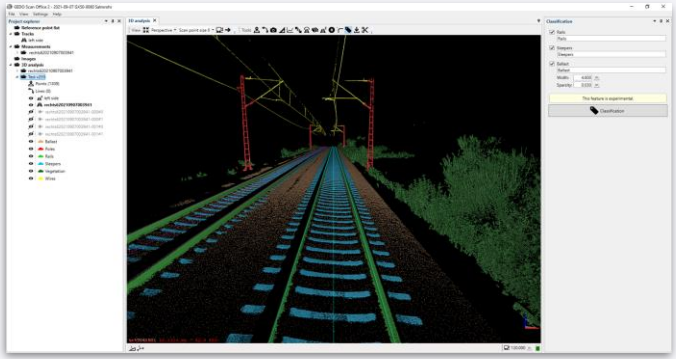
Sleepers

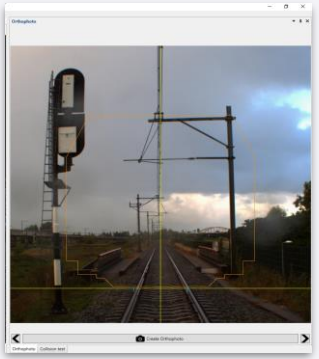
Imaging

GEDO Scan Office updated with photogrammetry and imaging capabilities:

Image view in collision



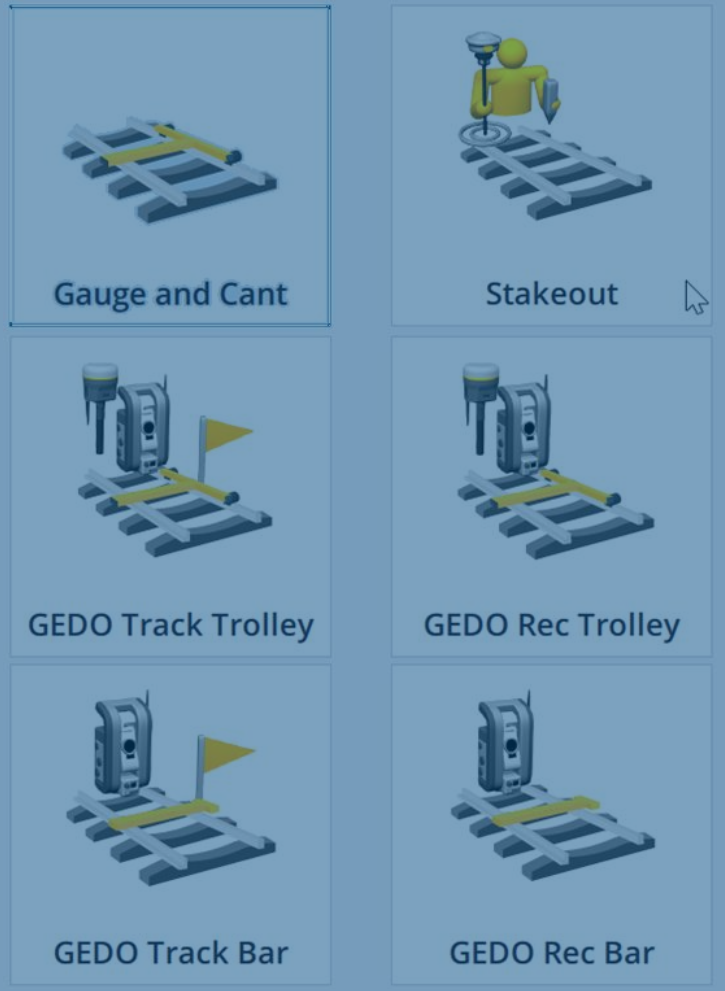




01

Trimble Access goes on Rails

From track stakeout and survey to construction and as-built control

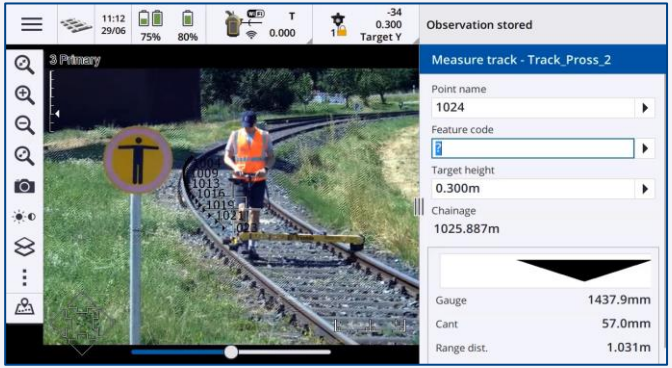


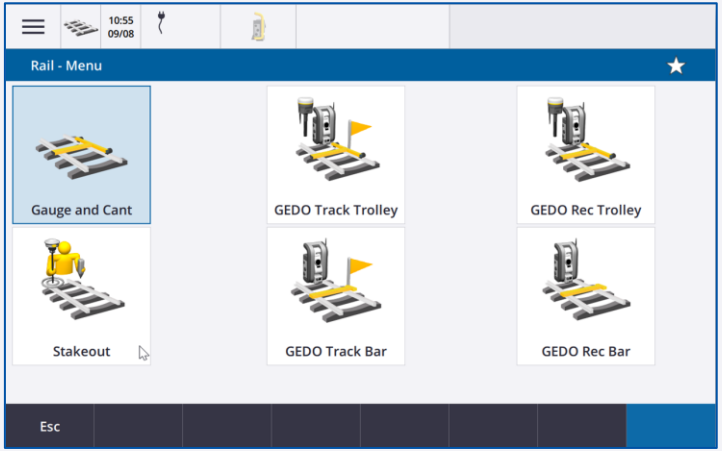
New TA modules for Rails

Track survey

New track survey and control applications released for Trimble Access:

- TA Rail – GEDO Rec
- TA Rail – GEDO Track
- TA Rail – Stakeout
- TA – Track Gauge and Cant

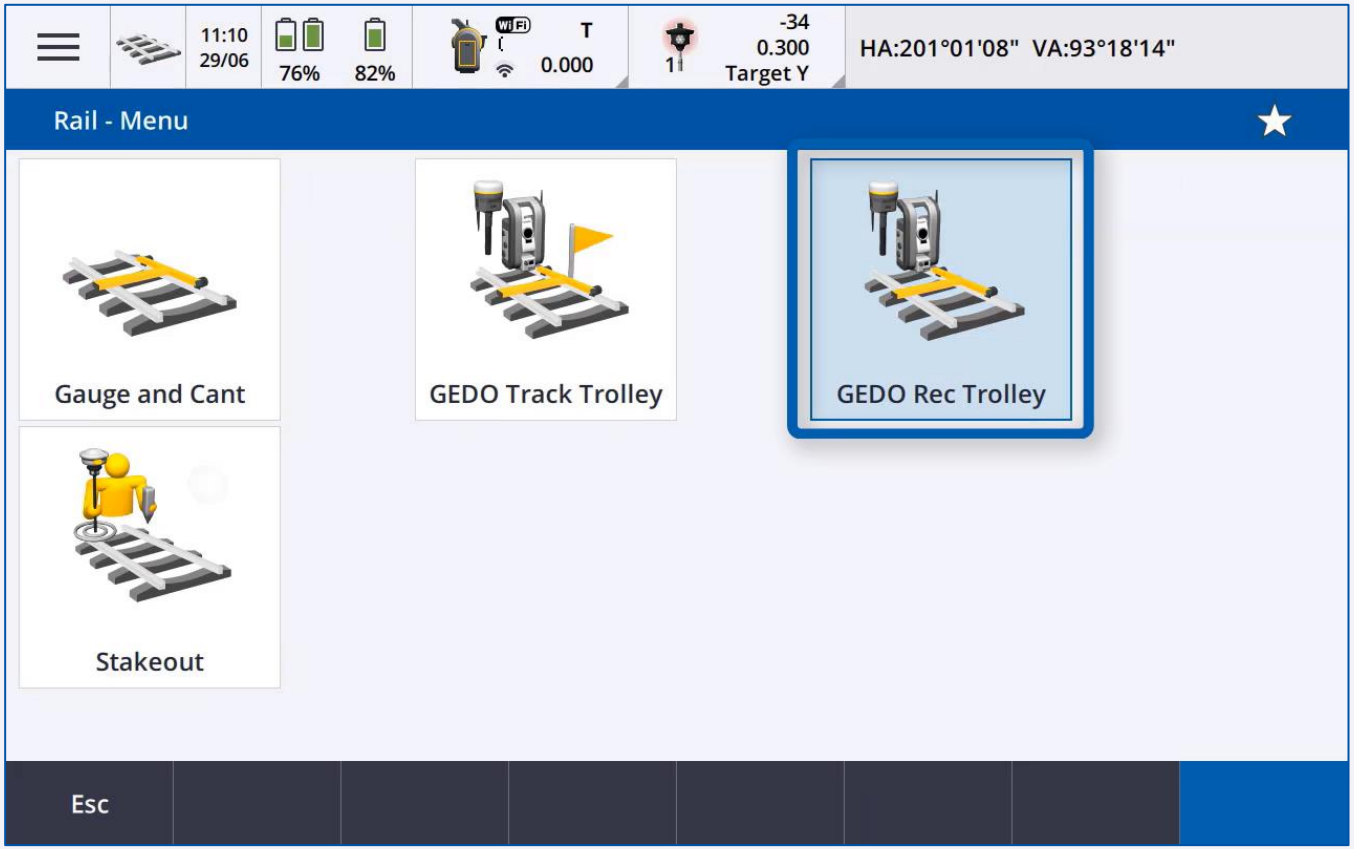




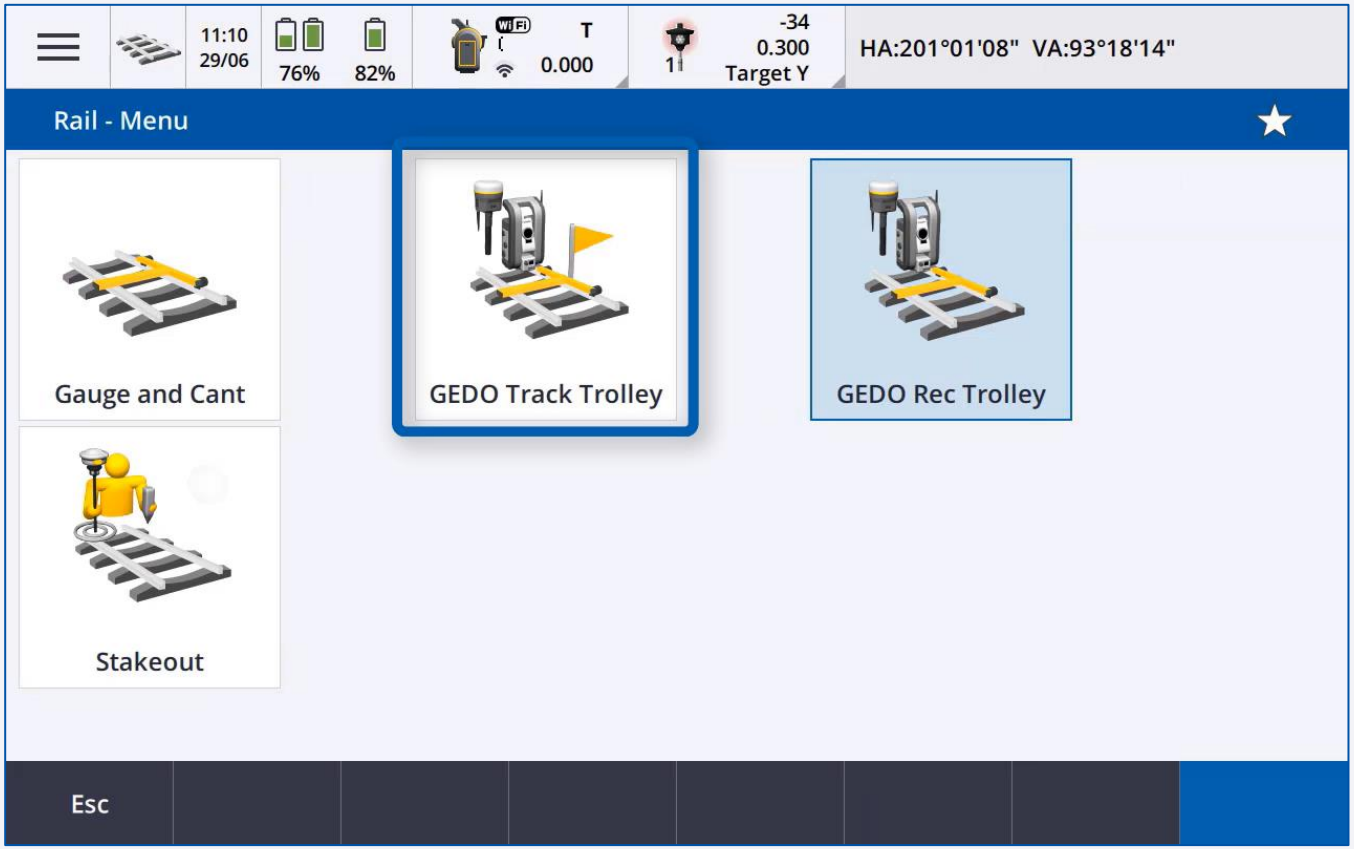
Benefits

- Compatible with TA Windows and Android
- Compatible with GEDO trolley and Track Bar
- Support of Trimble S, SX and R instruments
- Support of Vision Technology
- Support of railway track design alignments
- Live survey and stakeout results
- Track quality reporting in field and .JXB

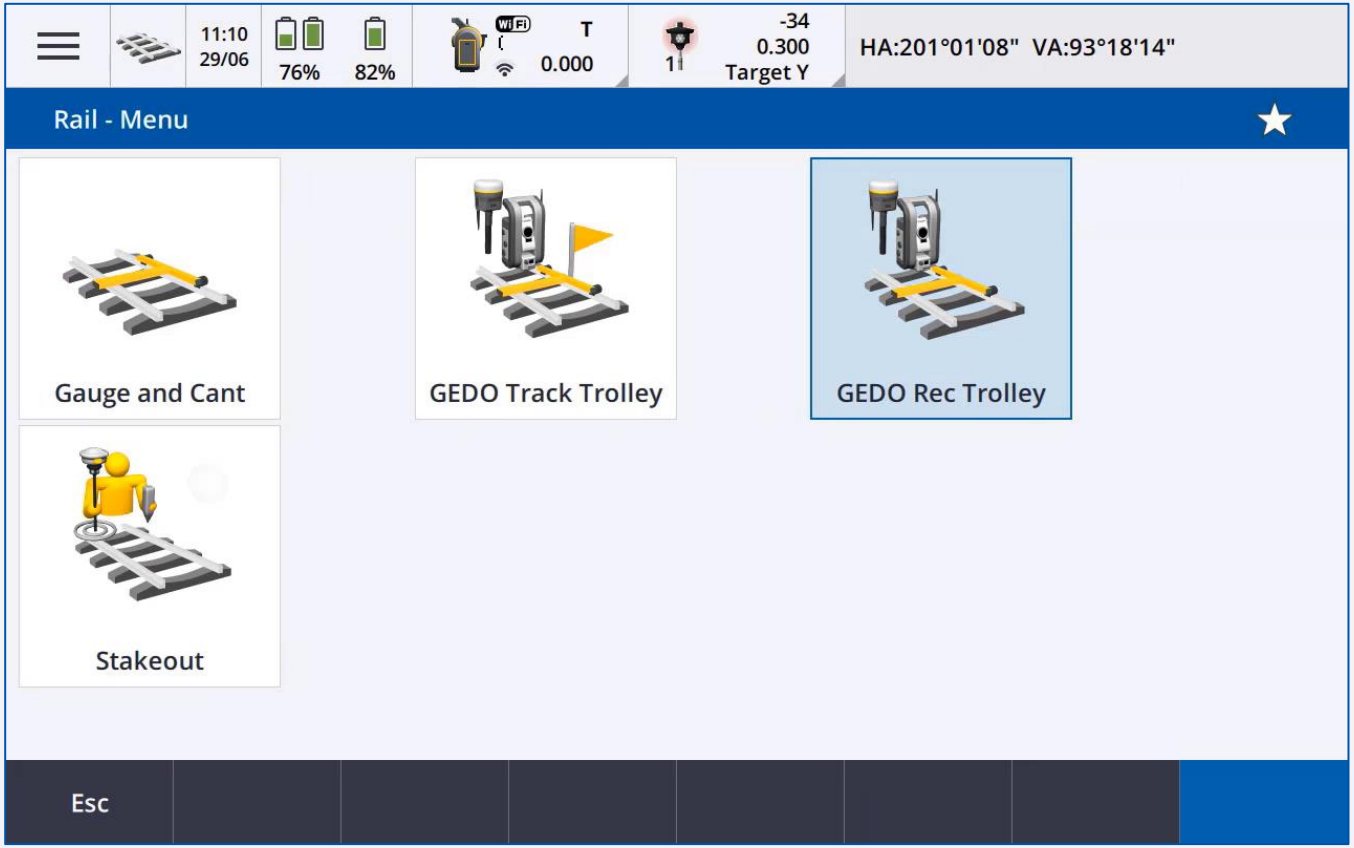
New TA Rail module – GEDO Rec



New TA Rail module – GEDO Track



New TA Rail module – Gauge & Cant



02

GEDO Scan Office - news

Review of key features and latest updates

Trimble Scanning and Mapping Portfolio for Railway Applications

Trimble Terrestrial Scanning

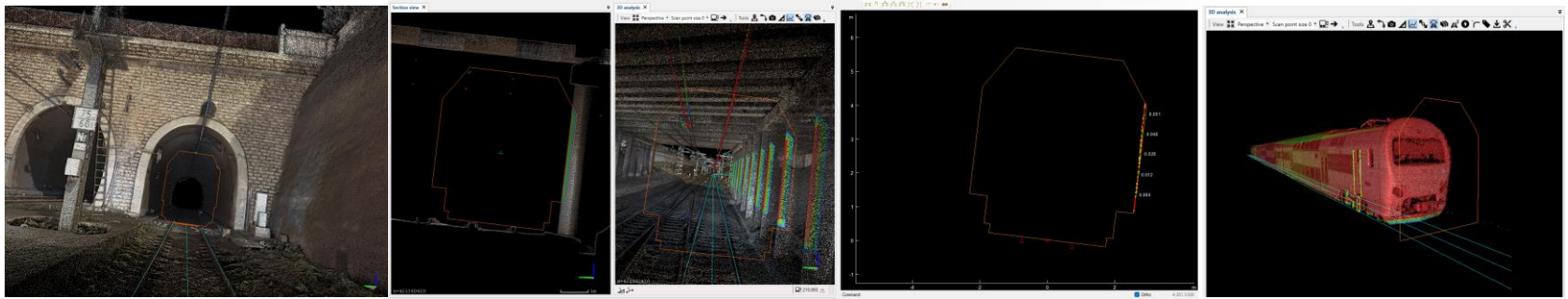
Trimble GEDO Scan Systems

Trimble Mobile Mapping

Trimble GEDO Scan Office – solution for handling rail point cloud data

Key functionality and features:

- Single and uniform project environment
- Highly intuitive UI and clear workflows working within railway corridors
- Trajectory locked navigation and 360° field of view
- Special engines for rail data extraction, modeling and classification
- Support of rail specific entities – OHL, tracks, linear objects and chainages
- Support of a large volume point cloud projects - 100 km and more
- Data interoperability based on CAD, point cloud and report formats



Point cloud data for Railway Applications

Applications

Material Volumes

Clearance Check

Rolling Stock

Platform Gauging

Planning & Design

Asset Data

Overhead Lines

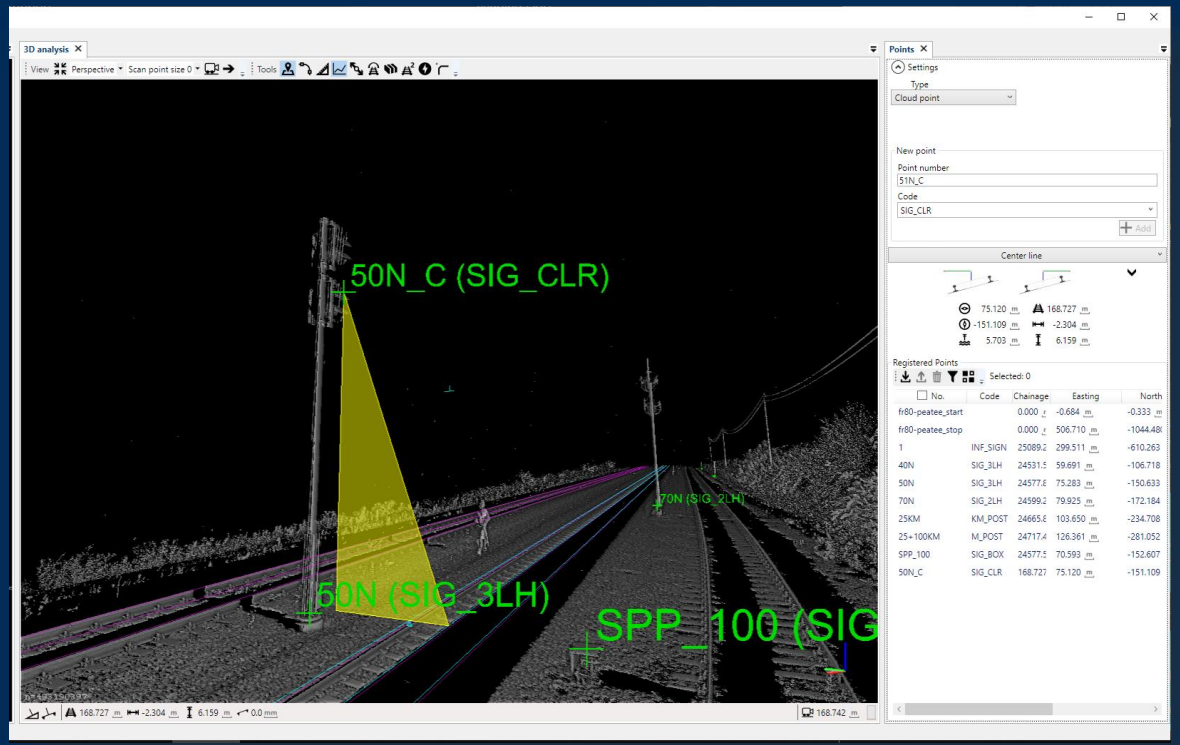
As-Built Check

Track Maintenance & Inspection

Deformations

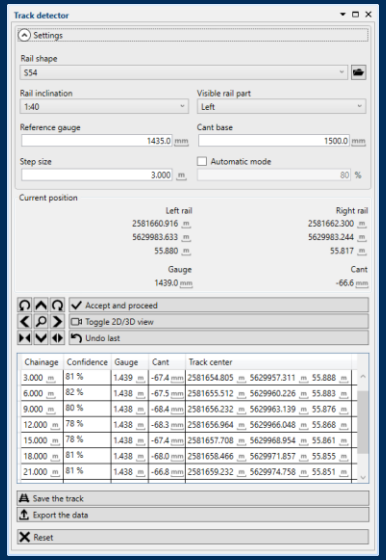
Mapping rail specific objects

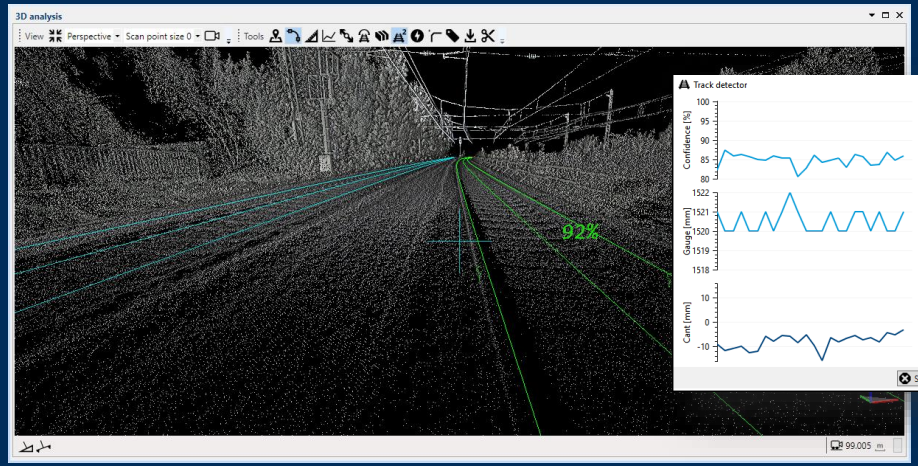
- Offsets between track and objects
- Perpendicular and vertical deviations
- Relative information to the track
- Referencing to existing or design track trajectory
- Snapping to the plane, SP, CT and single point

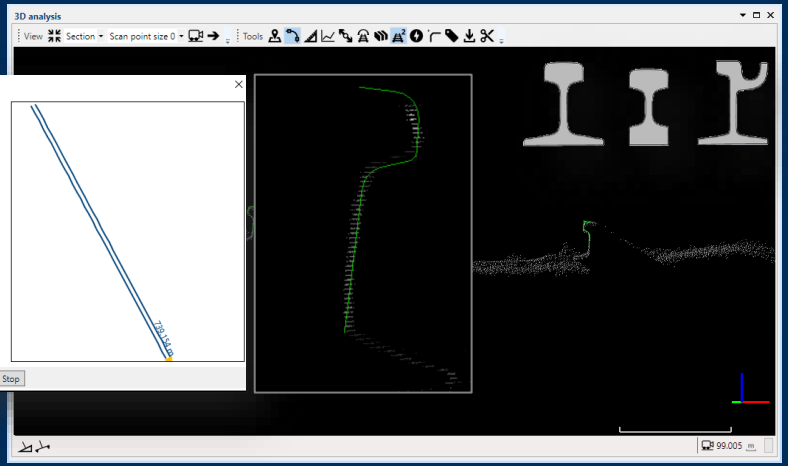


Extracting track trajectory

- Automatic track geometry extraction from the point cloud
- Rail shape matching based on IPC approach
- Gauge fitting based on a user defined settings
- Accuracy depends on rail distance, visibility and definition:
  - Height ~ 3-7 mm
  - Lateral ~ 5 mm



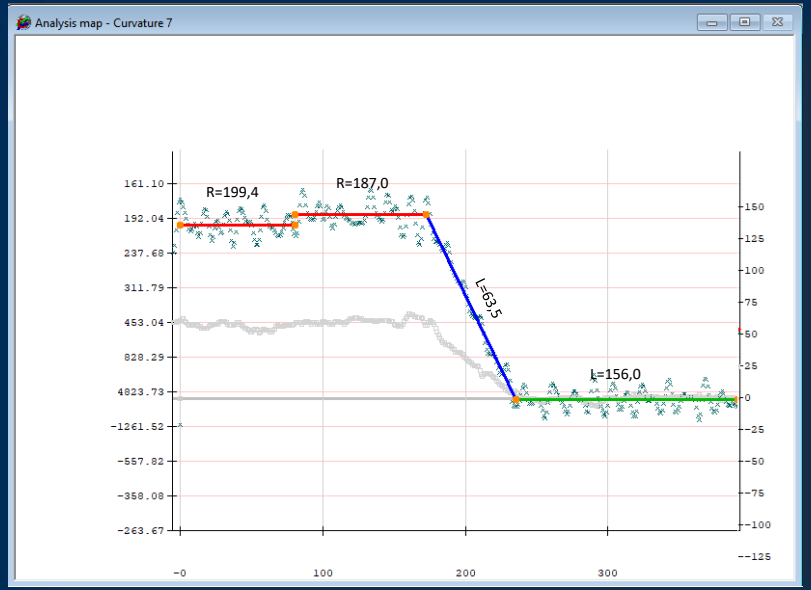


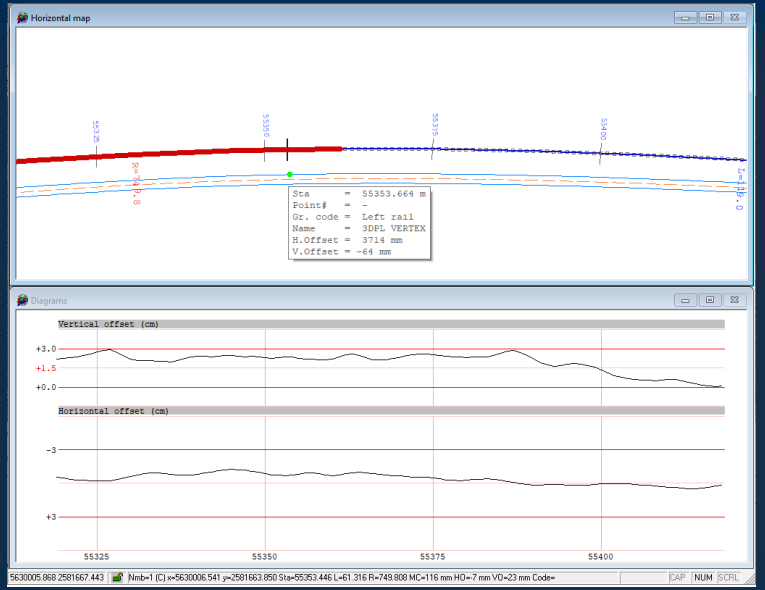


Extracting track trajectory

Optimal track alignment fitting

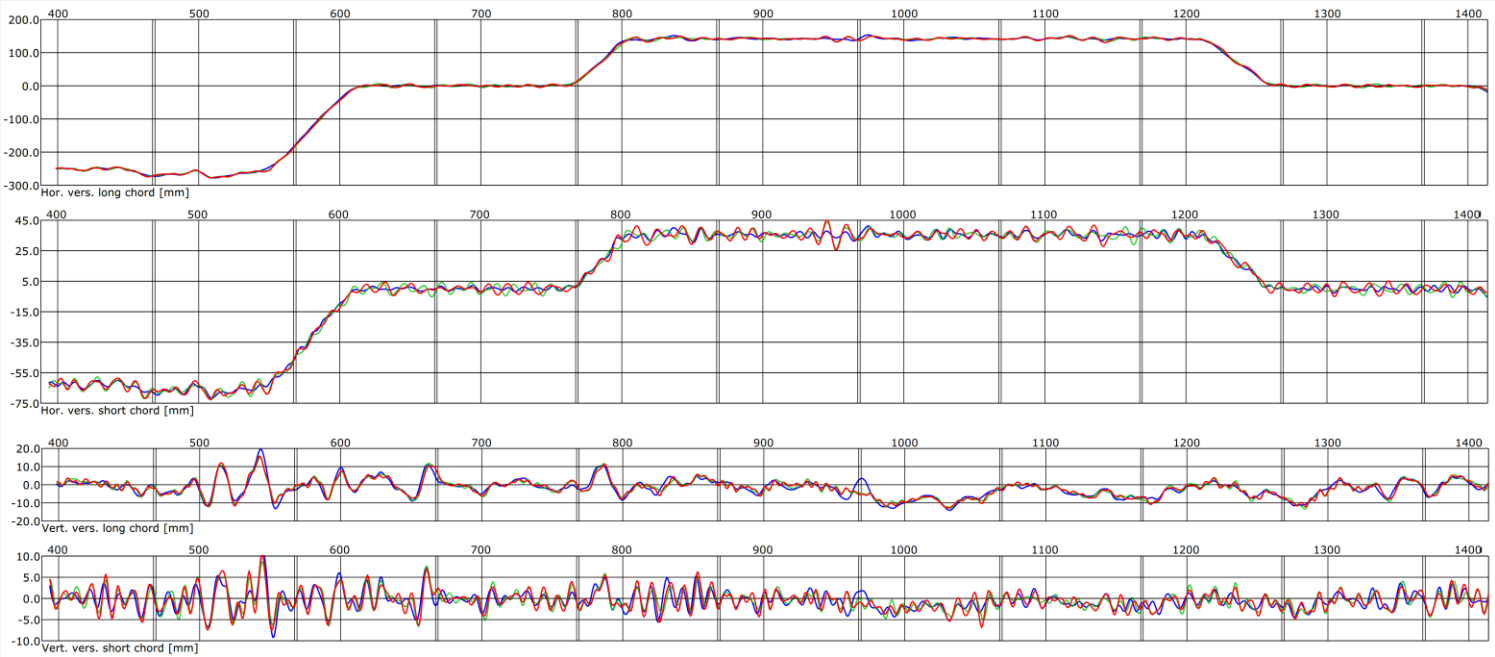
- Retro-fitting design alignment in the GEDO NovaTrack
- Adjacent map data for further constrain and alignment lateral and height offset control





Track geometry quality evaluation

Isolated defects detection in track geometry using 20 and 40 m chords



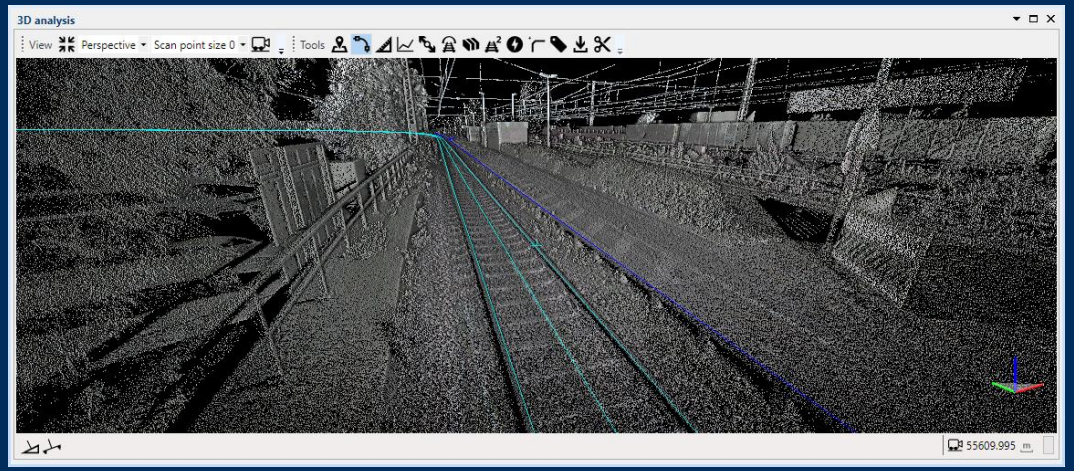
MX9 registered

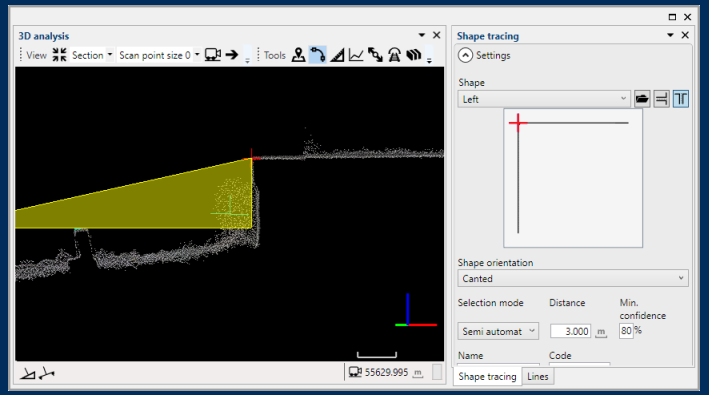
MX9 unregistered

GEDO IMS+GNSS

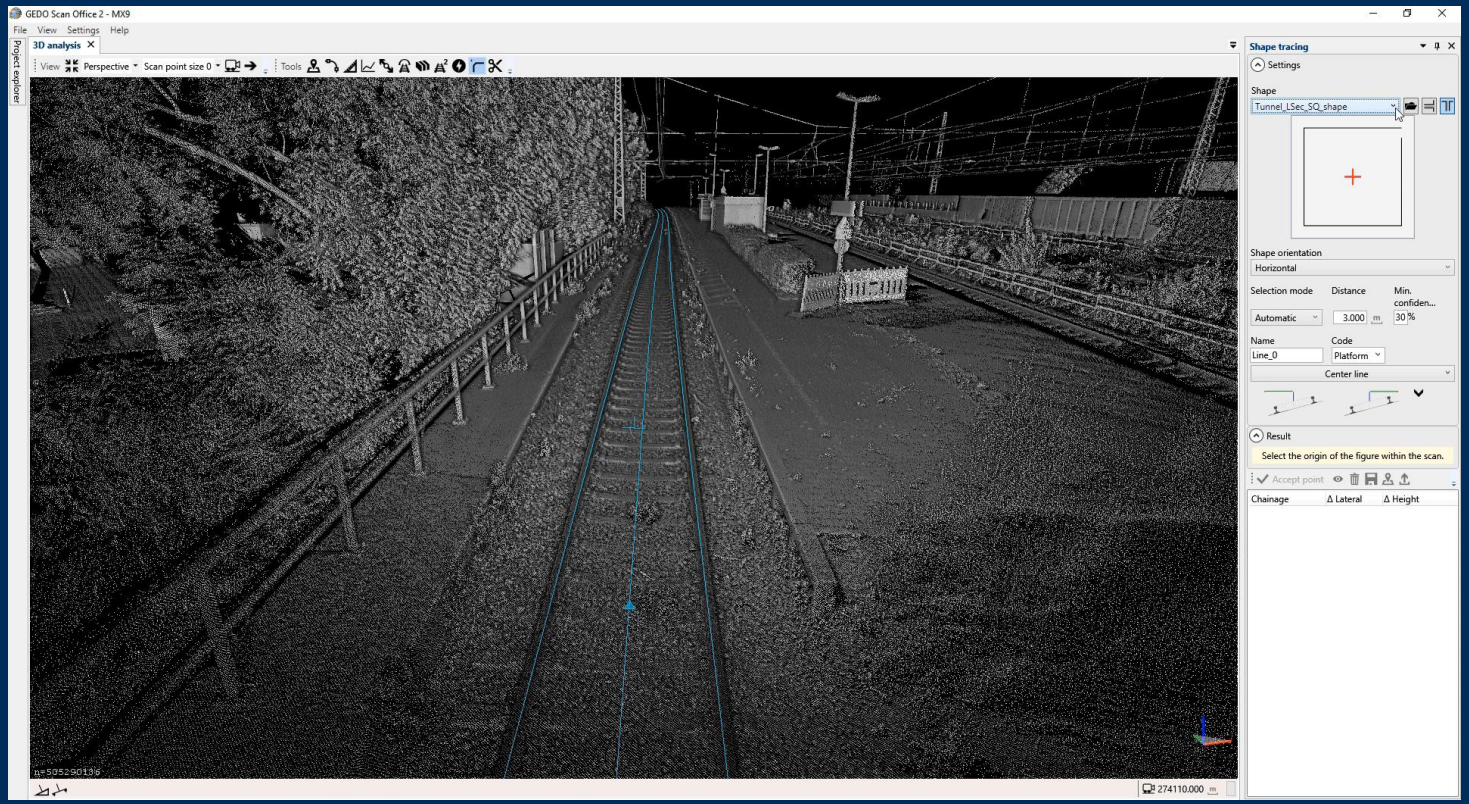
Extracting shapes and breaklines

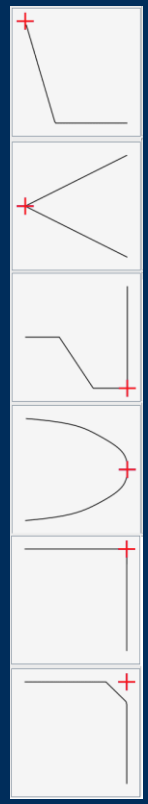
- Automated surface edge/break recognition and extraction
- Extraction is guided by user defined object shapes and QA index
- Extracted data is referenced to the track
- Result export to .DXF and .CSV file formats





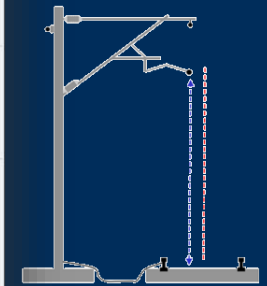
Extracting shapes and breaklines



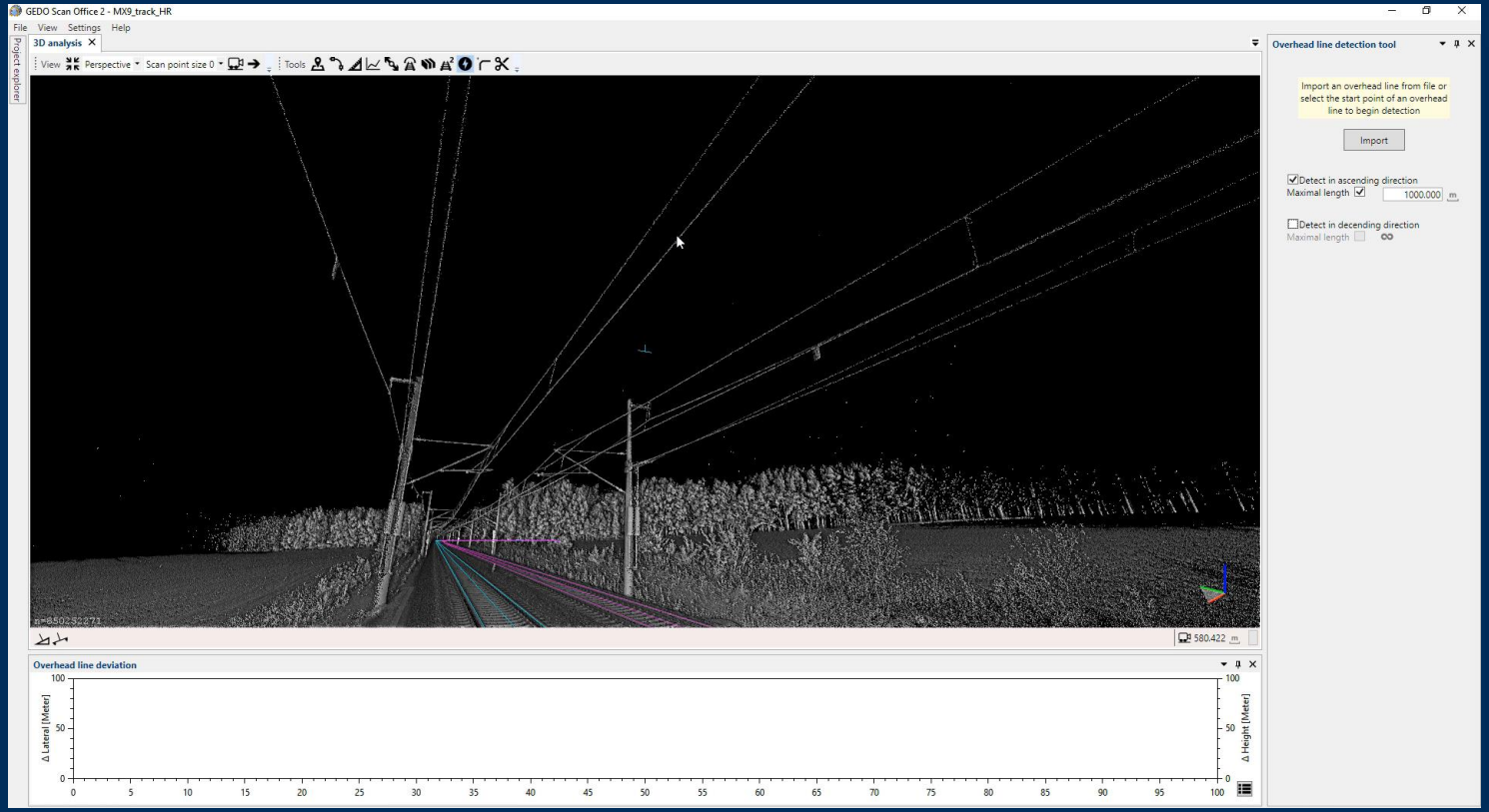


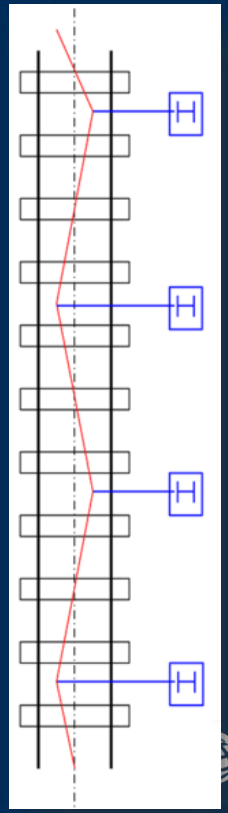
Extracting overhead lines (OHL)

- Automated OHL contact wire tracing
- Absolute and relative OHL referencing to the selected track
- Detection of OHL mounting points
- Result export to .DXF and .CSV file formats

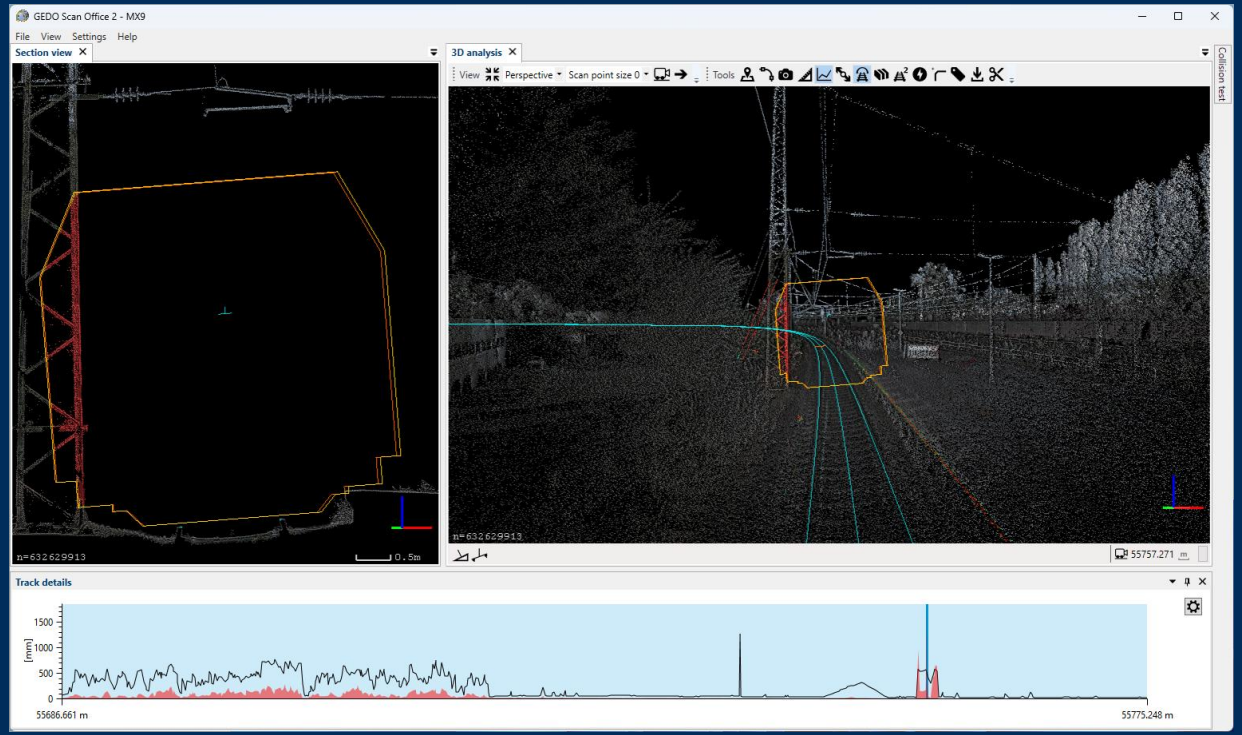


Extracting overhead lines (OHL)

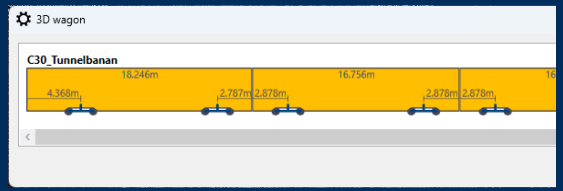




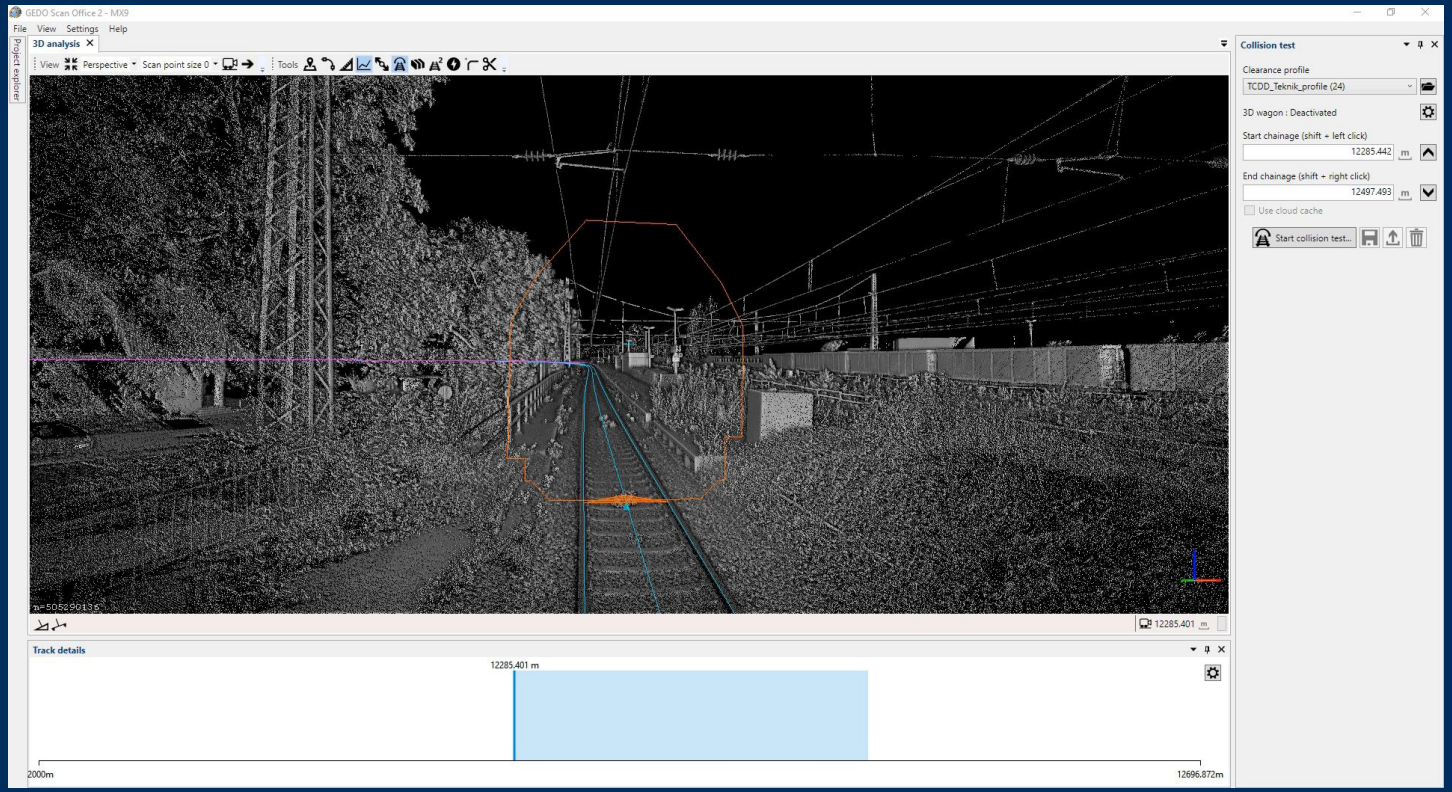
Safety and kinematic clearance



- Automated clearance check based measured or design trajectory
- 3D dynamic profile based on cant and curvature
- Automated collision profiles
- Rolling stock library

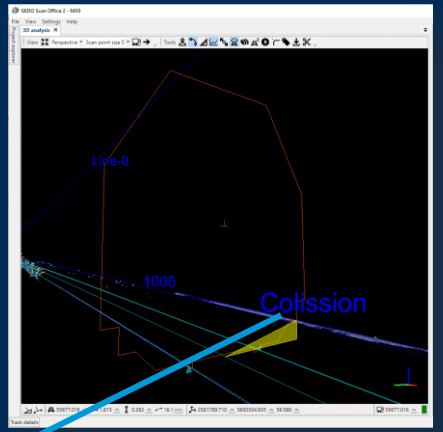


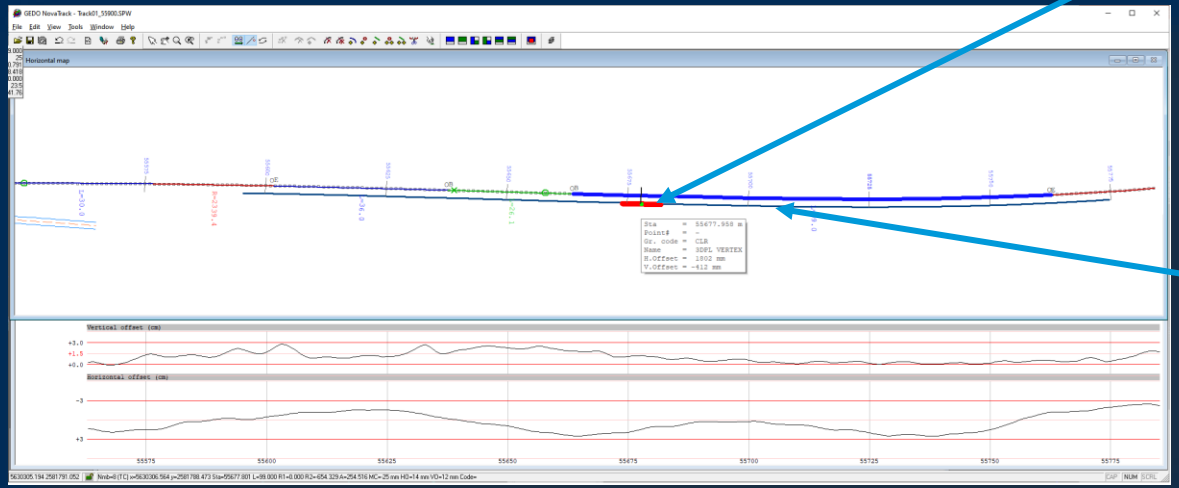
Safety and kinematic clearance

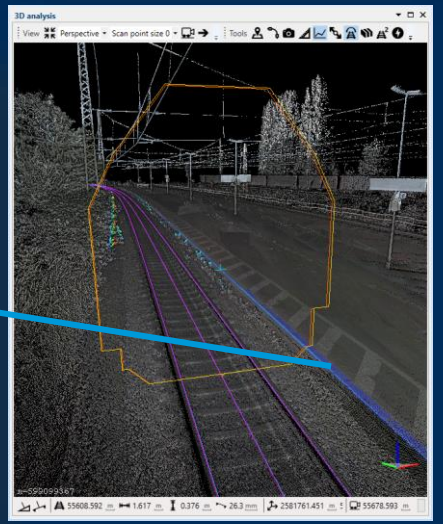


Colission data for design

- Vectorization of the collision point cloud areas
- Exchange collision results with Quadri/Novapoint or GEDO NovaTrack software to correct HAL/VAL/CANT

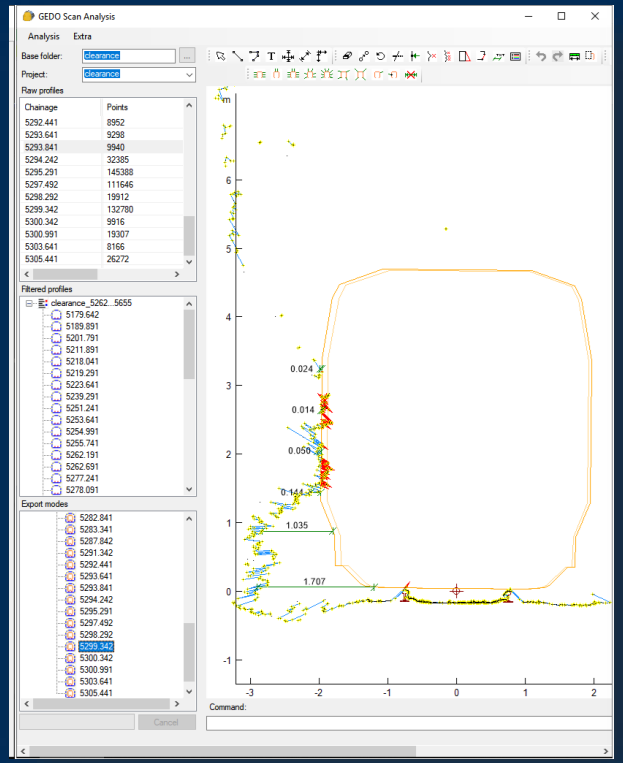


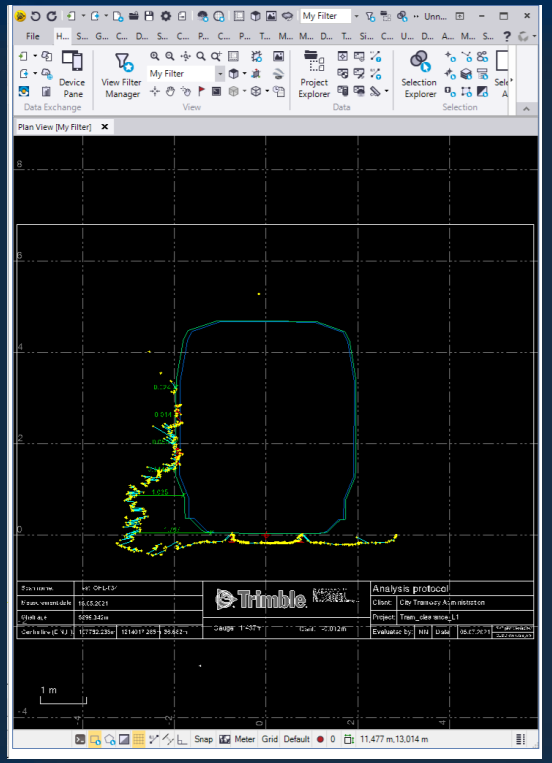




Clearance reporting

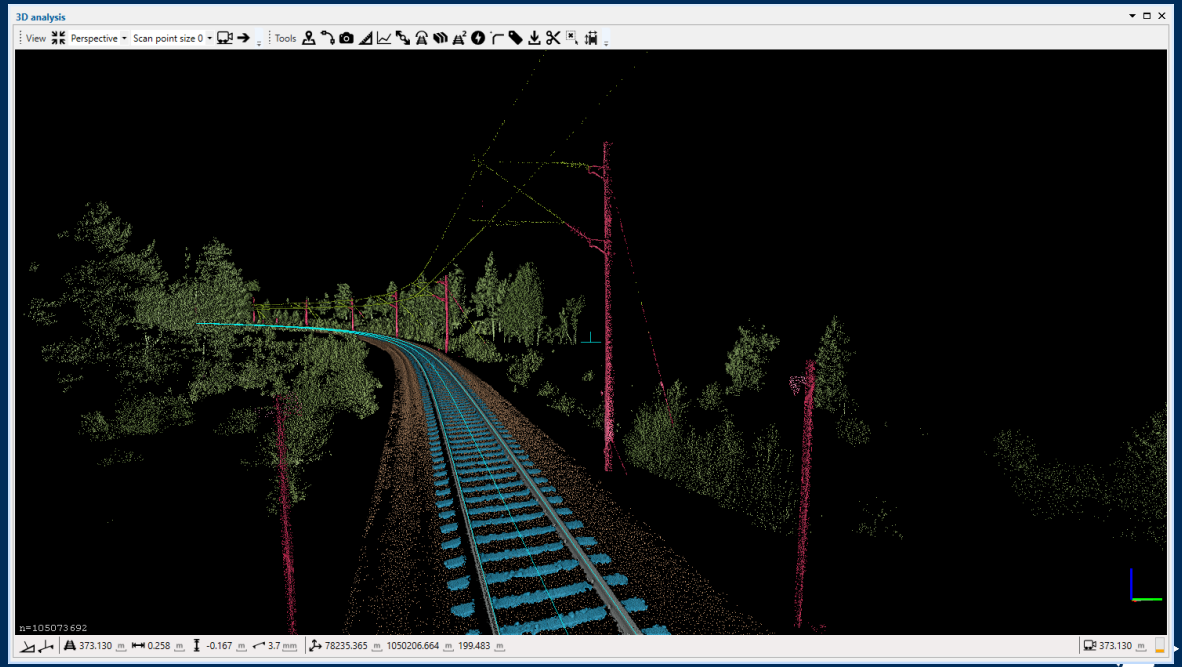
- Vectorized collision sections
- Automated infringement dimensions
- Report export to 2D, 3D DXF and .CSV format
- Special reports for DB, BaneDenmark, NetworkRail, Stockholm Lokaltrafik





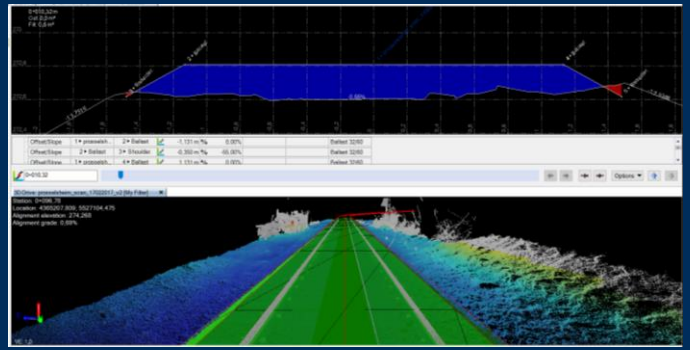
Railway specific classification

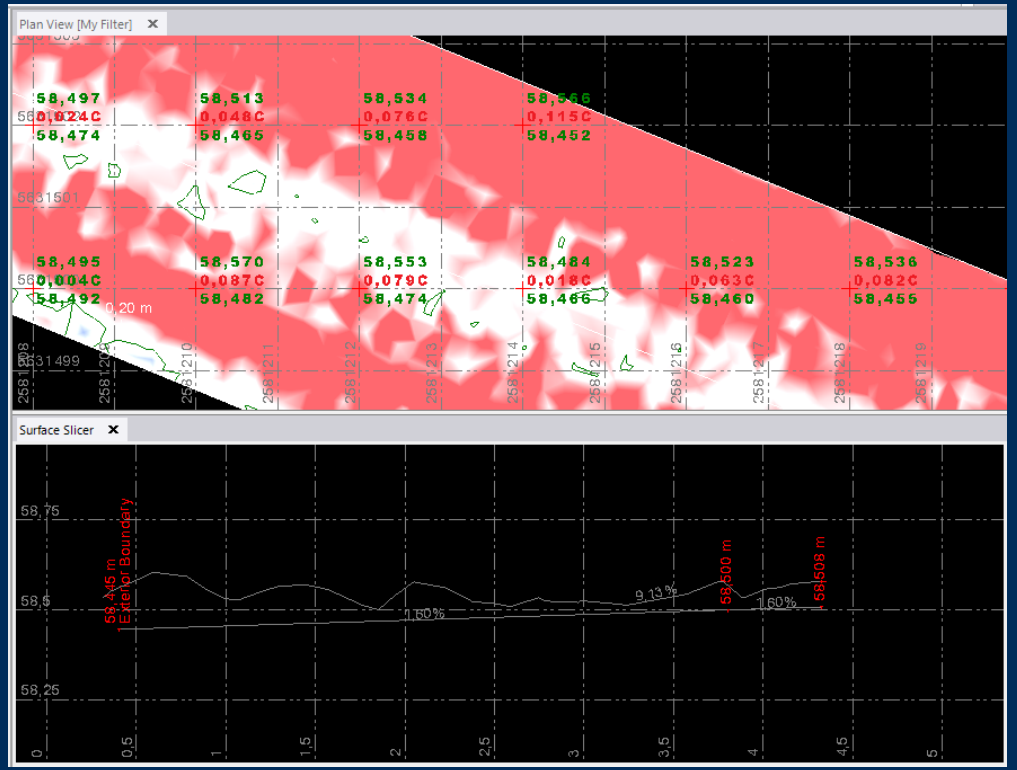
- Automated classification process along the track corridor
- Parametrical control
  - Width
  - Density
  - Selectable groups
- Classification groups
  - Sleepers with positions
  - Ballast
  - Rails
  - Poles (catenary)
  - Import from TBC
- Machine learning and AI algorithm



Ballast volume & cut/fill calculation

- Ballast classification point cloud
- Import design ballast DTM from GEDO Office
- Ballast Cut/Fill map and volume reports in TBC





03

Questions & Answers

Ask your Questions

Thank You

Trimble Track Survey & Scanning

For Questions or Feedback please contact:
info_railway@trimble.com