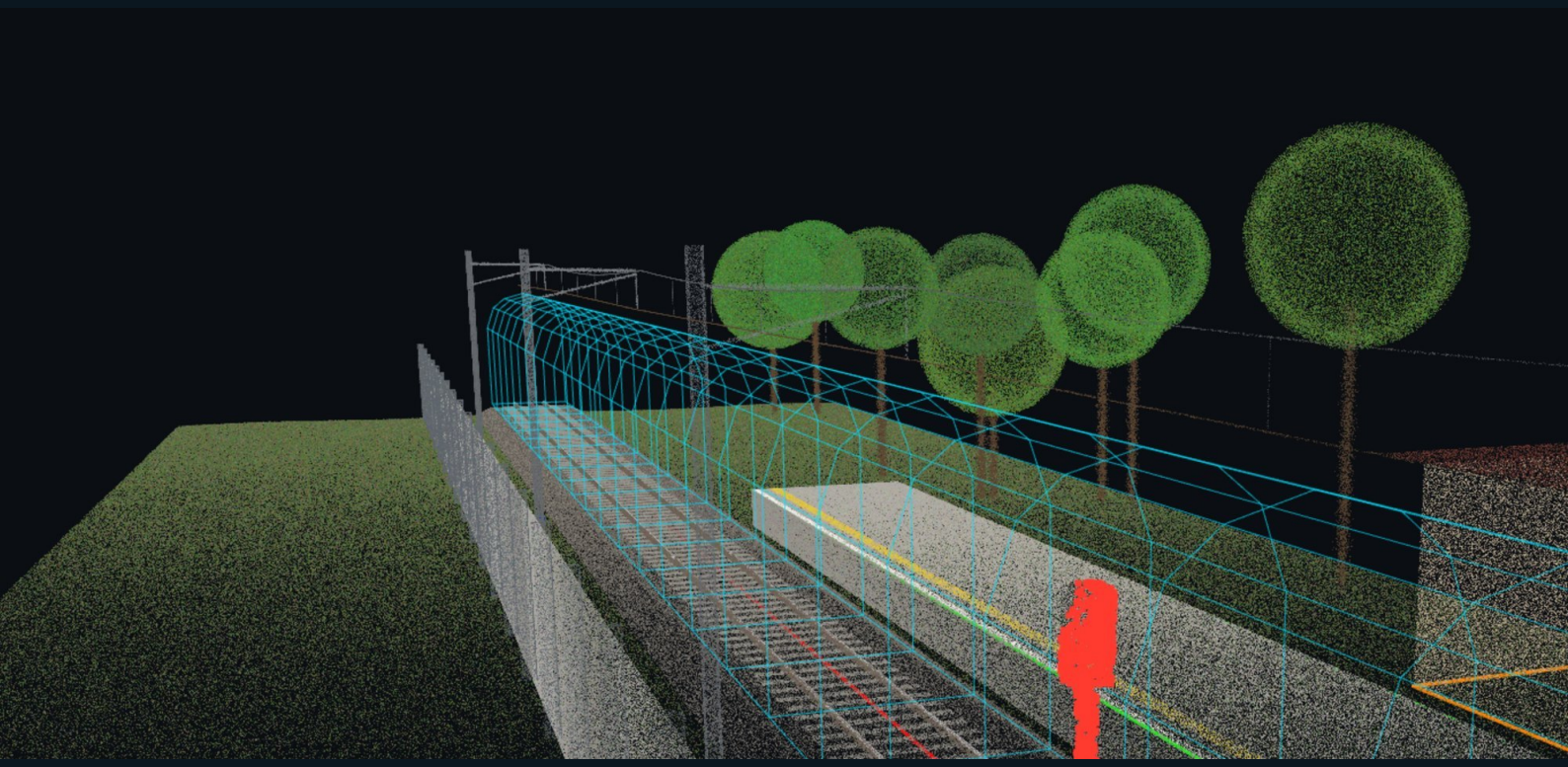
RailScope

USER GUIDE

From survey data to reviewed results

Step-by-step workflows for independent operation



TLS / ALS · 3D & CAD · Railway analysis

Version 2.21.0 | English | 4 November 2026

Illustrations use a demonstration project. Menu names are shown as they appear in the English interface.

How to use this guide

Start with installation and source checks. For an existing prepared project, confirm its data and reference, then jump to your workflow. Click a topic below to open it.

01 Install and sign in 3

02 Prepare data and spatial references 4

03 Create and prepare a project 5

04 Add replace and clip source data 6

05 Navigate and select confidently 7

06 Measure draw and correct CAD 8

07 Work through cross sections 9

08 Set the axis and chainage 10

09 Extract and review rails 11

10 Extract overhead wires 12

11 Run a clearance analysis 13

12 Define profiles zones and section checks 14

13 Check contact wire height and stagger 15

14 Analyse track geometry from cloud 16

15 Prepare and play the train simulation 17

16 Check drawing against cloud 18

17 Review scans and manage issues 19

18 Save views and document inspection 20

19 Export and verify deliverables 21

20 Save back up and recover 22

21 Troubleshoot and finish the handover 23

Operating principle: verify source data, select a reference, choose justified parameters, run, inspect unresolved cases, export and back up.

01

Install and sign in

Get from the installation package to your first working session.

01 Keep the matching Setup EXE and setup.dat together. Close the viewer, run Setup and choose a writable installation folder. The licence period is supplied with the package; reinstalling does not reset the first activation of the same build.

02 Open RailScope from the desktop shortcut. Keep its small application window running while using the browser. Closing only the browser tab does not stop the application.

03 Read the initial administrator credentials shown at first start. Sign in, then use Password on Projects to set a personal password of at least eight characters. Do not share the administrator account.

04 An administrator can create accounts in Users. A viewer can save working results; a read-only account can inspect, measure and export but cannot persist changes. Apply project restrictions where appropriate.

05 Archive the original installation package: successful installation consumes the adjacent activation file. DWG preparation additionally requires the separately licensed ODA File Converter; use DXF when it is unavailable.

CHECK

Projects is visible and the account has the intended role.

If the port is occupied, stop the other local viewer. For access or licence problems contact the administrator; do not edit activation files.

02

Prepare data and spatial references

Confirm the source reference before measuring or analysing.

01 For TLS gather panorama images, their ImageList.csv and LAS/LAZ files. The list must describe actual scan positions and orientations in the expected import format. Keep image names consistent.

02 For ALS gather georeferenced GeoTIFF orthos and LAS/LAZ files. Freehand and ortho workflows do not require panoramas. Add reference CAD as DWG/DXF when available.

03 Identify the horizontal EPSG, coordinate units and vertical datum of every source. EPSG:31256 is a suggested default, not a determination of your survey reference. Check whether the CAD is genuinely 3D.

04 Compare control points or known objects across cloud, imagery and CAD. Equal horizontal EPSG codes do not prove matching heights. Resolve geoid corrections, height datums and offsets from the survey documentation.

05 If a CRS conflict dialog appears, inspect the source definitions. Accept a supported change only if it matches the actual data. Selecting an EPSG is not a general reprojection of mixed sources or a vertical transformation; cancel and correct sources when needed.

CHECK

A known location matches across the intended views, with credible elevations.

A display-density change does not repair a coordinate error.

03

Create and prepare a project

Build a usable project from the available survey sources.

01 On Projects choose + Add Project. Enter a clear name, select TLS or ALS and enter the confirmed EPSG. Browse to the appropriate sources; optional data can be added later.

02 Complete the dialog, then use the preparation controls on the project card for the supplied sources. Keep RailScope running until every background job finishes. Queued or running does not mean ready.

03 Run Project Check from the project controls or when prompted before opening. Read errors and warnings. Resolve missing paths, unavailable source data and CRS conflicts.

04 Open the viewer. Check a known location, a CAD object and a cloud point. For TLS switch between at least two scans and inspect panorama-to-cloud alignment.

05 Review Project Dashboard for project type and storage information. Record the source set and preparation date before analytical work.

CHECK

Required sources are prepared and no blocking Project Check error remains.

Prepared viewer data may open without the original LAS/LAZ needed by a particular analysis. Check that tool requirement separately.

04

Add replace and clip source data

Distinguish an additional survey from replacement of an old source.

01 Back up the project first. Open Data on its card and inspect existing sources. Add includes another file set; Replace supersedes the selected old source.

02 Check TLS image names and ImageList coverage. For ALS check ortho/cloud extents, attributes and CRS before preparation.

03 For ALS AOI clipping, supply a supported boundary, inspect its extent and CRS, then select the intended operation. Keep the original survey separately. For a shapefile keep SHP, SHX, DBF and the supplied PRJ together.

04 Check polygon holes and the chosen inside/outside operation. Wait for clipping, preparation or activation to finish before reopening the result.

05 Run Project Check and revisit control locations. Rerun analyses affected by changed sources or reference geometry; a previous result describes a previous state.

CHECK

Only the intended sources changed and coverage remains usable.

After a failed job inspect Data status and keep its message. Do not manually delete activation or recovery files.

05

Navigate and select confidently

Use the right view and confirm what a click will select.

01 Use 2D for the map, Split for map plus panorama, 3D for the panorama and Freehand for independent cloud navigation. Station 3D offers a local full-cloud workspace around the current scan.

02 Inspect your mappings in Tools > Shortcuts & controls before rotating, panning or zooming. A double-click on a cloud point can set the orbit centre; do not confuse this with another tool action.

03 Use View > Layers for CAD/user-layer visibility. Choose RGB, intensity or height colouring in cloud controls. If RGB contains no useful colour, try intensity or height.

04 Activate the required selection button, hover and inspect the yellow highlight, then click. Escape cancels. A preview is not a saved selection: the label must change. Route selections require distinct axis and rail lines.

05 Recheck after view changes. Hide unrelated layers or change angle when objects overlap. Reduce displayed density for navigation and wait for local detail before inspecting fine features.

CHECK

The tool shows the intended object name and matching geometry.

The navigation cloud is optimised for display; exact picks and full-cloud analyses may load additional data.

06

Measure draw and correct CAD

Create traceable values and reusable geometry.

01 Open Tools > Measure / Draw. Choose the required distance, height, coordinate, polyline or area tool. Read its current pick prompt and select suitable physical points.

02 Set a suitable snap mode. Vertex snap uses an endpoint and line snap constrains to a segment. A nearby background point may belong to the wrong surface.

03 Check values and units. Use Finish for a completed multi-point draft, Undo for the last point and Cancel for an unwanted draft. Wait for Saved before leaving.

04 For deliverable geometry create or choose a named user layer. Draw the needed points, lines, polylines, areas or text, and distinguish them from CAD using style and visibility.

05 For CAD correction, activate the drawing edit tool, select the element and perform the intended vertex or element operation. Review and use undo/redo as needed. Export the corrected drawing separately; viewer edits do not overwrite the original DWG.

06 Export measurement CSV/DXF and user-layer DXF. Check a known coordinate in the receiving CAD program.

CHECK

Completed objects are saved in the right list and layer.

With read-only access, export temporary results before closing.



Demonstration project

07

Work through cross sections

Inspect slices or continue a 3D element across successive sections.

01 Choose the required profile operation in Measure / Draw. Follow the pick prompts or select a reference line for a series. Set width, thickness and spacing for the object and point density.

02 Use Fit or Maximize in the profile view. Compare cloud points and crossing geometry. A thick slice includes more points but mixes positions along the route.

03 Use Previous, Next, Step and Cloud to navigate a series. Cloud finds covered positions; an empty section does not prove a clear corridor.

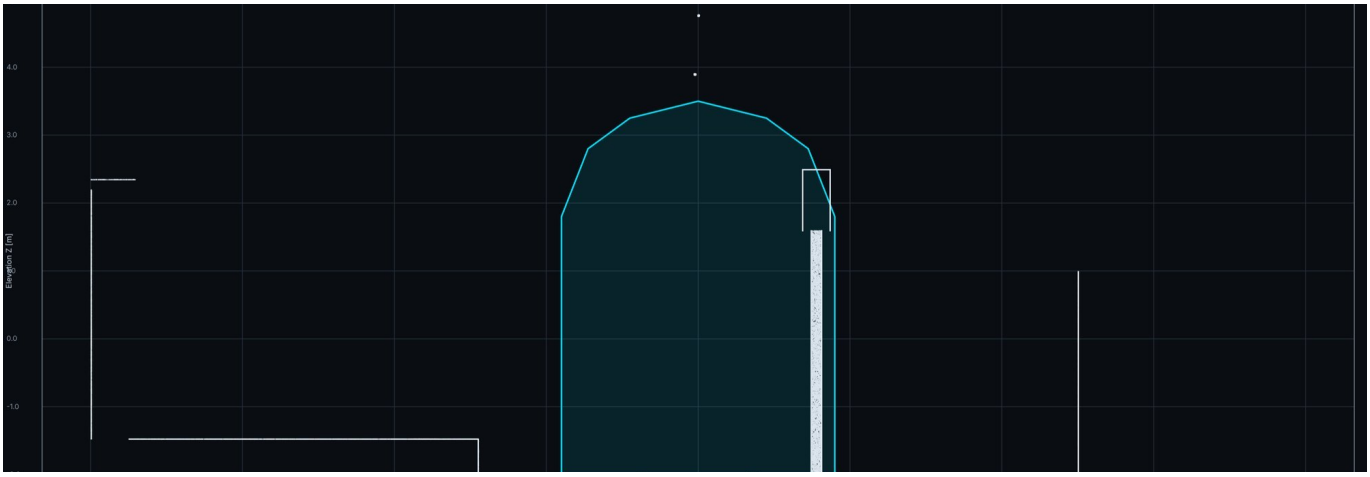
04 Choose Layer and As: 2D profile for section-local work or 3D line for scene and user-layer output. To continue a 3D polyline across profiles, keep the draft active and add points in successive sections; press Finish only after the entire element is complete.

05 Use Save current or Save & Next. Export Profile DXF with Local profile (Station / Z) for section drafting or Project / Global XYZ for spatial CAD.

CHECK

The saved profile and 3D line use the intended coordinate mode.

Do not confuse a local profile DXF with a global-coordinate export.



Demonstration project

08

Set the axis and chainage

Give results a consistent position along the route.

01 Open Analysis > Track axis & km. Select a suitable drawing, extracted or user-layer axis. Check direction and extent.

02 Set the chainage reference in the track controls. Compare a known location with its km label. Polyline distance is not automatically official railway kilometre reference.

03 Correct direction before analysis and document the increasing direction. Left/right and signed lateral results depend on it.

04 Use View > Track strip for scan and finding context. Use Analysis > Rail Nav for route navigation and available clearance results.

05 After axis or direction changes, revisit settings and rerun affected analyses. Check that reports still use the intended reference.

CHECK

A known station has the expected km value and direction.

Start/End axis distance fields take metres from the first axis vertex, not a formatted km string.

09

Extract and review rails

Follow two rail heads through the full-resolution cloud.

01 Open Analysis > Rails from cloud. Set step, nominal gauge, maximum length and direction using project-specific values.

02 Choose Pick rails and select both rail heads in a well-covered, unambiguous section. Verify both seeds in 3D or a local section before extraction.

03 Run extraction and review stations in cross-section. Previous, Next and Show help compare fitted rail positions with actual rail-head points.

04 Correct doubtful positions and Approve checked stations. Review low scores, gaps, switches and crossings manually. Use batch approval only after checking what its score threshold accepts.

05 Set the vertical offset from top of rail before writing output. Use Write to layer for rails and axis, then DXF, Set as track axis or Use for clearance as needed. Inspect output starts, ends and gaps.

CHECK

Output rails follow the intended rail heads and reviewed sections are approved.

A geometric quality score is not a survey accuracy certificate. Automatic tracking does not resolve every turnout.

10

Extract overhead wires

Create 3D wire polylines in a controlled search corridor.

01 Open Analysis > Extract overhead wires. Choose Select line in viewer, inspect the yellow CAD/user-line highlight and click. Confirm the selected name.

02 Set start/end distance and a preset or custom lateral/height window. Heights depend on the reference geometry. Include intended wires and exclude unrelated parallel objects.

03 Set the quality threshold, minimum section length and maximum join gap. Use advanced geometry filters to address a specific fit or clustering problem.

04 Choose Extract and draw automatically. Accepted sections go directly into the Overhead wires user layer; no individual wire acceptance click is required. Wait for completion.

05 Inspect the result in several views. Joined gaps are interpolated, not measured samples. Check intersections, attachments and close parallel wires. Export the layer DXF. Replace selected extraction only when the chosen earlier run should be superseded.

CHECK

The result contains the intended wires and gap connections are understood.

Quality is a geometric score, not a probability. Search settings are not regulatory limits.

11

Run a clearance analysis

Compare a justified profile with the surveyed corridor.

01 Open Analysis > Clearance and create/select a named set. Under Geometry select the alignment and verify direction and height reference.

02 For superelevation from rails select Rail 1 and Rail 2. Inspect the SE summary, rail spacing and cant sign. Without rail-derived superelevation, document the reference assumption.

03 Choose a verified Clearance Profile or create one in Open Profile Designer. Built-in examples are neutral templates, not automatic approval of a railway standard.

04 Set Warning zone. Review No warnings below the profile base and Leave out the rails. The rail width/height exclusion removes points from both checking and export; use it only for intended track components.

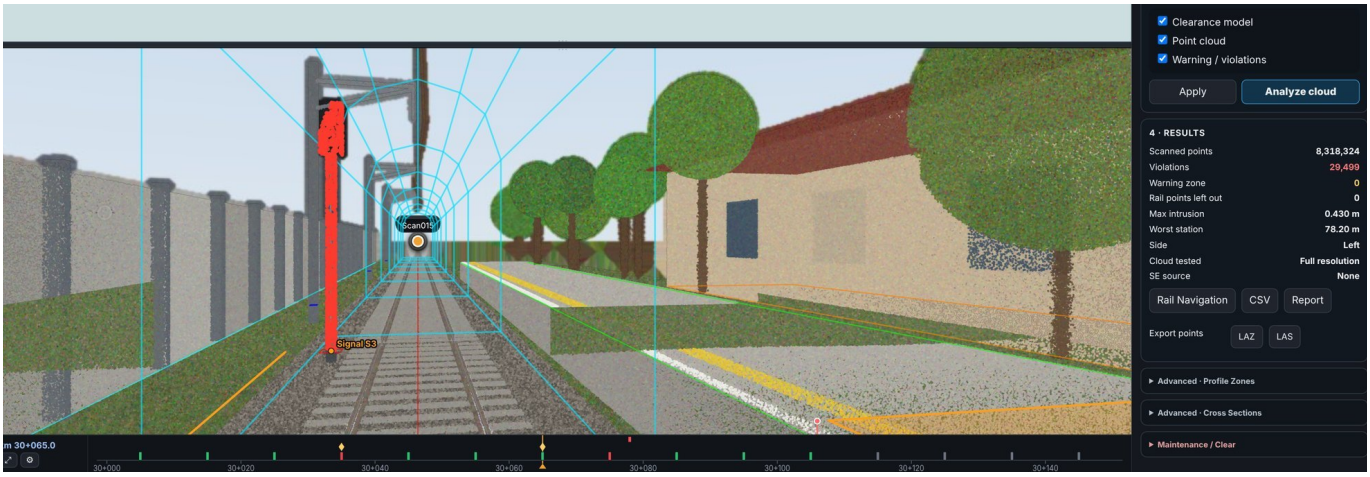
05 Use Apply to inspect the envelope, then Analyze cloud to test the points. A displayed envelope alone is not an analysis. Inspect violations, warnings, excluded points and maximum intrusion.

06 Navigate with Rail Navigation, confirm important findings in cross-section, then export CSV, Report and required LAS/LAZ result points. Check coverage before concluding that an area is clear.

CHECK

Envelope orientation and important findings are verified against actual points.

No detected violation proves nothing about an unobserved area or a check made with the wrong reference.



Demonstration project

12

Define profiles zones and section checks

Control the envelope used by clearance analysis.

01 Choose Open Profile Designer. Create/import the required polygon and inspect dimensions, origin and orientation. Use grid, snap, Ortho and vertex controls as needed.

02 Check closure and every corner. Save the profile with a descriptive name and, where useful, in the reusable library. A wrong unit or origin changes the entire result.

03 Use Raw coordinates / CSV to inspect or import profile points. These describe the lateral/vertical section, not global map coordinates.

04 Under Advanced > Profile Zones enter From/To distances and the applicable profile. Inspect zone boundaries and the selected profile on both sides of every transition.

05 Under Advanced > Cross Sections set spacing, width, thickness and name prefix. Generate and Open browser to compare cloud, envelope and findings. Re-run Analyze cloud after changing geometry, exclusions or profiles.

CHECK

Origin, dimensions and applicable route interval are documented.

Save the profile and parameters with the report for a reproducible check.



Demonstration project

13

Check contact wire height and stagger

Use a checked track reference and explicit project limits.

01 Open Analysis > Contact wire. Choose an axis or clearance set. Axis height represents top of rail; for canted track use a verified set with both rails and rail-derived superelevation.

02 Enter nominal height and height, stagger and gradient warning/error limits from project rules. Check units: height in m, stagger in mm and gradient in per mille.

03 In Search window and spacing set Every, Lateral and Height from/to. Constrain the window to avoid following a different overhead object.

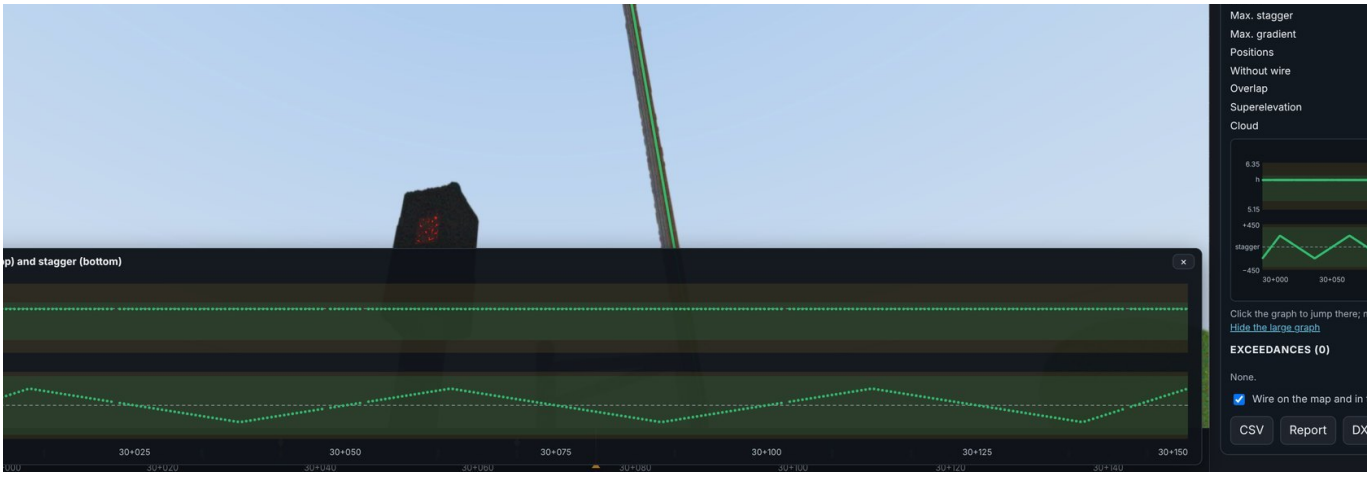
04 Choose Analyse. Review charts, events and missing coverage. Use chart/event navigation to inspect suspicious locations against actual wire points and the rail reference.

05 Create Issues for follow-up and export CSV, Report or DXF. Repeat after axis or superelevation changes.

CHECK

Exceptions are inspected and the reference and limits are recorded.

Default limits are suggestions. A reference-height error shifts the reported wire height.



Demonstration project

14

Analyse track geometry from cloud

Determine gauge cross level and twist along a selected route.

01 Open Analysis > Track geometry from cloud. Select the axis and two different rail lines, or Use saved train simulation route if it is the correct reference.

02 Check increasing direction and set start/end axis distance. Adjust sampling and search parameters to actual rail heads and survey density. Select the twist base deliberately.

03 Enable Compare with my entered limits only when project limits are known. Enter Rule set name / source and the required values. A blank limit is not a passed check.

04 Choose Analyze full cloud. Inspect charts and individual cross-sections. Use Next missing / outside user limits and Show position in viewer to investigate problems.

05 Export CSV and Full result JSON. Separate missing or low-quality observations from exceeded limits. Include twist base, definitions and reference direction with the output.

CHECK

Rail fits are credible and metric definitions and limits are explicit.

Absolute cross level is not deviation from design cant. This is not a certified track-recording vehicle or automatic standards approval.

15

Prepare and play the train simulation

Visualise a vehicle in the existing Freehand scene.

01 Open Tools > Train simulation. Choose Select movement axis, inspect the highlighted route and click. Confirm the selected label.

02 Repeat with Select first rail and Select second rail. All three must be different lines. Check continuity and keep the route in the surveyed corridor.

03 Set Along axis or Against axis and start/end distance in metres from the first axis vertex. Enter length, width, height and bogie centres for the intended illustrative vehicle.

04 Set driver camera height, lateral offset and setback, plus speed. Choose Prepare & show in Freehand. Use the train playback, position and camera controls to inspect the route from the available external/follow and driver views.

05 Pause before other analysis work. After changing geometry or dimensions, prepare again. Reload prepared train restores the prepared result; it does not apply new input settings by itself.

CHECK

The vehicle follows the intended route and camera position.

Illustrative movement is not collision testing, signal-sighting analysis, a dynamic swept envelope or a safety approval.

16

Check drawing against cloud

Assign layers by their actual physical feature before checking them.

01 Open QC > Drawing vs. cloud. New/unconfigured layers start as Not selected. Check saved assignments; use the reset-all control to begin with everything excluded.

02 Open ? What do the element types mean? Rail (top) means a line along the rail running surface. Edge / break means a physical step or slope break. Surface line lies on a continuous surface. Mast / pole marks a mast centre.

03 Rail and edge compare lateral position and height. Surface line evaluates height only. Mast / pole evaluates horizontal centre offset, not height or lean. A painted line on a flat surface is not a physical edge.

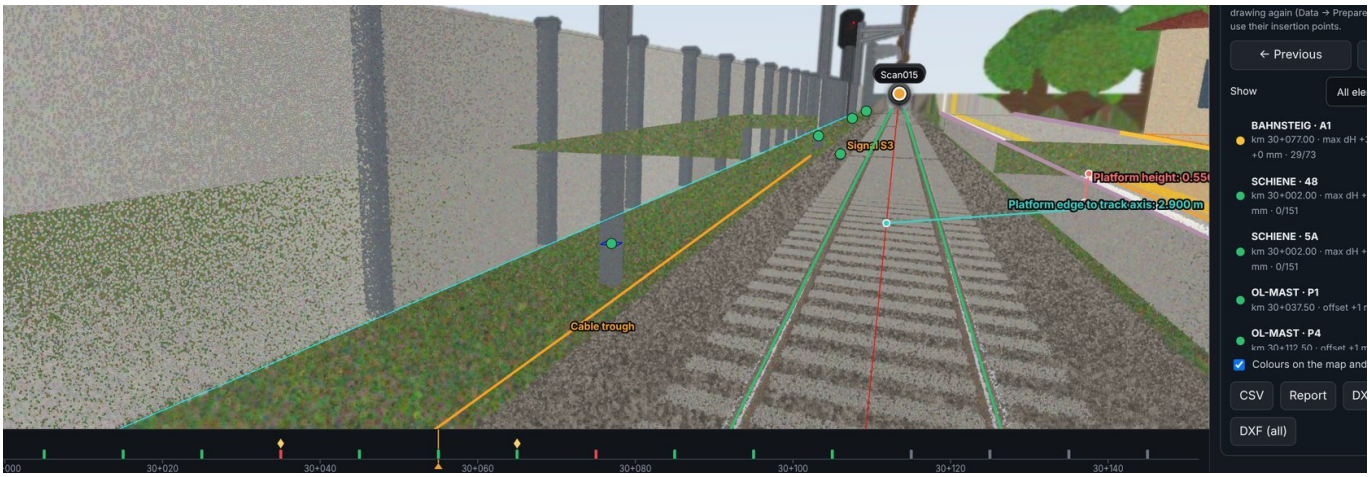
04 Set sampling spacing, minimum points and warning/error thresholds, checking panel units. Start the check, inspect the problem list and visit suspicious fitted locations.

05 No data means too few usable points. No edge means coverage without a clear detected break. Neither proves the drawing is correct. Export CSV, Report or DXF markers and create Issues where needed.

CHECK

Only intended layers are checked; unresolved cases stay visible.

Line dH is signed laterally: positive means the drawing is left of the detected feature along drawing direction. Pole dH is centre distance. dV is drawing height minus detected height.



Demonstration project

17

Review scans and manage issues

Turn a visual finding into a located review record.

01 Open QC > QC review and select/create a review round. Work through scans, marking OK only after inspection and Issue for findings requiring action.

02 Describe what is wrong, where and what should be checked. Use QC > Annotate for a located record and the available screenshot/context.

03 In QC > Issues set status and priority, filter findings and revisit the location before resolving an issue.

04 Use progress and Next unchecked to avoid skipping scans. With automatic advance, verify that the mark saved before moving on.

05 Use Scan metadata for source context. Export review CSV and Export annotations. Agree with colleagues what resolved or closed means before handing over the list.

CHECK

Material issues have a location, description and review status.

A review-round OK mark is a workflow record, not an engineering acceptance certificate.

18

Save views and document inspection

Help another reviewer find the same scene.

01 Use View > Save view at important locations and choose meaningful names. Reopen Saved views to verify the stored context.

02 Use Presets and workspace controls for repeatable layouts. Keep colouring and layer visibility suitable for the current task.

03 Use Tools > Screenshot for a still image. Identify route/issue context in the filename and report; an image alone does not retain full analysis parameters.

04 Use Freehand camera-path, auto-orbit and recording controls for a walkthrough where needed. Prepare route and camera first and inspect the recording after stopping. Format availability depends on browser support.

05 Tools > Copy link points into the same accessible installation/project; it is not a portable project. For another installation supply the relevant backup and result exports.

CHECK

The saved view or media opens the intended scene with clear context.

For slow display inspect View > Performance and record the mode and extent before changing several settings.

19

Export and verify deliverables

Choose outputs for the receiving workflow and validate them.

01 Use measurement CSV for values and DXF for CAD geometry. Export user layers and corrected drawing through their respective layer/drawing controls.

02 For profiles choose Local profile (Station / Z) or Project / Global XYZ deliberately. For clearance use CSV/Report for findings and LAS/LAZ for classified result points.

03 Drawing vs. cloud and Contact wire offer CSV, Report and DXF. Track geometry offers CSV and Full result JSON. Export QC records as data, not only screenshots.

04 Where Report opens a printable page, use its print action or browser printing and choose Save as PDF. Check project, units, limits and layout before saving.

05 Open an export in the receiving program. Check a known coordinate, height, layer and chainage. Include CRS, vertical datum, source date, parameters and unresolved gaps with the handover.

CHECK

The recipient can identify the reference and meaning of the output.

Classified analysis exports are result products, not a replacement for untouched source data.

20

Save back up and recover

Protect working records and the sources needed to reproduce them.

01 Watch the save state. Wait for Saved before closing or switching projects. Keep and resolve failed-save/conflict messages before continuing edits.

02 Use project backup controls for a restorable handover package. Inspect the chosen scope: prepared viewer data and external original files are not interchangeable.

03 Administrators can use Backup user data on Projects for accounts and project working records. Treat the archive as sensitive and keep another copy outside the active folder.

04 Use Restore Backup or Import Project for the corresponding archive. Restore into a distinct test project first where possible. Verify measurements, layers, issues and source availability.

05 Use document history where available for earlier working-document states. It cannot restore deleted external LAS, images or DWG. Keep source-data backups separately. For installation/access recovery, contact the administrator with archive and errors rather than editing account files.

CHECK

A second copy exists and a sample restore can actually open.

A backup is proven by a restore check. Record source and archive locations.

21

Troubleshoot and finish the handover

Use this checklist before support or delivery.

01 No highlight or wrong selection: reactivate the intended pick button, cancel other tools with Escape, check visibility and use a clearer angle. Confirm the selection label. After an update reload with Ctrl+F5.

02 Empty/dark cloud: check preparation and visibility, fit the view, wait for tiles and try intensity/height colours. For ALS check extent and AOI. Read Project Check for missing paths or failed source reads.

03 Offset geometry or implausible heights: stop analysis and check CRS, units, vertical datum, CAD height and axis reference. Do not mask an offset with arbitrary tolerance.

04 Missing results or many warnings: inspect coverage, feature type, search window, point density and exclusions. Rerun with justified settings. No data and No edge remain unresolved.

05 Before delivery confirm reference direction, profile and limits, review of doubtful detections, coordinates/units, a checked export and a restorable backup.

06 For support record RailScope version, project type, tool, exact steps, message and a screenshot without passwords or private account data. State whether the same location fails repeatedly.

CHECK

Assumptions and unresolved areas are documented.

Results need competent review against survey quality, project requirements and applicable rules.