SCANTRA
Beyond Clouds

Release 3.2

Release Notes

SCANTRA PRO, LT

© technet GmbH

Document-Version:

21.06.2023

SCANTRA 3.2.1.354

Table of Content

1   New Features

1.1   Generate adjacencies: Auto Connect

The ability to have full control of your network design in SCANTRA is a blessing and a curse at the same time. A blessing since the user can configure the network topology exactly how it is needed. The curse is that it requires time to define the network. Hence, we have already developed many tools allowing you to efficiently define adjacencies between individual scans. The latest addition is the *Auto Connect* function which makes use of given pre-orientations or results from block adjustments. The algorithm seeks overlapping planes from different scans within a local environment and checks for sufficient geometric contrast. If both requirements are satisfied, a new relation is automatically generated, and plane matching is initiated. In order to avoid weak registrations a threshold can be defined that rejects results with a translational precision σ_t worse than *n* millimetres. Note that the function can also be applied for unoriented scans once a block adjustment was carried out.
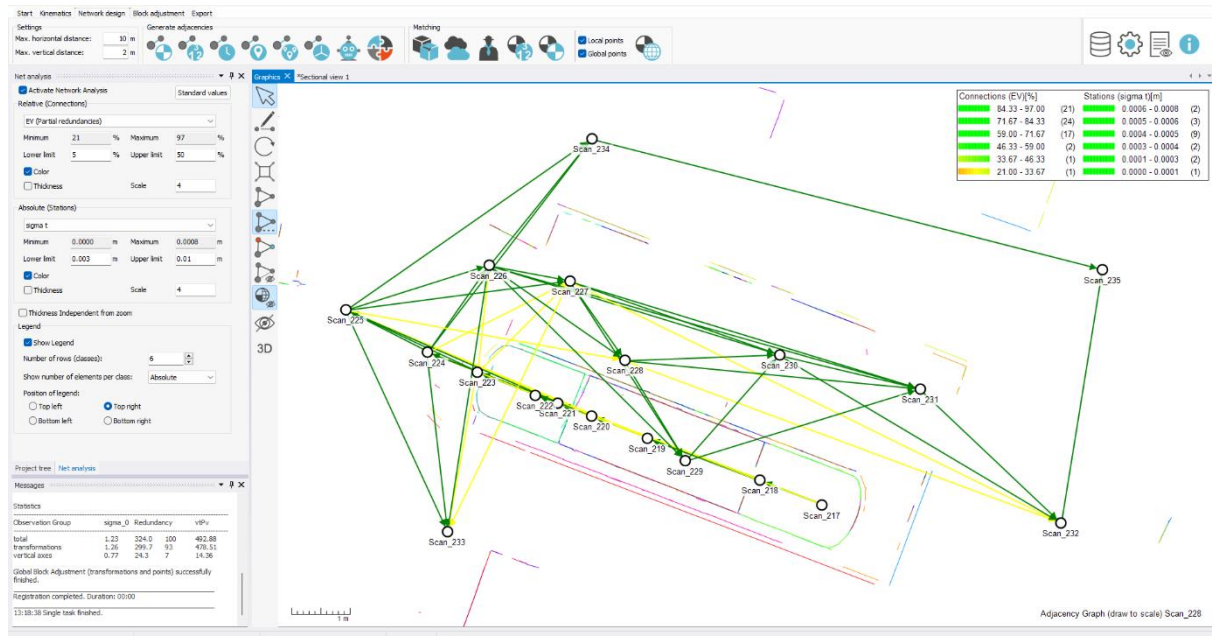
Figure 1: Automatically generated network using the *Auto Connect* function
([data courtesy of Gordon Nish, Roska DBO Inc., Canada](#))

1.2   Detection: Checkerboards

All existing checkerboard detectors in practice and most in science are based on image correlation techniques. That means that users will receive correlation coefficients e.g., 73%, as quality measures – which are impossible to interpret in a metric way. Hence, we have developed the first checkerboard detector that includes a variance matrix for every target's centre as a sound quality measure. These measures serve as individual weights within block adjustments.
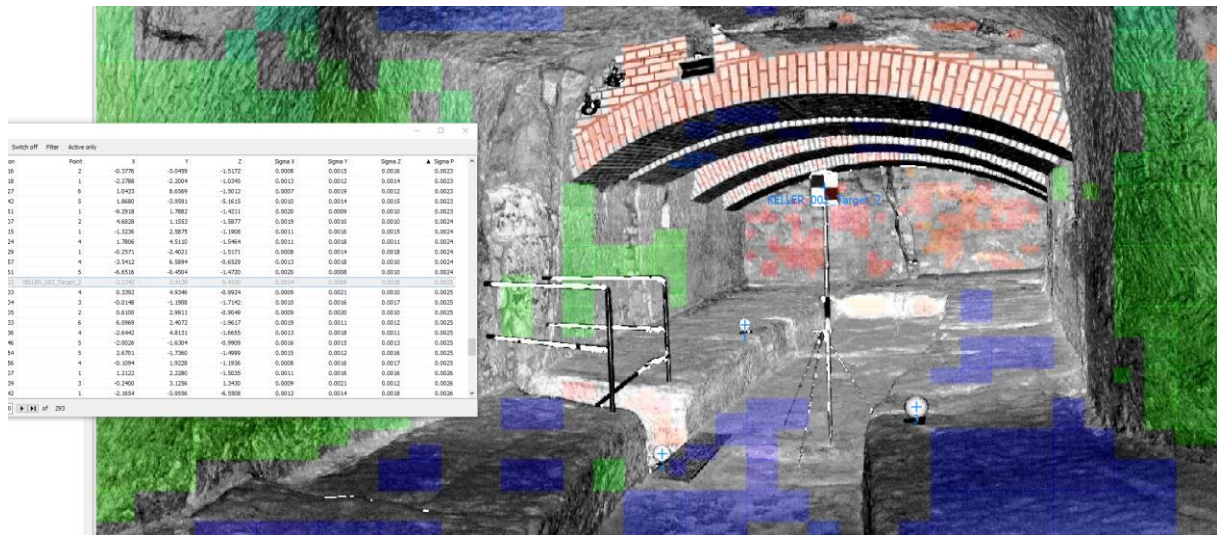
Figure 2: Detected spheres and checkerboard target in a cave. The corresponding
variance of the centre point is depicted in the point browser

1.3   Pairwise registration: "Cloud2cloud"

SCANTRA's weak spot until now were scenarios with poor spatial distributions of planes and / or areas where none or nearly no planes were found. For cases like the one depicted in Figure 3 we are delighted to provide our take on the "cloud2cloud"-algorithm. However, this new function is only coarsely comparable to the commonly used ICP-algorithm (aka cloud2cloud). Just as in the case of the original ICP, our solution requires an initial pose which is typically provided by today's scanners with pre-orientation. Instead of establishing point to point or point to triangle correspondences, our algorithm detects thousands of tiny planes that are then matched.
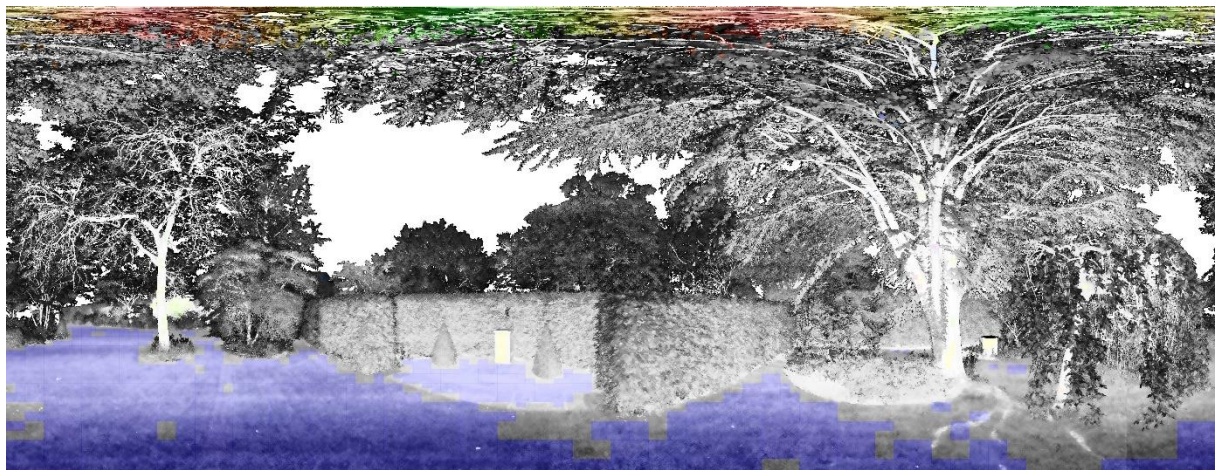
Figure 3: Poor starting point for plane2plane-registration (data courtesy of J Matthews, Sova Surveys, England)

1.4   Import / Export: Faro API

Faro has introduced a new API last year with numerous new features and improvements that will replace the discontinued Faro SDK. The biggest enhancement is the ability to update Faro Scene projects (*.lsproj) after registration in SCANTRA. This allows users to continue working in the Faro ecosystem e.g., in Faro Scene itself, Faro As-Built or BuildIT, based on the proprietary files. Apart from having access to scans many other pieces of information can be imported to SCANTRA such as a project's data structure from Faro Scene in form of clusters and detected targets. Another notable improvement is the accelerated access to point cloud data.

1.5   TagLabs: Importing SCANTRA databases into ScanSap

Technically this is not a new feature in SCANTRA, yet definitely worth a mention. Our colleagues at TagLabs have introduced a new function that allows to import registration parameters computed in SCANTRA to ScanSap. This feature will be available from version 2.0 of ScanSap. We are looking forward to extending our collaboration by creating a multi-functional interface between the two solutions in the future.

1.6   Graphics: Selection from the legend

Cleaning up the network graph e.g., from weak registrations that are not causing statistically significant tensions can be tedious. Thus, the entries in the legend are now interactive allowing you to select stations or relations by clicking on the corresponding items in the legend.

Figure 4: Highlighted relations as selected by entries of the legend

1.7   Vertical tool bar: Hide observations icon

The vertical tool bar has received a new icon that will extend the known functionality of the *hide points* icon. It is now possible to switch off individual observations such as local or global points, relations, and stations. This functionality will receive more entries in the future in the context of new data sources.

2   Improvements

2.1   Bitmap / Matchmaker: Global points receive new symbol

Up to now local and global points were highlighted by identical symbols. Hence, it was not clear which information was used. Hence, we have introduced a new symbol that allows to distinguish local and global points.
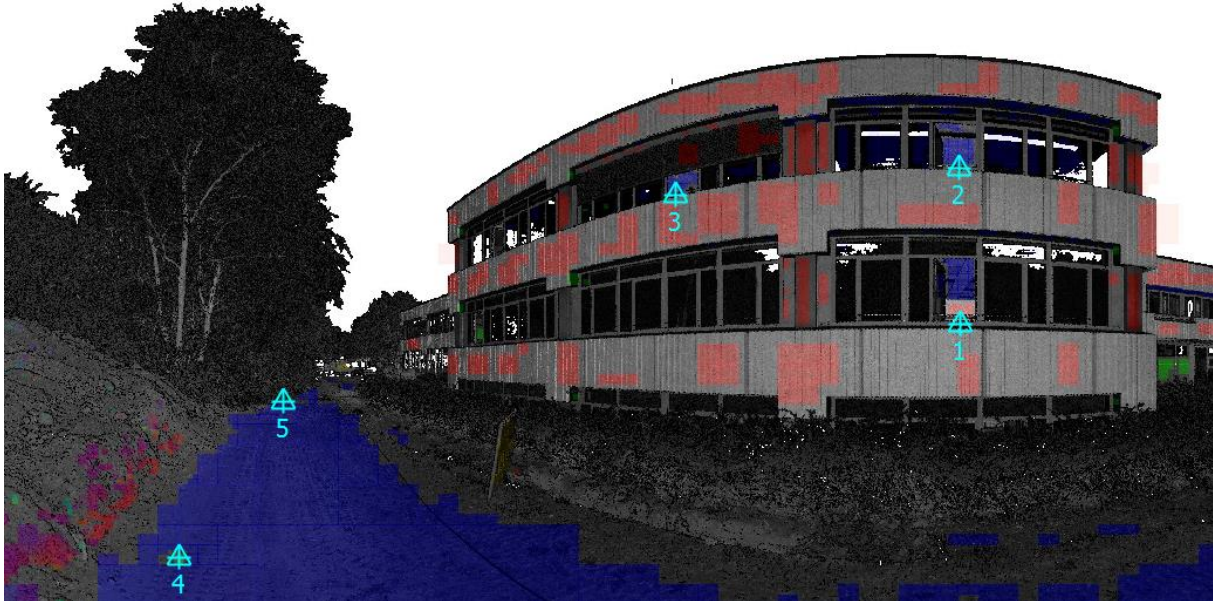
Figure 5: Symbols of local (crosshairs) and global points (triangles) ([data courtesy of GeodatIQ GmbH, Germany](#))

2.2   Core: Accelerated plane matching

Since the plane matching process is quite crucial in most projects, we have reviewed the algorithm and accelerated it. The updated algorithm is now ~30% faster compared to SCANTRA 3.1. On average, a pairwise registration now only requires 4.5 seconds based on pre-orientations.

2.3   Core: Improved multi-threading

Our development team has optimised SCANTRA's multi-threading engine which yields in better response, greater stability and shorter runtimes. Tests on projects with combined use of plane detection and matching were ~2-times faster than in SCANTRA 3.1.

2.4   Core: Transactions Thread

All information that is generated in SCANTRA is added to a project database (*.scdb). Since heavy data traffic for instance during plane matching can slow down the reaction of the graphical user interface (GUI), we have added a transaction thread that manages all writing operations into the database separately.

2.5   Graphic: Focus at superior control points

Focussing on local control points from e.g. the point identity browser has always been supported. However, it was not possible to focus on superior control points due to technical reasons. This functionality is now implemented.

2.6   Graphic: Improved colouring in sectional views

In some cases, the contrast of sectional views was poor which made it tricky to assess the current registration. Thus, we have developed a new algorithm that ensures high colour contrast, regardless how many stations are displayed.

2.7   Graphic: Open single sectional view

Opening sectional views require at least the selection of at least two stations in the graphics. We have implemented a quicker way of access when single relations are of interest. Therefore, only the relation needs to be selected plus clicking CTRL + i.

2.8   Graphic: Updating sectional views

Until now sectional views were static, meaning that they always depicted the current status of a network. Since every block adjustment typically contains some changes that yield in differences of the underlying geometry, a new function has been added that allows to update the superimposed sectional view. It can be enabled in any sectional view panel. The current sectional view that is transferred to the graphics window is highlighted by an asterisk next to the view's identifier. Another new functionality allows switching between several sectional views.
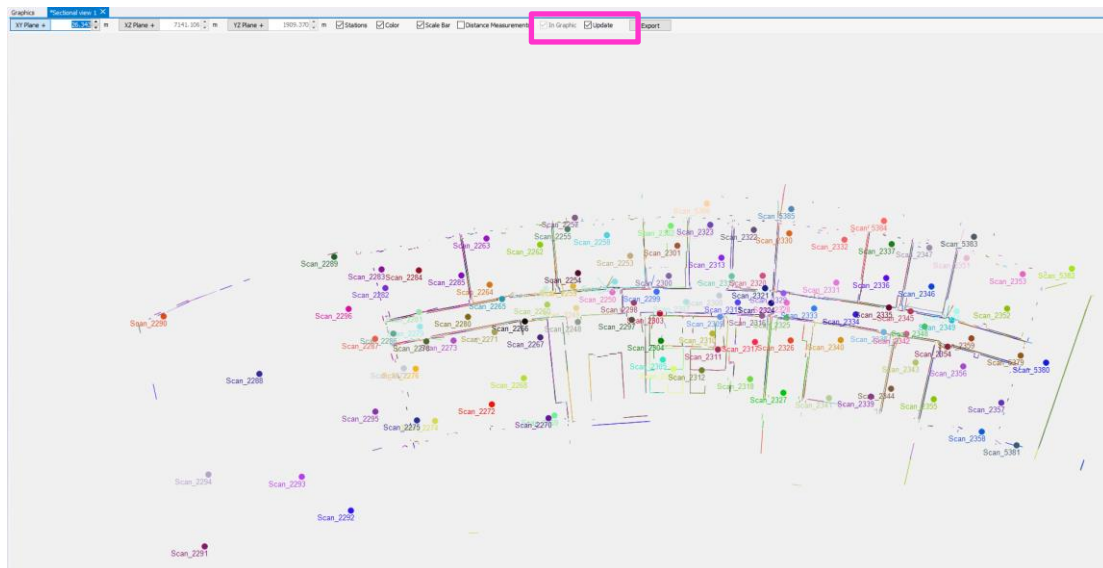

Figure 6: Updating option in the sectional view window

2.9   Import/Export: LupoScan

Lupos3D has overworked their library. Hence, we have added the latest library for LupoScan to Scantra.

2.10   Import/Export: PointCab Origins 4.1

PointCab has recently introduced PointCab 4.1. Hence, we have updated the corresponding interface.

2.11   Magnifier: Contrast enhancement

While it is possible to enhance the contrast of generated bitmaps, this functionality has not been supported by the magnifier in SCANTRA 3.1. This function is now implemented.

2.12   Settings: Default single point accuracies < 1 mm

Individual point accuracies can be imported to SCANTRA ever since. Yet, if this information is not given, then global accuracies can be assigned to points in the settings which was restricted to a minimum of 1 mm. Since control points in industrial environments are quite often observed by laser trackers, we now support global point accuracy settings of up to 0.1 mm.

3   Bugfixes

3.1   Bitmap/Matchmaker: Failed digitisation in detail scans

When working with detail scans SCANTRA produced false images that consequently could not be used for e.g., the detection of checkerboard targets. This issue has been fixed.

3.2   Bitmap/Matchmaker: False error message when digitising points

In some cases a false error message occurred that did not allow to create a new point. This issue has been fixed.

3.3   Bitmap/Matchmaker: Magnifier opened at wrong positions

Once a user performed a right-click to open the magnifier, the tool opened at an entirely different position. This issue has been fixed.

3.4   Block adjustment: Access violation when sorting in the blunder detection window

If a user carried out the blunder detection and tried to sort observations by type, then an access violation occurred. This issue has been fixed.

3.5   Block adjustment: Default setting for vertical axes disabled

The default setting for vertical axes (enabled) has been mistakenly switched off when creating a new project. This issue has been fixed.

3.6   Block adjustment: Minimum configuration with two control points plus inclinometer readings

SCANTRA was picky with very slim survey configurations such as having only two control points and inclinometer readings to transform a given scanning network. This survey configuration is now supported.

3.7   Data browsers: Creating, renaming and deleting a reference frames

In rare cases it was neither possible to create, rename or delete a reference frame. In all cases an access violation occurred. This bug was fixed.

3.8   Data browsers: Use of the #-operator in the filter function

An error occurred if a user tried to use the #-operator in the filter function. This error has been fixed.

3.9   Detection: Double detection after double click

If a user mistakenly double clicked on the detection symbol, the detection process was consequently carried out twice. This behaviour has now been prevented.

3.10 Graphics: "Jumping" stations after shifting

If a user shifted pre-oriented stations with, let's say UTM coordinates, in the graphics window then the station virtually jumped into a position very far away from the designated location. The reason was an incomplete coordinate reduction. This issue has been fixed.

3.11 Graphics: Trying to access moved or deleted databases

In case that a database was either moved or deleted and a user tried to access it via the *last recent project* button, simply nothing happened. Since this can be quite irritating, we have added a message that informs the user about the existing problem.

3.12 Graphics: Updating the graphics window after deleting entities

There were inconsistencies in the graphics (processing vs. results mode) when objects were deleted from the data browsers. This issue has now been fixed.

3.13 Import / Export: Exports /Updates registration parameters

The dialogue under *exports /updates registration parameters* requires setting an export path respectively a path under which the scans of interest are located. If this path is invalid simply nothing happened. A message has been added that informs the user once this issue occurs.

3.14 Import / Export: LupoScan point import

If a user has opened a ref file from LupoScan, SCANTRA blocked access to this file during an existing session. Consequently, it was not possible to make changes to a file. This issue has been fixed.

3.15 Matchmaker: Empty magnifier

In some cases, the magnifier displayed nothing. This issue has been fixed.

3.16 Matchmaker: Selection in graphics window was not considered.

If the Matchmaker was started from *Network design -> Generate adjacencies* a selection of a relation in the graphics window was not considered. This issue has been fixed.

3.17 Reference frame: Adjustment failed

In some specific cases, the block adjustment failed when a reference frame was used as a reference frame. This bug has been fixed.

End of file