



Release 3.5

Release Notes

SCANTRA

STATIC, KINEMATIC

© technet GmbH

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1 GENERAL DEVELOPMENTS

1.1 New Features

1.1.1 New logo and icon

Due to our old cloud logo, we have increasingly had awkward encounters at trade shows where interested people asked about “our cloud services”. Clarifying misunderstandings like this took quite some time, so we have made the decision to tackle this issue. Hence, we tried to find a unique icon that signifies what we are really doing. The solution was relatively simple: the bell curve perfectly represents what our software is doing – it applies statistics and adjustment theory. After installation of SCANTRA 3.5 keep looking for the icon on the right of Figure 1.



Figure 1: New logo (left) and new icon (right)

1.1.2 Licensing: More semi-static scans for the LT-option

When we introduced the SCANTRA LT-option for kinematic scans, the idea was to being able to process projects of identical size compared to static scanners. After one year of practical experience we noticed that our initial estimate was too pessimistic. Hence, we have doubled the amount of semi-static scans from 200 to 400 from this release onwards.

1.1.3 Graphics: Colorise intersected planes by data source and group association

Before this release the sectional view tinted planes based on their association to a certain station. Yet, in some cases it is either interesting to know to which group stations respectively their planes belong or based on which data source they were recorded. Hence, users can now choose three different colourisation schemes in the sectional view window, namely:

1. Colour by individual stations
2. Colour by associated group
3. Colour by data source (static or kinematic)

1.1.4 Graphics: Colorise stations by height and group association

The vertical toolbar now features a new button that allows to control the colourisation for stations respectively relations. It features three options:

1. Colourise by geodetic metrics (previously existing method). These numbers are computed after a block adjustment and can be controlled in the network analysis tab.
2. Colourise by group association: the function *group frame* in the graphics window is very helpful for adding annotations to certain groups as well as to see the extends of a group. Given the case that the bounding boxes of groups are overlapping, it is impossible for the user to identify

to which group a certain station is associated. Therefore, we have added this feature that colourises stations based on their group association.

3. Colourise stations based on height: we have added this option which is very helpful particularly in staircases where the user can easily see height differences among stations in the 2D-view.

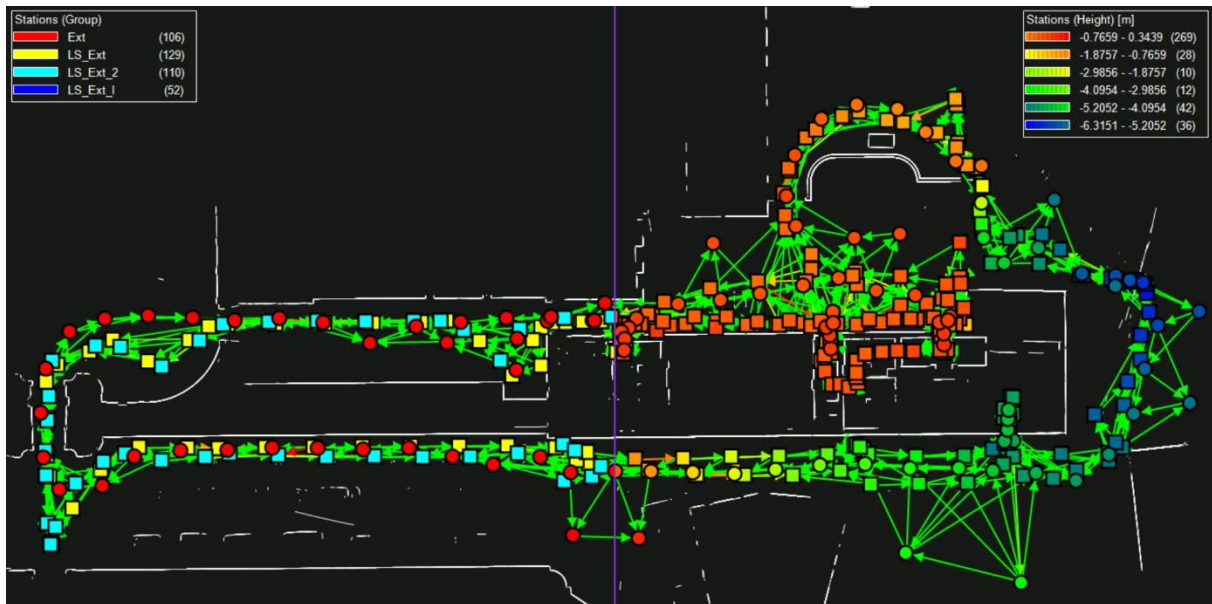


Figure 2: Stations colourised by group association (left half) and tinted by height (right half)

1.1.5 Graphics: The highlighter - paint unselected items grey

In complex, large or large complex projects it can be tedious to visually spot selected items. In addition to several new best helpers, such as the new features described in sections 1.1.6 and 1.2.10, our team has added a toggle function that allows finding the needle in a haystack with ease. Pushing the space key once items are selected, such as relations or stations, paints all unselected items grey while the selected items are highlighted in the colour that the user has assigned in the settings.

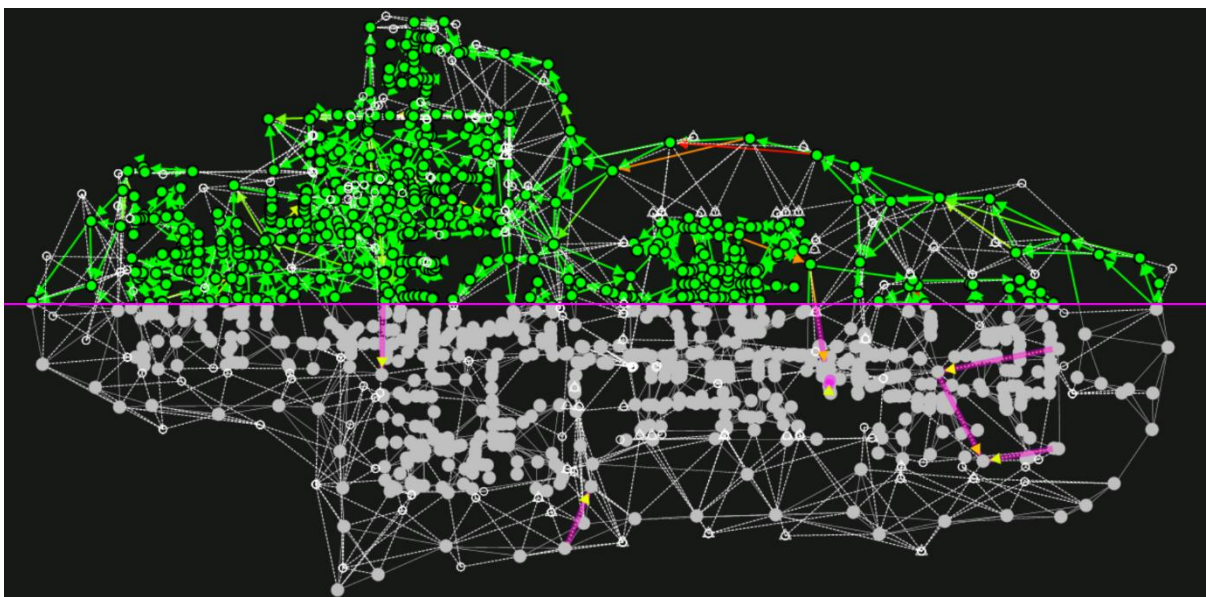


Figure 3: Normal view mode of the network analysis (top) and use of the highlighter function (bottom)

1.1.6 Browsers: Autofocus on relations and stations in the browsers

The browsers for relations and stations now feature a so-called autofocus function which immediately focuses on selected entries. This is particularly helpful for browsing through entries, for instance, if they have been selected by a database query via the filter function or by clicking at a set of one of the browsers.

1.1.7 Project tree: Select all groups by shortcut

All groups can be selected by the shortcut CTRL + A.

1.1.8 Browser: Bulk changes of point precisions

Point precisions can now be changed in bulks in the point browser.

1.2 Improvements

1.2.1 Browser: Selection of browser entries through the graphics

A new option for the browsers allows to transfer the selected entities into a separate browser window. This is for instance particularly helpful for browsing through legend entries or to check how many vertical axes were deactivated in a certain area of a project.

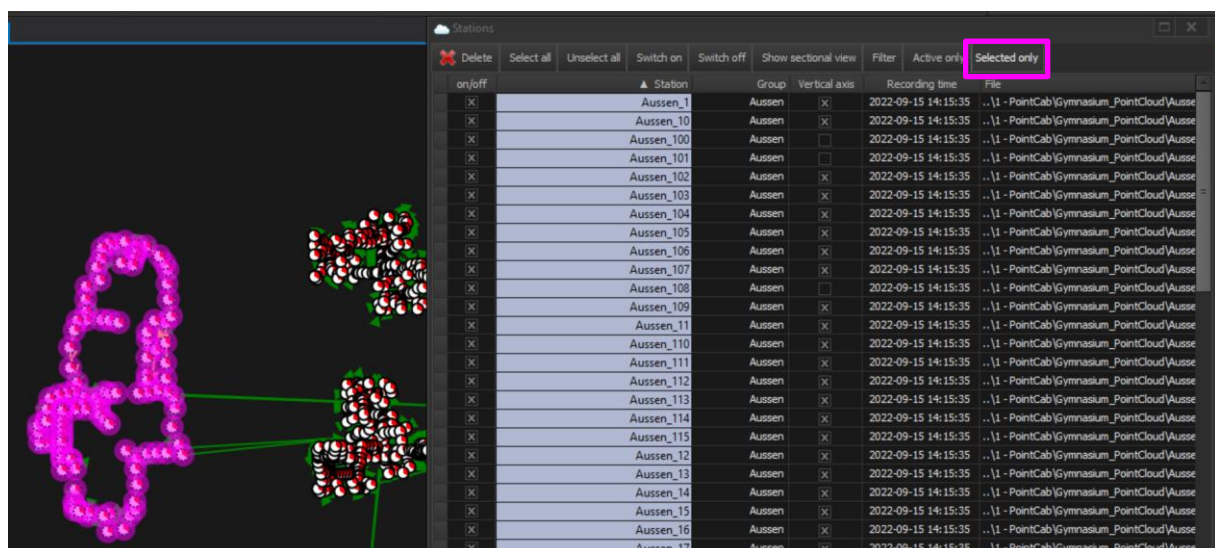
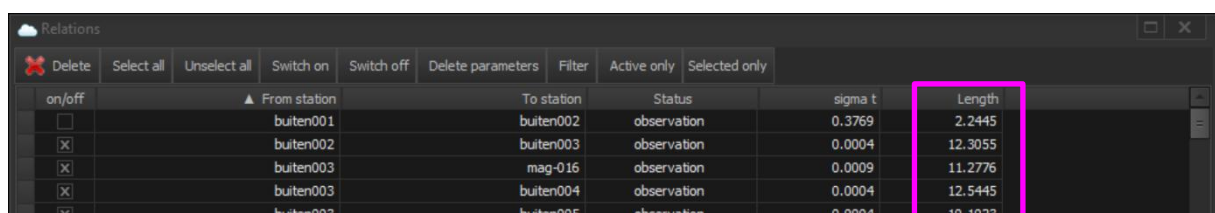


Figure 4: Selected stations in the graphics window can be transferred to a separate browser

1.2.2 Browser: Additional column with length' of relations

Depending on how relations were created, it can be helpful to remove particular long ones from the network. This can be achieved by using the new "length" column of the "Relations" browser, as depicted in Figure 5.



on/off	From station	To station	Status	sigma t	Length
☐	buiten001	buiten002	observation	0.3769	2.2445
☒	buiten002	buiten003	observation	0.0004	12.3055
☒	buiten003	mag-016	observation	0.0009	11.2776
☒	buiten003	buiten004	observation	0.0004	12.5445
☒	buiten003	buiten005	observation	0.0004	10.1032

Figure 5: Length of a relation in the relation browser

1.2.3 Browser: Additional column “scanner type”

An additional column has been added to the station browser which allows to select stations based on data source, for instance static or kinematic scans. This is particularly helpful in mixed projects, where scans need to be differently exported.

1.2.4 Browser: Improved filter dialogues

The filter dialogues now suggest suitable entries once a user has started editing a certain field, for instance by listing all stations that start or contain an “e” that was entered.

1.2.5 Block adjustment: new reference station dialogue

While analysing the performance of an entirely different component, one of our developers noticed that the GUI component for setting the reference station was hampering the speed of certain algorithms. Hence, this component was replaced with a faster one. In addition to its original functionality, it is now also possible to search for substrings within station names, which makes navigating through huge projects a lot easier.

1.2.6 Matchmaker: Opens the Matchmaker if no relation is defined

If a user wants to check if two scans can potentially be matched, it was until now necessary to tediously create a relation between them. It is now possible to open the Matchmaker directly by selecting the two scans in questions in the graphics window and using either a shortcut (F9 or F10) or by clicking the Matchmaker icon.

1.2.7 Graphics: Filtering of Ghost planes in sectional view

In some cases the sectional view shows very long implausible lines. The reason for this are very slant angles of incidence between a detected plane and the sectional plane. We have added another filter that drastically reduces this effect.



Figure 6: SCANTRA 3.4 (left half) and SCANTRA 3.5 with Ghost plane filtering (right half)

1.2.8 Graphics: Show last n characters of stations

Let's say that some file names for stations have become monumental in terms of length. In order to reduce the amount of redundant and meaningless text in the graphics window, such as an encoded project number, a new option allows to trim the shown file name. We are aware of the irony, that the previous sentence was rather long.

1.2.9 Graphics: improved performance

Our team has increased the performance of the graphics window.

1.2.10 New shortcuts

Version 3.5 brings the following new short cuts:

1. CTRL + 3: this short cut toggles the graphic window between 2D and 3D mode
2. CTRL + Enter: adds selected objects in the graphics window to browsers
3. CTRL + /: Collapse project tree
4. CTRL + Q: Shows quality colouring the graphics window
5. CTRL + G: Colourises stations by group association
6. CTRL + H: Colourises stations by height

1.2.11 Printing function of the shortcut window

The shortcut window now features a printing function.

1.3 Bugfixes

1.3.1 Sectional view: Access violation when calling the sectional view twice

Given the case that a user mistakenly called the sectional view twice, an access violation occurred. This bug has been fixed.

1.3.2 Important notification for AMD Ryzen users

Two users who are running AMD Ryzen processors have reported unusual behaviour of SCANTRA. In their case the plane detection skipped every second scan. The used processors were:

- AMD Ryzen 9 9950X3D
- AMD Ryzen 9 7950X

The problem was solved by updating the chipset drivers, see e.g. [here](#) or directly at [AMD's](#) homepage.

2 SCANTRA STATIC

2.1 New Features

2.1.1 The unofficial Leica Cyclone Register 360 interface

We were approached by several clients that use SCANTRA for registration but want to remain in the Leica ecosystem afterwards. Since it is very inefficient having to reimport registered E57 point clouds into Leica Register 360, which is additionally accompanied by a loss of information, we have implemented an unofficial interface.

It allows to import one or more existing Register 360 projects into one SCANTRA project. SCANTRA reads the existing network topology, existing local targets, point identities and point cloud names. Unfortunately, E57 still serves as an initial vehicle for the point cloud. Yet, the files are not required in the latter since all Register 360 project databases are updated with the registration parameters from SCANTRA.

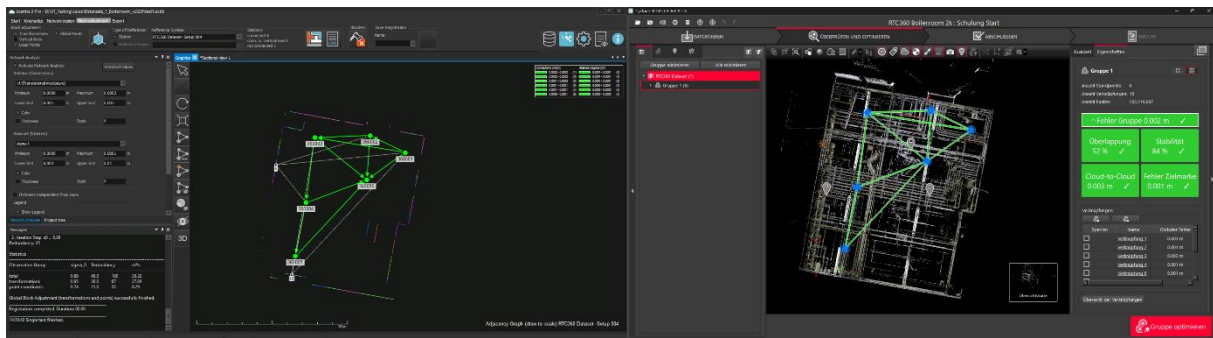


Figure 7: Network in SCANTRA (left half) and updated Leica Register 360 Plus (right half)

2.1.2 Import / Export: Faro Scene import natural points

Until now, SCANTRA only imported spherical targets and checkerboards from Faro Scene projects. We now also consider natural points of interest that were manually digitised by a user.

2.1.3 Import / Export: Faro Scene export coloured e57

If you are connected to a Faro Scene project and the colour from scans has been applied to the point cloud in the Scene project, the colour will now also be exported along with the intensity when exporting to E57.

2.2 Improvements

2.2.1 Import / Export: Faro Scene interface license to SCANTRA extended

We are delighted to announce that Faro Ametek has continued the license for the Faro Scene / SCANTRA interface for three more years. Hence, Faro users can continue to seamlessly going back and forth between both solutions.

2.3 Bugfixes

2.3.1 Issues with detail scans

In some cases, detail scans were not correctly processed. This bug has been fixed.

3 SCANTRA KINEMATIC

3.1 New Features

3.1.1 Adaptive SLAM

The first release of our kinematic module only allowed the segmentation of a kinematic scan into fixed segments that could not be altered once created. Should a specific segment either contain a SLAM-anomaly that lead to a tension in the network or a disturbed part that should be removed from the resulting dataset, users were left with no real options. Hence, we have overworked this weak spot by allowing to alter, insert or combine different segments after their initial creation.

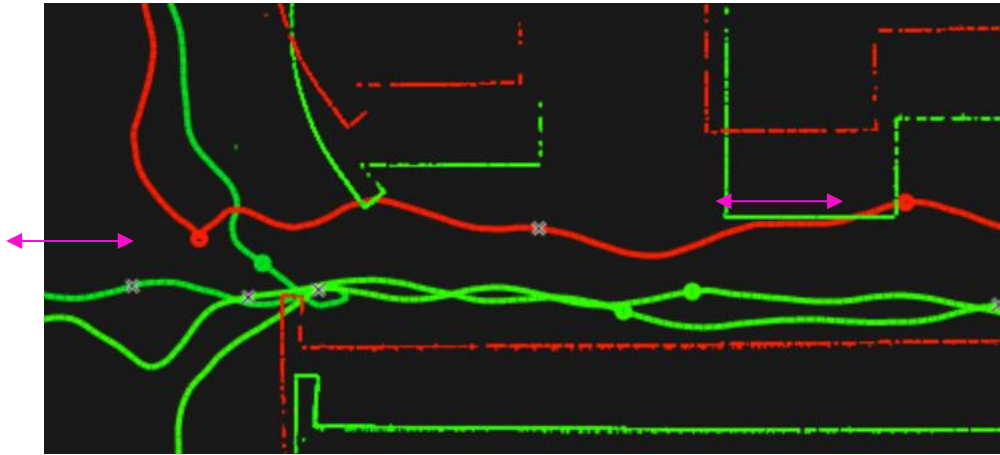
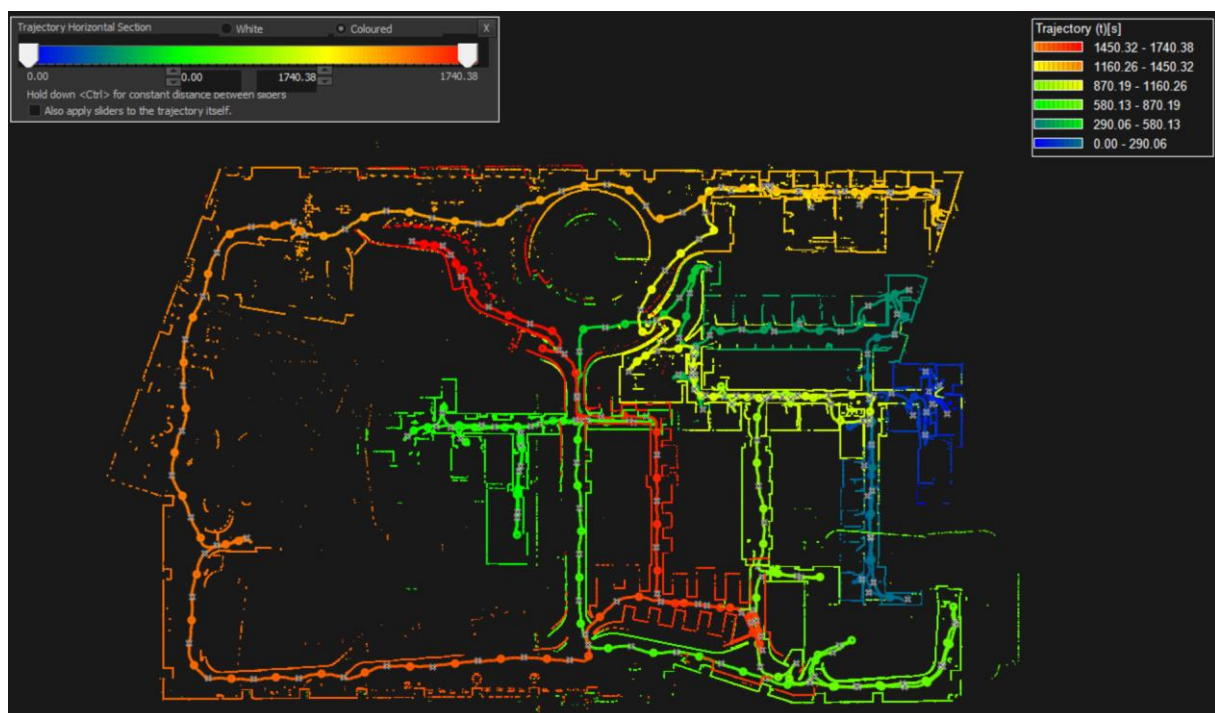


Figure 8: Adaptive SLAM

3.1.2 Visualisation of a point cloud section and trajectory

A vital missing link in our first release of the kinematic release was the absence of a visualisation. The user only got to see the trajectory but not the point cloud. Hence, users can now visualise the slice of a point cloud at the height of the sensor's origin. The slider helps to analyse the data in greater detail in order to identify areas of the point cloud that require more attention than others.

Note that we are still improving this function in terms of performance.

Figure 9: Temporally-coded point cloud and trajectory (Courtesy of [Hypsometric](#), New York City, USA)

3.1.3 Import / Export: Local control points

Some handheld scanners allow to capture target centres in a tactile fashion. These local points can be used as superior control points further down the processing pipeline. SCANTRA is now able to import these control points including time stamps, so that they can be associated with a semi-static scan.

3.1.4 Association of more than one point cloud to one trajectory

The vast majority of mobile mapping systems as well as some personally carried kinematic laser scanners possess more than one LIDAR-module, for instance the [Gexcel HERON MS TWIN](#) or the [Viametris MS-96](#). In this case, several point clouds may be associated to a single trajectory. In SCANTRA 3.4 users were forced to import individual point clouds as separate entities. By extending our data structure users are now able to assign n point clouds to one trajectory. As a consequence, only one tree structure is assembled during the detection phase and all point clouds receive identical transformation parameters.

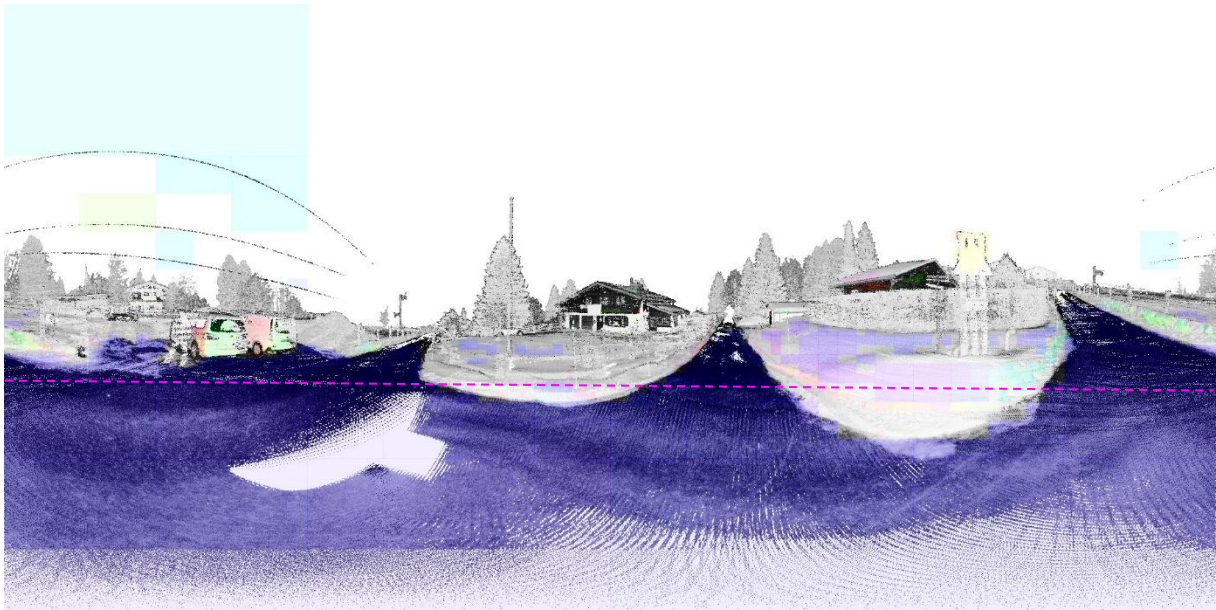


Figure 10: Combined plane detection from the two LIDAR-heads of a Viametris MS-96 (Data courtesy of [3sigmas](#), Cousset, Switzerland). The pink line highlights the boundary between the top and side lidar's field of view.

3.1.5 Reference points trajectory

All mobile mapping platforms and some personally carried laser scanners possess RTK-positioning solutions. In this case SCANTRA now allows you to introduce this information as an observation in the adjustment. This is achieved by introducing point identities between the origin of a semi-static scan and a GNSS-position. Hence, the drift of your system cannot exceed the accuracy of RTK, unless of course multipath effects occurred or other blunders biased the GNSS solution.

3.1.6 Automatically add group to the project tree

Users can now automatically create groups in the project tree with the same name as the trajectory ID. All derived semi-static scans are associated to this group.

3.1.7 Deploying vertical axes

From this release onwards users can introduce vertical axes as additional observations in adjustments that some kinematic laser scanners additionally capture. This information stabilises the rotations about the x and y axes which consequently supports levelling a project. Note that the precision can be set independently from vertical axes captured by static scanners. The corresponding setting can be found in the Kinematics ribbon of the settings.

3.2 Improvements

3.2.1 Updated Graphical User Interface

The Graphical User Interface (GUI) has been significantly updated. It now allows importing several trajectories and kinematic scans in one go that can be batch-processed later on. Additionally, the conversion step from kinematic scans to semi-static scans can now be rerun with different settings in order to find the best solution for your data. Meta data of the trajectory are now also displayed.



Figure 11: New GUI of the Kinematic module

3.2.2 Improved import speed

The code for importing las and laz files has been revised which lead to an improved import speed compared to its predecessor SCANTRA 3.4.

3.3 Bugfixes

End of file